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ESTUDIO FLORISTICO DEL FITOPLANCTON DEL LAGO ZIRAHUEN, MICHOACAN MEXICO.

A.Catalina Mendoza-González
Laura Huerta Múzquiz *
Celia Flores Granados
Laboratorio de Ficología
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional 11340
México, D.F.
*Becario de COFAA

Los lagos se pueden considerar como ambientes lénticos muy importantes para algunos asentamientos humanos, debido no sólo al suministro de agua sino también a las diversas formas de vida que se desarrollan en sus aguas, una de las cuales son las algas que forman el fitoplancton y dan la productividad primaria siendo ésta la base de las cadenas alimenticias que llegan hasta el hombre, en Michoacán existen cuatro lagos que son: Cuitzeo, Pátzcuaro, Zirahuén y parte de Chapala. De ellos Zirahuén, es considerado el más joven debido a sus aguas limpias, azules, transparentes y más profundas.

Este lago se encuentra en el municipio de Villa Escalante entre las coordenadas geográficas 19°25" 17" y 19°27'19'' de latitud Norte y 101°41'32'' y 101°44'' 10'' de Longitud Oeste,(Fig. 1) a una altitud de 2080 m.s.n.m.

El lago es una cuenca cerrada con una superficie aproximada de 985 Ha el cual recibe agua únicamente por el escurrimiento de arroyos temporales y unos pequeños manantiales internos que hay en el borde noreste. Tiene una longitud máxima SE-NW de 4.5 km y ancho máximo de 4.1 km la profundidad media estimada es de 18.4 m y la profundidad máxima de 35 m. (Fig. 2)

El clima del área según la clasificación de Koppen, modificada por E. García (1973) es C(WZ) b (e) g, el más húmedo de los templados subhúmedos con lluvias en verano, extremoso con oscilación térmica de 7-14°C y con una precipitación pluvial que vá desde 0.0 mm en marzo hasta 350.2 mm en julio, encontrándose dentro de la isoterma de 18°C.

Las muestras fueron obtenidas estacionalmente durante 1978 y 1979, por medio de arrastres superficiales haciendo un recorrido como se muestra en el mapa 2 , a 3,5 y 14 m de profundidad. Dichas muestras se fijaron en formol al 4 %, para su posterior identificación en el laboratorio de Ficología de la ENCB, para ésto se utilizó bibliografía de diversos autores como son: De Buen (1943), Osorio Tafall (1941), Prescott (1962), Smith (1920 y 1924), Tiffany & Britton (1952), Whitford & Schumacher (1973) y Bourrelly (1966, 1969 y 1970). Se empleó el método de Edmondson (1969) para obtener la abundancia relativa calculando los porcientos de las especies de cada estación del año.

En el cuadro 1 se puede observar el total de especies encontradas así como la abundancia relativa de cada una de ellas en porciento para las cuatro épocas del año.

En la primavera se encontraron 73 especies y con respecto a su abundancia están primero Staurastrum paradoxum, St. limneticum v. cornutum, Closterium aciculare y St. furcigerum; después se encontraban Ceratium hirundinella, Gloeocystis ampla, G. planctonica, Botryococcus braunii entre otras y algunas de las especies raras son; Nephrocytium agardhianum, N. lunatum, Arthrodesmus maximus, A. convergens, Quadrigula lacustris y Rhizochrysis limnetica.

Durante el verano se localizaron 61 especies y la mas abundante es Peridinium bipes y le siguen en abundancia Gloeocystis vesiculosa, Staurastrum leptocladum, St. paradoxum, St. contortum, Chlorella vulgaris y Closterium aciculare después de éstas especies se encuentran St. johnsonii var. bifurcatum, Microcystis incerta, Gloeocystis ampla, Crucigenia irregularis y Botryococcus protuberans, entre las especies raras están; Botryococcus braunii, Euglena, Micrasterias radiata var. dichotoma, Palmella mucosa y Onychonema laeve entre otras.

En el Otoño se registraron 44 especies, las más abundantes fueron: Gloeocystis ampla, Staurastrum leptocladum, St. paradoxum, Closterium aciculare, St. limneticum var. cornutum, le siguen en importancia St. johnsonii var. bifurcatum, Coelastrum microporum, Chroococcus minimus, St. furcigerum y las 23 restantes se encuentran en forma muy escasa por ej. Melosira italica var. tenuissima, Micrasterias radiosa, Microcystis incerta, etc.

En Invierno encontramos 31 especies de las cuales la más abundante fué Closterium aciculare, le sigue en importancia Chlamydomonas globosa, Chroococcus minimus, Botryococcus braunii y las restantes son muy escasas como: Staurastrum paradoxum, St. leptocladum, St. furcigerum, Coelastrum microporum, Ceratium hirundinella, Palmella mucosa, Hyalotheca mucosa, etc.

Como podemos ver en el cuadro 2 de los porcentajes obtenidos que incluyen el total de especies durante el año se observa que el grupo mejor representado es el de Chlorophycophyta con 54 % y dentro de éstas las Zygophyceae son las más importantes tanto en número de especies como en abundancia y frecuencia.

Chrysophycophyta tiene 29 % y de éstas las más importantes son las Bacillariophyceae con 22 %.

Xantophyceae se encuentra con 4 %, Ophyocytium majus y 3 especies de Botryococcus que son frecuentes todo el año.

Chrysophyceae tiene 3 % y de éstas la especies Rhizochrysis limnetica es frecuente todo el año y en otoño aumenta considerablemente su cantidad.

Pyrrophycophyta está en un 7 % de las cuales Dinophyceae tiene 5 % y la especie Peridinium bipes es frecuente todo el año y abunda en verano.

Euglenophyceae fué la menos representada de toda la flora yá que sólo se encontraron a Euglena acus y Trachelomonas hispida en forma escasa.

Cyanophyta está en 10 % y de éste grupo Chroococcus minimus es abundante y las demás especies son escasas.

Encontramos un total de 100 especies durante todos los muestreos de las cuales 73 fueron registradas en Primavera, 61 en Verano, 44 - en Otoño y 31 en Invierno. De éstos datos se observa que en invierno hubo menos especies presentes y en primavera el fitoplancton se en-- cuentra mas diverso que en las demás estaciones del año.

Las especies mas abundantes en cada estación del año fueron; en - primavera, Staurastrum paradoxum con 34 % en verano Peridinium bipes con 23.19 %, en otoño Gloeocystis ampla con 20 .9 % y en invierno - las especies que se encontraron fueron muy escasas y sólo está bien representada Closterium aciculare con 91 %

Durante el estudio se identificó un total de 100 especies fito--- planctónicas, por lo que consideramos que el lago Zirahuén presenta una gran diversidad.

Cuadro 1

CYANOPHYTA	P	V	O	I
Anabaena sp.	*	*		
Aphanocapsa elachista W. & W.		*	*	
Chroococcus minimus (Keissl.) Lemm.	-	3.25	3.7	1.8
Dactylococcopsis acicularis Lemm.	-			
Lyngbya major Meneghini	-			
Merismopedia punctata Meyen	-	*	*	*
Microcystis incerta Lemm.	*	4.44	*	
Oscillatoria limnetica Lemm.	-			
O. prolifica (Grev.) Gom.	*			
Rivularia sp.		*	*	
CHRYSOPHYTA				
Botryococcus braunii Kutz.	2	*	-	1.2
B. protuberans v. minor G.M.Smith	-	3.25	*	
B. sudeticus Lemm.	*		*	
Cyclotella bodanica Eulenstein	*			
C. kuetzinghiana Twaites			*	
C. meneghiniana Kutz.	*	*		
Cymbella turgida Grégory		*		
C. sp.	-	*		
Ephitemia sorex Kutz.	-	*		
E. turgida (Ehr.) Kutz.	-			
E. zebra (Ehr.) Kutz.	*	*		
Fragilaria sp.	*			
Gomphonema acuminatum Ehr.	-			
G. olivaceum (Lyngb.) Kutz.	*			
Gyrosigma acuminata (Kutz.) Cleve		*		
Mallomonas acaroides Perty		*	-	-

Melosira italica v. tenuissima (Grun.) Mull.		*	-	-
Navicula platystoma Ehr.	*			
N. sp.	-		*	*
Ophyocytium majus Naegeli	-	*	*	*
Pinnularia nobilis Ehr.	-			
Rhizochrysis limnetica G.M.Smith	-	*	1.1	*
Stauroneis p'oenicentrum (Witzch) Ehr.	*			
Stephanodiscus sp.	*	*	-	
Synedra acus Kutz.	*			
S. rumpens Kutz.	*			
S. ulna (Nitzsch) Ehr.	*		*	*
Synura uvella Ehr.	*	*	*	
Terpsinoe musicae Ehr.	*		*	
PYRROPHYTA				
Ceratium hirundinella Muller Schrank	3.04	*	-	-
Dinophycis caudata Seville-Kent	-	*		
Euglena acus Ehr.		*		
Gonyaulax sp.	*			
Peridinium bipes tein	-	23.19	*	-
P. claudicans Paulsen	-	*		*
Trachelomonas hispida (Perty) Stein	*			
CHLOROPHYTA				
Arthrodesmus convergens Ehr.	-			
A. maximus Borge	-			
Bulbochaete sp.		*		
Closterium aciculare T.West	13.04	4.73	9.9	91
C. Kutzingii De Brébisson		*		*
Coelastrum microporum Naegeli	-	1.33	4.2	-
C. reticulatum (Dangeard) Senn.	-			
Cosmarium contractum Kirchner			*	
C. dentatum f.spinosum Scott & Gronbl.	*			
C. pseudoconnatum v. pluriradians Nordtedt		*		
Crucigenia irregularis Wille	*	4.04		
Chlamydomonas globosa Snow.		1.57	*	1.8
Chlorella vulgaris Beyerinck	-	6.12	-	-
Desmidium elegans (Racib.) Gronb.			*	
D. schwartzii C.A.Agardh			*	
Euastrum glaziovii Borgesen	*	*		
Gloeocystis ampla Kutzing	3.3	4.14	20.9	-
G. vesiculosa Nageli	1.6	9.37		*
G. planctonica (W.& G.S.W.) Lemm.	*	*		
Haematococcus lacustris (Girod) Rostaf.			*	
Hyalotheca mucosa (Mertens) Ehr.	*	*		*
Kirchneriella obesa (W. & W) Schmidle			*	-
Micrasterias laticeps Nordstedt	*		*	

Micrasterias radiata v. dichotoma (Wolle) Cushm.		*			*
M. radiosa Ralfs				*	
Mougeotia sp.		*			
Nephrocytium agardhianum Nageli	-	*		*	
N. lunatum W.West	*				
Oedogonium sp.	*	*			
Onychonema laeve Nordstedt		*			
Oocystis naegeli A.Braun	*	*			
Palmella mucosa Kutzing	*	*			*
Pandorina morum Bory				*	*
Pediastrum boryanum (Turp.) Meneghini	*	*			
P. duplex Meyen		*			
P. duplex var. clathratum (A.Braun) Lagerh.	-	*		*	
P. simplex v. duodenarium (Bailey) Rabenh.				*	
Pleurotaenium trabecula (Ehr.) Nageli				*	
Quadrigula lacustris (Chodat) G.M. Smith	-	1.24		1.6	*
Spirogyra sp.	*				
Staurastrum arachne Rafls	*				
St. contortum G.M. Smith	*	7.10		*	-
St. ellipticum West	-	*			
St. furcigerum De Brébisson	8.6	*		2.7	-
St. johnsonii v. bifurcatum W & W.	4.13	4.54		4.8	-
St. leptocladum Nordstedt	6.1	8.09		16.4	-
St. limneticum v. cornutum G.M. Smith	34	5.72		11.4	-
Ulothrix zonata (Weber & Mohr) Kutz.	*				
Xanthidium antilopeum f.breviaculeatum (Scott.-Gronbl.)	*				
X. cristatum v. pustulatum Scott-Gronbl.	*	*			
Zygnema sp.	*				

Simbología: escasa = -, rara = *, los números están en %.

Cuadro 2

PHYLUM			ORD.	FAM.	GEN.	ESP.	%
CHLOROPHYTA	54	Chlorophyceae	5	11	17	23	23
		Zygophyceae	1	2	14	31	31
		Xantophyceae	1	2	2	4	4
CHRYSOPHYTA	29	Bacillariophyceae	2	7	13	22	22
		Chrysophyceae	2	3	3	3	3
PYRROPHYTA	7	Dinophyceae	2	4	4	5	5
		Euglenophyceae	1	1	2	2	2
CYANOPHYTA	10	Cyanophyceae	1	4	9	10	10
		TOTAL	15	34	64	100	100

NOTA: Hacemos patente nuestro agradecimiento al M. en C. R.Cortés A. por la donación de algunas muestras de fitoplancton.

BIBLIOGRAFIA CONSULTADA

De Buen, F., 1943 Los Lagos Michoacanos, Rev.Soc.Mex.Hist.Nat. IV (3-4): 211-232.

Bourrelly, P. 1966 Les Algues D'Eau Douce. Tome I Edit. N. Boubée, 511 pp. Paris.

_____ 1969. Les Algues D'Eau Douce. Tome II Edit. N. Boubée, 439 pp. Paris.

_____ 1970. Les Algues D'Eau Douce.Tome III Edit. N. Boubée, 512 pp. Paris.

Osorio Taffall, B.F., 1941, Materiales para el estudio del micro-- plancton del lago de Pátzcuaro (México). An.Esc.Nac. Cienc. Biol. II (2-3): 331-383 + lams. 28-33.

Prescott, G.W., 1962. Algae of the Western Great Lakes Area --- Britisch Co. Publisch. Iowa, U.S.A. XIII + 977 pp.

Smith, G.M. 1920. Phytoplankton of the Inland Lakes of Wisconsin - Part. I. Wis.Geol.Nat.Hist.Surv. 57 (13): 243 pp.

_____ 1924. Phytoplankton of the Inland Lakes of Wisconsin. - Part. II. Bol.Univ. Wisc. 1270 (1048): 227 pp.

Tiffany, L.H. & M.E.Britton. 1952 The Algae of Illinois. Univ. -- Chicago Press. XIV + 407 pp.

Whittford, L.A. & G.J. Schumacher. 1973. A Manual of Fresh Water Algae. Sparks Press N.C. U.S.A. 323 pp.

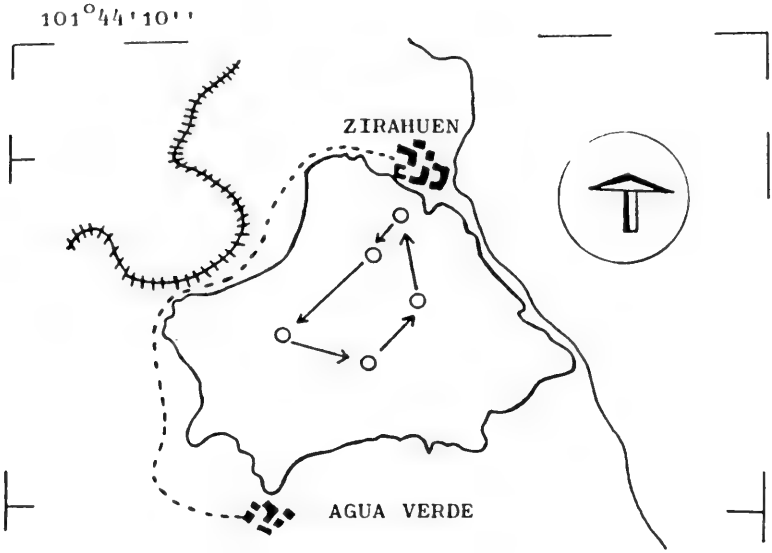
101°44'10''
ZIRAHUEN
AGUA VERDE

Fig.1

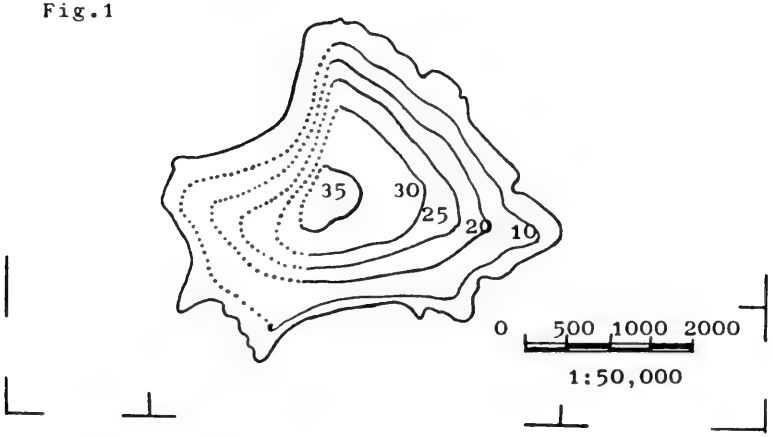
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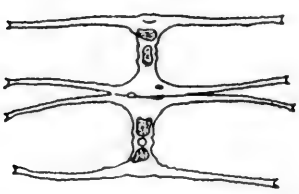
Fig.2



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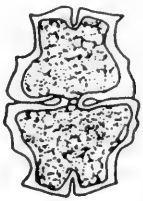

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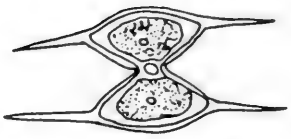

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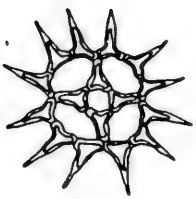

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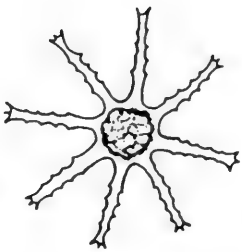

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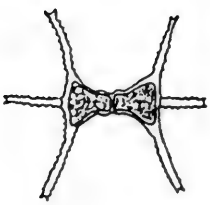

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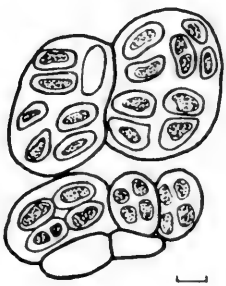

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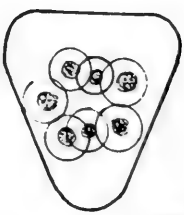


9 ⟵ 5µ

Algunas especies fitoplanctónicas del Lago Zirahuén

1.- Staurastrum leptocladum, 2.- Euastrum glaziovii, 3.- Arthrodesmus maximus, 4.- Pediastrum simplex, 5.- Kirchneriella obesa, 6.- Staurastrum limneticum var. cornutum, 7.- Staurastrum paradoxum, 8.- Crucigenia irregularis, 9.- Gloeocystis planctonica.

CONTRIBUCION AL CONOCIMIENTO DE LA FLORA MARINA BENTONICA DE LAS ISLAS SACRIFICIOS Y SANTIAGUILLO, VERACRUZ, MEXICO.

A. Catalina Mendoza-González
Luz Elena Mateo-Cid

Laboratorio de Ficología
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional 11340

Uno de los primeros estudios sobre algas realizados en el litoral de Veracruz fue el de J.Agardh (1847) el cual trabajó sobre material colectado por Liebman en 1846, Huerta (1960) estudia las islas Sacrificios y Enmedio así como Montepío y Tuxpan en su trabajo "Lista Preliminar de las Algas Marinas Bentónicas del estado de Veracruz", Humm y Hildebrand (1962) en su trabajo "Marine Algae from the Coast of Texas and Mexico" incluyen especies colectadas en esta región, Huerta y Garza (1964) hacen un estudio de la Barra de Tuxpam y los arrecifes La Blanquilla y Lobos; De la Campa (1965) en su trabajo "Notas preliminares sobre un reconocimiento de la Flora Marina de Veracruz" revisa la Isla Sacrificios, Tuxpam, Barra de Chachalacas y varias lagunas costeras, Sánchez-Rodríguez (1967) realizó un estudio en Montepío, cabe mencionar el trabajo de Taylor (1960) sobre las algas de las costas Tropicales y Subtropicales de América en donde menciona algunas especies para la zona, como se observa, la vegetación marina de este estado ha sido parcialmente estudiada, la mayoría de los trabajos conocidos no tienen continuidad y aunque se conoce parte de la flora ficológica aún faltan más estudios para el litoral y las islas del estado. En general la zona costera y las islas son variadas y se pueden encontrar diferentes tipos de sustratos desde el francamente limoso que carece casí totalmente de algas marinas hasta los ambientes caracterizados por arrecifes coralinos cuya flora es muy notable y sobre estos últimos se basa el presente trabajo.

Isla Sacrificios e Isla Santiaguillo son parte de los arrecifes coralinos de Veracruz, la primera de ellas se localiza a los 19°10' 27" N y 96°05' 31" W está a 1 milla al NE de Punta Mocambo tiene una superficie de 0.37 Km^2 la vegetación insular está constituida por Duna Costera (DETENAL 1984); es de tipo coralino con praderas de Thallassia y fondo arenoso, entre la arena hay escasos guijarros a medida que se aproxima al nivel infralitoral el sustrato es rocoso y con guijarros, en éste lugar se colectó en las zonas infralitoral e infralitoral superior y en el muelle en febrero de 1983. La segunda se encuentra a los 19°09' 32" N y 95°48' 27" NE tiene 2.43 m de alto y 400 m de longitud está a 11 millas al NE de Punta Coyol, ésta isla es de tipo coralino desprovista de vegetación terrestre, la mayor parte de ella tiene sustrato de tipo pedregoso constituido por guijarros y fragmentos de coral principalmente Porites porites con escasa arena; las rompientes son de grandes rocas y corales como Acropora palmata y A. cervicornis en este lugar se colectó en las zonas infralitoral superior e infralitoral en mayo de 1984. Mapa 1.

Según Taylor(1960), la flora marina del Golfo de México es tropical el ambiente está influenciado por las corrientes que vienen del Ecuador, que pasan por el caribe y entran al golfo por el canal de Yucatán, todo el golfo está bañado por corrientes cálidas y la flora es tipicamente tropical.

Las islas presentan un clima cálido-húmedo con lluvias en verano correspondiente al $A(W_2'')(W)(i)$ Koeppen modificado por E.García (1973).

En el cuadro 1 se muestran los resultados obtenidos y observamos que el grupo mejor representado es el de Rhodophyta con 38 especies, le siguen en importancia Chromophyta con 30, Chlorophyta con 18 y Cyanophyta con 9 especies.

En isla Santiaguillo en la zona infralitoral en el lado barlovento sobre los guijarros y fragmentos de coral se desarrollan principalmente especies de la familia Gelidiaceae como Gelidium, Pterocladia y calcáreas costrosas como Porolithon y Lithophyllum las cuales son las más abundantes en esa zona. Así mismo en los guijarros donde se depósita el limo y en otras algas de ese nivel se encontraron numerosas diatomeas bentónicas como: Cocconeis, Lic mophora, Melosira, Nitzchia, Pleurosigma, etc. las cuales también se hallaban epifitas o asociadas a diferentes algas como Herposiphonia, Sphacelaria, Wrangelia, etc.

Avanzando hacia la rompiente en el infralitoral e infralitoral superior abundan Ceramium nitens el cual forma prados y hay ejemplares hasta de 25 cm de alto; en éste mismo lugar existe una asociación de las más importantes y conspicuas entre Amphiroa rigida, V. antillana, Jania adherens y Laurencia nana, estas 3 especies tapizan el lugar y sirven además como sustrato a otras algas así mismo son formadoras de suelo(excepto Laurencia) junto con Halimeda opuntia la cual es la más abundante en todo el lugar y forma prados encontrandose en todos los niveles.

En la rompiente donde están las rocas y en los corales ya muertos encontramos principalmente Bryopsis, Wrangelia y Halimeda, cabe mencionar que la topografía del lugar presenta numerosas oquedades y hoyos profundos y muy irregular y accidentada.

Las cianofíceas prosperan sobre otras algas o forman masas flotantes en todo el lugar siendo abundantes.

Las clorofíceas se desarrollan como epifitas, sobre unicel, sobre guijarros o asociadas a otras algas y el número y abundancia no es grande.

La flora es tipica de lugares pedregosos expuestos a protegidos y de zonas tropicales.

En la Isla Sacrificios encontramos Playas arenosas que en el nivel infralitoral superior presentan prados de diversas algas que son; varias especies de Caulerpa, Cymopolia barbata, Halimeda discoidea, H. opuntia, Ulva lactuca, Enteromorpha compressa, etc., sobre guijarros a Sphacelaria tribuloides, Amphiroa fragilissima, A. rigida v. antillana, etc., en el mismo nivel encontramos praderas de Thalassia testudinum que forma un ambiente semiprotegido para diversas algas que crecen entre ella ó como sus epífitas y son: Dictyota —

bartayresii, Dictyopteris delicatula, Galaxaura lapidescens, Polysiphonia gorgoniae, Eudesme zosterae, Giffordia mitchelliae, Champia parvula, Cocconeis placentula, Fosliella farinosa, etc., avanzando hacia el nivel infralitoral entre los corales ó sobre ellos y guijarros encontramos, Galaxaura squalida, Ceramium nitens, Laurencia obtusa, etc.

En ambas islas observamos que parte del sustrato está constituido por corales, principalmente Acropora palmata, A. cervicornis y Porites porites, guijarros y rocas. En Santiaguillo los corales estan muy fragmentados y constituyen una porción importante del sustrato además hay guijarros con escasa cantidad de arena por lo que la vegetación difiere un poco con el que encontramos en la época que se colectó en Sacrificios, como ejemplo tenemos a las Chlorophyceae, pues mientras que Isla Sacrificios posee un habitat ideal para las especies psamófilas como Ripochephalus y varias especies de Caulerpa así como Neomeris, Cymopolia, Acetabularia que se desarrollan en guijarros entre la arena , en Santiaguillo el tipo de sustrato no favorece mucho el desarrollo de estas especies, también se observó que solo Isla Sacrificios presenta pastos marinos,Ceibadal, sobre las cuales prosperan comunidades interesantes.

De acuerdo a los datos obtenidos la ficoflora es característica de zonas tropicales y aunque la revisión no fue exahustiva ni estacional vemos que la flora es muy interesante y probablemente la zona de arrecifes sea de las más ricas en flora del Edo. de Veracruz.

BIBLIOGRAFIA

Boergesen, F. 1913-1920. The Marine Algae of the Danish West Rep. as. Vol. 1 (1), Chlorophyceae pp 4+1-158, figs. 1-126; Vol. (2) Phaeophyceae, pp.6 + 159-228, figs. 127-170, 1913-1914 Vol. 2. Rhodophyceae, pp. 2+1-504, figs. 1-435 + map. 1915-1920. Copenhagen.

Campa de Guzmán S. de la. 1965 "Notas Preliminares sobre un reconocimiento de la Flora Marina del Edo. de Veracruz "An. Inst. Nac. Inv. Biol. Pesq. 1:7-49

Cupp, E.E. 1943. Marine Plankton diatoms of the West Coast of North América University of Cal.Press. Berkeley,Cal. 237+5pl.

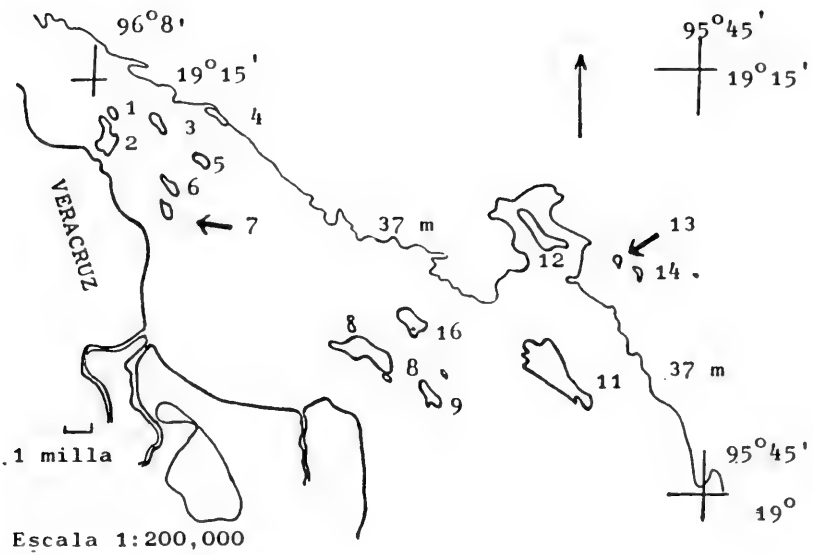
Huerta,M.L. 1962. Lista Preliminar de las Algas Marinas del Litoral del Estado de Veracruz. Bol.Soc.Bot.Mex. 25:39-45.

Humm.H.J. and Wicks S.R. 1980. Introduction and Guide to The Marine Bluegreen algae A.Wiley-Interscience Publ. John Wiley and Sons U.S.A. 194 pp.

Joly, A.B. 1965. Flora Marinha do Litoral Norte Estado de Sao Paulo e regioes circunvizinhas Bolm. Fac.Filos.Cienc.Univ. S. Paulo Sér.Bot. 21. Sao Paulo: 1-393,pl.1-69+4 mapas.

Oliveira Filho, E.C. 1969 Algas Marinhas do sul do estado do Espiritu Santo (Brasil) 1.Ceramiales. Bolm.Fac.Filos.Cienc. Univ.S.Paulo,ser bot. 26 Sao Paulo:1-277,pl.A-D.1-29 1 mapa.

Taylor, W.R. 1960 Marine Algae of The Eastern Tropical and Subtropical Coast of The Americas. Univ. of Mich. Press. Ann. Harbor Mich. 870+70 lams.



Mapa 1. Localización de los arrecifes cercanos a Veracruz y el área de estudio.

1. A. Galleguilla, 2.A. Gallega, 3.A. Blanquilla, 4.A.Anegada de adentro, 5. I.Verde, 6. A.Pájaros, 7. I.Sacrificios 8. A.Chopas; 9. A.Rizo, 10.A e I. de Enmedio, 11.A. Cabezo. 12.A.Anegada de afuera. 13. A. Santiaguillo, 14.A. Anegacilla.

CUADRO 1

		ISLA SACRIF.	ISLA SANTIAG.	PISO	FACIES	MODO	ESTADO	HABITAT	ASOCIADA A
	CYANOPHYTA								
1	Anacystis dimidiata(Kütz)Drouet&Daily		+	Is	A	P	As	psa	
2	Calothrix crustacea Schous.&Thuret	+	+	Is	Pe	P	H	epf s/78,80	6,8
3	Coccochloris stagnina(Drouet)Daily		+	Is	R,Pe	P,E	As	epl s/g	53,61
4	Microcoleus lyngbyaceus(Kütz)Crouan	+	+	Is	Pe,A	P,E	O	f,s/g,epf s/ 79,81,82	2,8,76
5	Oscillatoria lutea C.Agardh		+	Is	Pe	E	O	s/g	52,76
6	Schizothrix arenaria(Berkeley)Gom.		+	Is	-	P	O	epf s/82	
7	S. mexicana Gomont		+	Is	Pe	P	O	epf s/81	2,5
8	Spirulina subsalsa Oerstedt		+	Is	-	P	O	epf s/81	2,8
9	Entophysalis deusta Drouet & Daily		+	Is	Pe	P	O	epf s/81	2,6,8
	CHLOROPHYTA								
10	Acetabularia polyphysoides Crouan	+		Is	Pe	P	G	s/g	24
11	Bryopsis hypnoides Lamouroux		+	I	R	SE	O	epl	95
12	Caulerpa cupressoides (West)C.Ag.	+		Is	A	P	O	psa	
13	C. racemosa(Förss.)J.Ag. v.macrophysa (Kütz)Taylor		+	Is	A,Pe	SE	O	psa,s/g	38
14	C.racemosa v.uvifera(Turner)Weber van Bosse	+		Is	A	P	O	psa	
15	C,sertularioides f.brevipes (J.Ag.) Svedelius	+		Is	A	P	O	psa	
16	C.vickersiae Börg.v.luxurians Taylor		+	Is	Pe,A	SE	O	psa,s/g	35,36
17	Cladophoropsis membranacea(C.Ag.)Börg.		+	Is	Pe	E	O	s/g	
18	Cymopolia barbata (L.) Lam.	+		Is	A	P	O	psa	
19	Derbesia marina (Lyngbye)Kjell.		+	Is	-	P	G	s/unicel	94
20	Dictyosphaeria cavernosa(Forss.)Borg.	+		Is	R	P	O	epl	
21	Enteromorpha compressa (L.) Grev.	+		Is	R	E	O	epl	
22	Halimeda discoidea Decaisne	+		Is	A	P	O	psa	
23	H.opuntia (L.)Lamouroux	+	+	Is	A,Pe,R	P	O	epl,psa,s/g	
24	Neomeris annulata Dickie	+		Is	Pe	P	G	s/g	10

25	**Rhipocephalus phoenix**(Ellis &Sol)Kütz	+		Is	A	P	O	psa	
26	Ulva lactuca Linnaeus	+	+	Is	P	E	O	s/g	
27	Valonia ventricosa J.Ag.	+	+	Is	R	P	O	epl	
	CHROMOPHYTA								
28	Amphora coffeaeoformis Ag.		+	Is	Pe	SE	O	s/g	41,47, 52,53
29	Asterionella kariana Grunow		+	Is	Pe	SE	O	s/g	41,48,52, 53,55
30	Biddulphia aurita(Lyng.)Breb.& God.		+	Is	Pe	SE	O	s/g	41,47,54,
31	B.pulchella Gray		+	Is	Pe	SE	O	s/g	76
32	Cerataulina bergonii H.Peragallo		+	Is	Pe	SE	O	s/g	95
33	Cocconeis placentula Ehrenberg	+	+	Is	L	P	O	epf,s/Th s/l	40,41,44
34	Colpomenia sinuosa(Roth)Derb.& Sol.		+	Is	-	P	O	epf s/35, 46	
35	Dilophus guineensis(Kutz)J.Ag.		+	Is	Pe	P	O	s/g	46
36	Dictyota bartayresii Lamouroux	+		Is	Pe	P	♀	s/g	
37	D. divaricata Lamouroux		+	Is	Pe	P	♂	s/g	38
38	Dictyopteris delicatula Lamouroux	+	+	Is	Pe	P	O	s/g	37
39	Eudesme zosterae(J.Ag.)Kylin	+		Is	-	P	g	epf s/Th	40
40	Giffordia mitchelliae(Harv.)Hamel	+		Is	Pe	P	g	epf s/Th, s/g	33,39,41, 44
41	Licmophora abbreviata Ag.		+	Is	Pe	SE	O	s/g	28,52,53
42	L. flabellata (Carm.)Ag.	+	+	Is	Pe,L	P,SE	O	epf s/Th, s/l,s/g	33,40,44 36
43	Melosira moniliformis(Müll.)Ag.		+	Is	-	SE	As	epf s/71	
44	Nitzchia closterium(Ehr.)W.Sm.	+		Is	Pe,L	P	O	s/g,s/l	33,40,42
45	N. longissima (Breb.)Ralfs		+	Is	Pe	SE	O	s/g	95
46	Padina vickersiae Hovt		+	Is	Pe	SE	♀	s/g	35,63
47	P. gymnospora(Kütz) Vickers	+		Is	Pe	SE	♀	s/g	53
48	Pleurosigma elongatum W.Sm.		+	Is	Pe	SE	o	s/g	52,53
49	P.normanii Ralfs		+	Is	Pe	P	O	s/g	76,61
50	Rhizosolenia delicatula Cleve		+	Is	Pe	SE	O	s/g	95

51	Spatoglossum schroederi(Mertens)Kütz		+	Is	Pe	P	O	s/g	
52	Sphacelaria furcigera Kützing		+	Is	Pe	P	As	s/g	28,29,41 47,53
53	S. tribuloides Meneghini	+	+	Is	R,Pe	P,E	As	epl,s/g	28,29,41, 47,52,54,
54	Striatella unipunctata(Lyng.)Ag.		+	Is	Pe	P	O	s/g	28,29,41, 47,52,53
55	Surirella fastuosa v.recendens(A.Schm.) Cleve		+	Is	Pe	P	O	s/g	29,47,52, 53,54
56	S.ovalis Brebisson		+	Is	Pe	P	O	s/g	61,76
57	Tropidoneis antartica v.polyplasta Grant & Angst.		+	Is	-	P	O	epf s/95	
	RHODOPHYTA								
58	Amphiroa fragilissima (L.)Lam		+	Is	Pe	SE	Ø	s/g	
59	A. rigida Lamouroux v.antillana Börg.	+	+	I,Is	Pe,R	SE,P	Ø	epl s/g	53,79,81
60	Asterocytis ramosa(Twaites)Gobi	+		Is	-	P	O	epf s/92	74,80
61	Centroceras clavulatum(C.Ag.)Mont.	+	+	Is	Pe,R	SE,P	O	epl s/g	30,41,56, 68,76
62	Ceramium gracillimum v.byssoideum (Harv.)Feldmann-Maz.	+	+	Is	-	P	Ø	epf s/77, 82	
63	C. nitens (C.Ag.)J.Ag.	+	+	I,Is	R,Pe	P	O	epl,s/g	46
64	Champia parvula(C.Ag.)Harvey	+		Is	-	P	Ø	epf s/Th	
65	Digenia simplex(Wulfen)C.Ag.	+		Is	Pe	P	Ø	s/g	
66	Erithrotrichia carnea(Dillw.)J.Ag.		+	Is	-	E	O	epf s/91	
67	Fosliella farinosa(Lam.)Howe	+	+	Is	-	P,SE	Ø	epf s/94 s/Th	64
68	Galaxaura lapidescens(Ellis&Sol.)Lam.	+	+	Is	Pe,R	P,SE	O	epl,s/g	61,77,94
69	G. squalida Kjellman	+	+	Is	Pe	P,SE	O	s/g	
70	Gelidium corneum (Hudson)Lam.		+	Is	Pe,R	E	Ø	s/g	
71	Gelidiella trinitatensis Taylor		+	Is	Pe	E	Ø	s/g	
72	Gigartina acicularis (Wulfen)Lam.		+	Is	Pe	SE	O	s/g	
73	Goniolithon accretum Foslie & Howe		+	Is	Pe	E	Ø	s/g	
74	Goniotrichum alsidii (Zan.)Howe	+		Is	-	P	O	epf s/92	60,80
75	Gracilaria cervicornis(Turner)J.Ag.	+		Is	R	P	Ø	epl	

76	Herposiphonia secunda (C.Ag.) Ambronn		+	Is	P	SE	Ø	s/g	31,42,49 56,61
77	Hypnea cervicornis J.Ag.	+		Is	R	P	O	epl	68
78	H. musciformis (Wulfen)Lam.	+		Is	Pe	P	Ø	s/g	87
79	Jania adherens Lamouroux		+	I	Pe	P	Ø	s/g	59,81
80	Kylinia crassipes (Börg.)Kylin	+		Is	-	P	O	epf s/92	60,74
81	Laurencia nana Howe		+	I	Pe	P	Ø	s/g	59,79
82	L.microcladia Kützing		+	I	Pe	P	♀	s/g	
83	L.obtusa (Hudson)Lam.	+	+	I	Pe,R	P	Ø	epl,s/g	85
84	L.papillosa(Forsskal)Grev.	+		Is	Pe,R	P	Ø	epl,s/g	
85	L.poitei (Lamouroux)Howe	+		Is	Pe,R	P	Ø	epl,s/g	83
86	Liagora ceranoides Lamouroux	+	+	Is	Pe	P,SE	♀	s/g	
87	L.farinosa Lamouroux	+		Is	Pe	P	♀	s/g	78
88	L.valida Harvey		+	Is	Pe	SE	♀	s/g	
89	Lithophyllum erosum Foslie		+	Is	Pe	E	Ø	s/g	
90	L.intermedium(Foslie)Foslie		+	Is	Pe	SE	Ø	s/g	
91	Ophydocladus herposiphonioides ? Joly & Yam.		+	Is	Pe	E	O	s/g	
92	Polysiphonia gorgoniae Harvey	+		Is	-	P	Ø	epf s/Th	67
93	Porolithon pachydermum (Foslie)Foslie		+	Is	Pe	E	Ø	s/g	
94	Pterocladia americana Taylor		+	Is	Pe	SE	Ø	s/g	68
95	Wrangelia argus Montagne		+	I,Is	R,Pe	E	Ø	epl,s/g	11,19,31, 45,50,57

SIMBOLOGIA

Presencia: + , Piso: Infralitoral superior Is, Infralitoral I; Facies: Arenosa A, Rocosa R, Pedregosa Pe, Limosa L; Modo; Protegido P, Expuesto E, Semiexpuesto SE; Estado: Vegetativo O, Tetrasporas Ø, Gametocistos Chlorophyta G, gametangios Phaeophyta g, Cistocarpos y carpogonios Rhodophyta y oogonios Phaeophyta ♀, Asexual As, Heterocistos H; Habitat: psamófila psa, epífita epf, epilítica epl, sobre guijarros s/g, Thallassia Th.

CONTRIBUCION AL ESTUDIO FLORISTICO FICOLOGICO DE LA COSTA OCCIDENTAL DE BAJA CALIFORNIA, MEXICO.

A.Catalina Mendoza-González
Luz Elena Mateo-Cid
Laboratorio de Ficología
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional 11340
México, D.F.

Las algas marinas, como todos los seres vivos, están expuestas a diferentes influencias de los factores ambientales tales como; luz, temperatura, exposición, salinidad, tipo de sustrato, movimiento del agua, etc. dando por resultado una zonación en la distribución de las algas que puede ser muy clara y marcada en algunas áreas o bien ser - espaciadas y no distintivas en otras. La península de Baja California con su extensa variación latitudinal y climática posee un ambiente marino muy diverso y las algas ocupan un lugar importante dentro del - gran potencial de recursos marinos de este lugar, algunas de ellas se encuentran en cantidades susceptibles de ser aprovechadas por el hombre y para utilizar racionalmente este recurso es necesario efectuar - diversos estudios de la sistemática y ecología de la ficoflora que - nos indiquen la presencia, distribución y abundancia de dicha flora - en Baja California.

Así mismo las condiciones ambientales son influenciadas por surgencias y aportes de aguas frías de la corriente de California que baña la costa pacífica de esta península lo cual favorece el desarrollo de una flora ficológica abundante y variada. Dawson (1944). El presente trabajo pretende contribuir al conocimiento de esta flora, por lo que con este objetivo se efectuaron muestreos en Ensenada B.C.N. y Bahía Tortugas B.C.S. durante octubre de 1982 y junio de 1983 respectivamente. Ensenada B.C.N. se encuentra en la parte norte de la Bahía - de Todos Santos, la cual se localiza entre los 31°43' y 31°54'N y entre los 116°36' y 116°43' W, el clima que predomina en este lugar es B S s K (e) seco, templado con verano cálido, con temperatura anual - entre 12 y 18°C la del mes más frío entre- 3 y 18°C y la del mes más caliente superior a 18°C, extremoso con oscilación entre 7 y 14°C; en esta zona se colectó haciendo un recorrido de la Escuela de Ciencias Marinas hasta Punta Morro, en el Muelle y Tres Hermanas; la mayor — parte de estas playas son rocosas, con numerosas pozas de marea de - modos expuestos y semiexpuestos en donde encontramos una flora variada y abundante, hay algunas playas arenosas muy áridas que no ofrecen un sustrato adecuado para la fijación de las algas ya que el oleaje es fuerte; también se observaron playas con cantos rodados y aún - cuando este sustrato es más susceptible de servir de base a las algas el fuerte movimiento del agua provoca una acción abrasiva que impide la fijación y crecimiento de ellas por lo que en estas playas las colectas de material fueron muy escasas, frente a Ensenada existen mantos de Macrocystis pyrifera los cuales son cosechados periodícamente

Bahía Tortugas B.C.S. se localiza entre los 27°43' y 27°54' N y - 114°59' y 115°55' W predominando el clima B W x'(S) h (e) muy seco, semicálido con verano fresco, temperatura media anual entre 18° y - 22°C la del mes más frío inferior a 18°C y la del mes más caliente - superior a 24°C. En esta localidad las playas rocosas tienen fuerte oleaje y numerosas pozas de marea como en Punta Eugenia, las playas de la Estación de Pesca y en los Morros que son formaciones rocosas aisladas y se encuentran frente a Bahía Tortugas éstos últimos no es tán habitados y sólo son utilizados por las personas del lugar como sitio de reunión cuando salen a bucear o pescar, ofrecen un sustrato adecuado para la fijación de las algas y constantemente hay arribazo nes de ellas por el fuerte movimiento del agua que las desprende de las cercanías; entre estos morros y las playas de Bahía Tortugas -- existen mantos de Macrocystis pyrifera que no son utilizados, abunda también Gelidium cartilagineum var. robustum el cual es cosechado y secado al sol para venderlo como materia prima. Mapa 1.

Con los datos obtenidos, se puede determinar que en ambas zonas - están mejor representadas las Rhodophyta con 99 especies, le siguen en importancia Chromophyta con 34 especies, Chlorophyta con 19 especies y las mas escasas fueron Cyanophyta con 13 especies, también es conveniente mencionar que dentro de las Rhodophyta las algas calcá-- reas de la familia Corallinaceae en sus formas costrosas y articuladas fueron las más notables en número de especies, la mayoría de -- ellas se presentó en fase reproductora con tetrasporas y son las más frecuentes en las diferentes zonas de colecta del nivel infralitoral superior y litoral. En el nivel infralitoral inferior las más características son las Phaeophyta cuyo desarrollo es exhuberante como -- por ejemplo: Egregia menziesii, Eisenia arborea, Halydris dioica, - Laminaria farlowii, Pelagophycus porra y Cystoseira osmundacea, algu nas llegan a formar mantos como los de Macrocystis pyrifera en Ensenada y Bahía Tortugas, rodoficeas como Gelidium cartilagineum var. - robustum crecen de manera muy abundante en el piso infralitoral infe rior frente a Bahía Tortugas. Por otro lado mencionaremos que de las 165 especies encontradas estan presentes 50 en ambas zonas, la flora encontrada para Ensenada está constituída por 102 especies, 59 de - ellas son Rhodophytas, 21 Chromophyta, 12 Chlorophyta y 10 Cyanophyta, en Bahía Tortugas encontramos 113 especies de las cuales 66 son Rhodophyta, 27 Chromophyta, 13 Chlorophyta y 7 Cyanophyta. La gráfica 1 muestra el total de las especies encontradas así como la cantidad que corresponde a cada grupo de algas en Ensenada y Bahía Tortugas. En el Cuadro 1 se observa la fenología de las especies.

La similitud de los datos obtenidos en porcentaje para las dos lo calidades puede ser debido a que la mayoría de los muestreos fueron efectuados en habitats similares de sustrato rocosos con numerosas - oquedades y pozas de marea en modos expuestos, semiexpuestos y eventualmente en modos protegidos; así como a los diversos factores --- ambientales con eventos de surgencias y corrientes que dan una gran - diversidad en la flora algal. Huerta, M. in Rzedowski (1978) menciona que en la Costa Occidental de Baja California la zona es templada y la mayor parte de la flora es común con California pues el agua es re lativamente fría casi todo el año y existen cuatro zonas de surgen-

cias de aguas profundas frias por lo que la vegetación es exhuberante y abundante y se vá volviendo más pobre y escasa a medida que se avanza hacia el sur",

Si consideramos que ambas localidades solo fuéron visitadas en una sola ocasión identificandose un total de 165 especies esto nos ratifica la riqueza florística de las costas de Baja California; como es bien sabido las diferentes especies encontradas presentan variaciones estacionales en presencia, distribución, abundancia y frecuencia por lo que es recomendable hacer estudios estacionales y de esta manera tener un conocimiento más preciso de la flora del lugar.

Bibliografía:

Abbot, I, and G.J. Hollenberg, 1976. Marine Algae of California -- Stanford Univ. Press. California, 1-827

Aguilar, R.L.E., 1982. Ocurrencia de Algas Cafés (Phaeophyta) en la Bahía Todos Santos, Baja California. Univ.Aut.de B.C. -- Cienc. Mar. (Méx.) 8 (2):24-34

Aguilar, R.M.A. 1982. Un Estudio Sobre las Algas Marinas Bentónicas de Baja California, México. Tesis Esc. Sup. de Cienc. Mar. U.A.B.C. 137 pag.ilus.

Aguilar, R.R., 1982. Identificación y Distribución de las Algas Marinas del Estero de Punta Banda, Baja California, México. -- Inst. de Inv. Ocean. Ens., Cienc. Mar. 8(1):78-87

Dawson, E.Y. 1953 a. Marine red algae of Pacific México. I. Bangiales to Corallinaceae subf. Corallinoideae. Allan Hancock Pacific Expeditions, 17:1-239. 33 pls.

_____. 1954 a. Marine red algae of Pacific México. II. Cryptonemiales (cont.). Allan Hancock Pacific Expeditions, 17:241-397. 44 pls.

_____. 1958. Notes on Pacific coast marine algae VII. Bull.So. Calif. Acad. Sci., 57:67-80. 5 pls.

_____. 1960. Marine red algae of Pacific Mexico. III. Cryptonemiales, Corallinaceae subf. Melobesioideae. Pacific Naturalist, 2(1):1-125. 50 pls.

_____. 1961 a. Marine red algae of Pacific Mexico, IV. Gigartinales. Ibid., 2(5): 191-341. 61 pls.

_____. 1962. Marine red algae of Pacific Mexico. VII. Ceramiales: Ceramiaceae, Delesseriaceae. Allan Hancock Pacific -- Expeditions, 26: 1-207. 50 pls.

_____. 1963 a. Marine red algae of Pacific Mexico. VI. Rhodymeniales. Nova Hedwigia, 5:437-76. 19 pls.

_____. 1963 b. Marine red algae of Pacific Mexico. VIII. -- Ceramiales. Dasyaceae, Rhodomelaceae. Ibid. 6:401-81. 46 -- pls.

Feldmann, J. 1937 Recherches sur la Végétation marine de la Mediterranée, La Cote des Alberes. Rev. Algol. 10, 1-339.

Hollenberg, G.J. 1961. Marine red algae of Pacific Mexico. V. The -- Genus Polysiphonia. Pacific Naturalist, 1(8):3-11. 5 pls.

Johansen, H.W. 1971 b. Bossiella, a genus of articulated corallines Rhodophyceae, Cryptonemiales) in The eastern Pacific. - Phycology 10:391-396

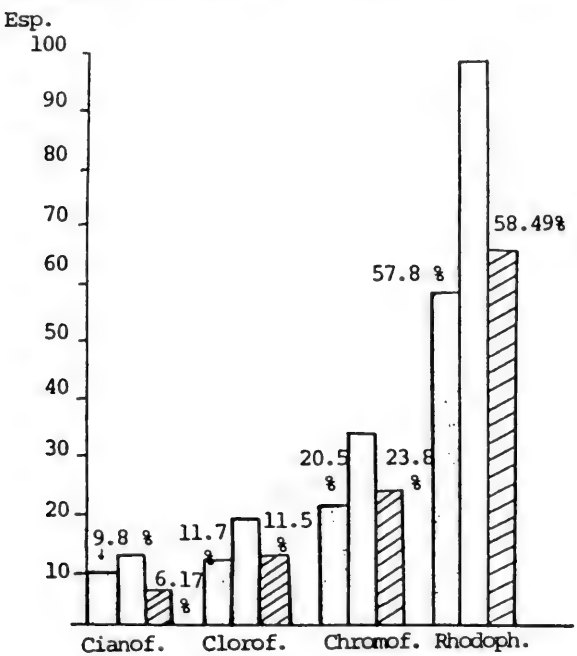
Setchell, W.A. and N.K. Gardner. 1919. The Marine Algae on the Pacific Calif. Public. in Bot. 8(1): 1-138. 8 pls.

_____. 1920 The Marine Algae of the Pacific Coast of North America. Part. II. Chlorophyceae Univ. of Calif. Public. in Bot. 8(2): 139-386. 9-33 pls.

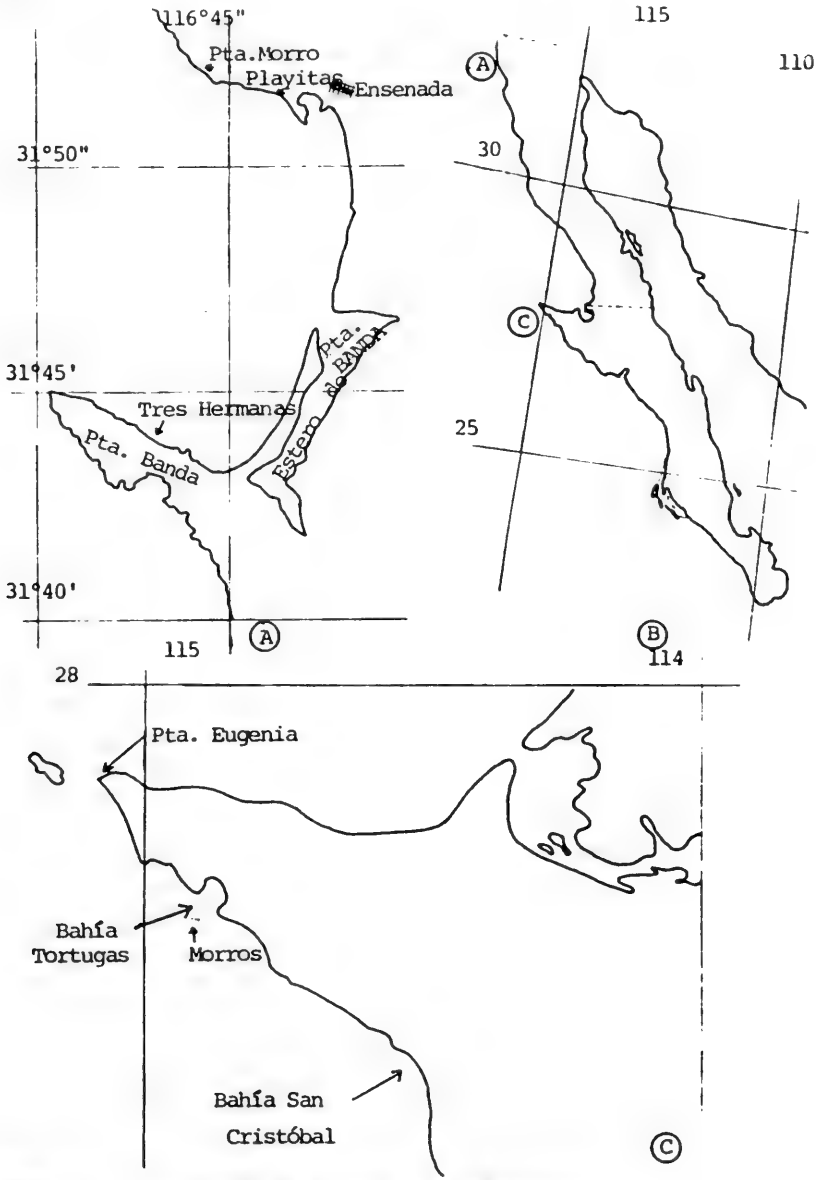
_____. 1925. The Marine Algae of the Pacific Coast. of No North America. Part. III. Melanophyceae Univ. Calif. -- Public. Bot. 8:387-898. 34-107 pls.

Silva, P.C. 1951. The Genus Codium in California with Observations on the Structure of the walls of the utricules Univ. Calif. Press. 25(2): 79-114

Taylor, W.R. 1945. Pacific Marine Algae of the Allan Hancock Expeditions to The Galapagos Islands. Allan Hancock Pacific. -- Expeditions, 12: 1-528. 100 pls.



Gráfica 1: No. de especies y porcentajes
Ensenada ☐ B.Tortugas ▨ Total ☐



Mapa 1: Localización de los sitios de muestreo
A: Ensenada B.C.N.; B: Edo. de Baja California
C: Bahia Tortugas B.C.S.

CUADRO 1

ENSENADA

CHLOROPHYTA	En	T	I	II	III	IV
1 Chaetomorpha anteninna (Bory) Kutz.					+	
2 Ch. linum (Mull.) Kutz.					+	
3 Ch. spiralis Okam.						
4 Cladophora columbiana Coll.		*				
5 Cl. microcladioides Coll.		*				
6 Cl. sericea (Huds.) Kutz.		*				
7 Codium cuneatum S. & G.					+	
8 C. fragile (sur.) Harv.			+		+	+
9 C. magnum ? Dawson						
10 C. setchellii Gardner						
11 Derbesia marina (Lyngb.) Kjell.		*				
12 Enteromorpha acanthophora Kutz.						
13 E. compressa (L.) Grev.				+		
14 Halimeda cuneata ? Hering						
15 Rhizoclonium hieroglyphycum (C.Ag.) Kutz.	*					
16 R. implexum (Dillw.) Kutz.	*					
17 Ulva californica		*	+	+		
18 U. lactuca L.				+		
19 U. rigida C.Ag.						
CYANOPHYTA						
20 Brachytrichia quoyi (C.Ag.) Bornet						+
21 Calothrix crustacea Schousboe & Thuret						+
22 Chroococcus turgidus (Kutz.) Naegeli	*					
23 Dermocarpa prasina (Reinsch) Bornet	*					
24 Lyngbya aestuarii (Mert.) Liebman						+
25 L. meneghiniana (Kutz.) Falk.	*				+	
26 Microcoleus chtonoplastes Thuret		*				
27 Oscillatoria nigra Vaucher	*					+
28 O. margaritifera Kutz.					+	
29 Phormidium faveolarum (Mont.) Gom.	*					

B. TORTUGAS

V	VI	VII	VIII	IX	X	XI	PISO	MODO	FACIES	HAB.	EDO.	EPIFITA DE:
							L	E	R	epl	O	
							L	E	R	epl	O	
+			+				L	SE	R	epf,Pm	O	61,62
			+			+	Is	E	-	epf	O	61,62
	+					+	IsL	E	R	epl,d/s	O	
						+	Is,Li	E	-	epf	O	52
						+	Is	E	R	epl	G	
		+				+	Is	E	R	epl	G	
						+	Ii	P	R	epl	G	
+							Is	SE	R	epl	O	
						+	Is	SE	R	epf	G	79,98
						+	Is	E	R	epl	O	
					+		Is	E	R	epl	O	
						+	Ii	P	R	epl	O	
	+						L	E	-	d/s	O	
	+						L	E	-	d/s	O	
	+			+		+	Is	E	R	epl	O	
	+						Is	E	R	epl	O	
						+	Is	E	R	epl,epf	O	58
						+	Is,S	SE	R	epl/Pm	H	
		+				+	Is,S	SE	R	epf,Pm	H	12,20 43,57
	+						Is	E	-	epf	O	134
			+				Is	E	-	epf	O	139
						+	Is,L	E	-	epf	O	8,148
							Is	E	-	epf	O	162
						+	Is	E	R	epl,epf	O	5,112
							Is	E	-	epf	O	43
							Is	E	-	epf	O	79
		+					Is	E	-	epf	O	8

30 Plectonema tomasinianum (Kutz.) Bornet		*				
31 Scytonema myochrous (Dillw.) C.Ag.		*				
32 Xenococcus kerneri Hansg.	*	*				
CHROMOPHYTA						
33 Colpomenia peregrina (Sauv.) Hom.		*				
34 C.ramosa Taylor						
35 C.sinuosa (Roth) Derb. & Sol.				+		
36 Cocconeis placentula Ehr.		*				
37 Cystoseira osmundacea (Turn.) C.Ag.						
38 Desmarestia ligulata var. ligulata (Lightf.) Abbot		*				
39 Dictyota flabellata (Coll.) S. & G.			+		+	
40 Dictyopteris undulata Holmes		*				
41 Ectocarpus parvus (Saund.) Holl.						
42 E. siliculosus f. subulatus (Kutz.) S. & G.		*				
43 Egregia menziesii (Turner) Aresch.		*	+			+
44 Eisenia arborea Aresch.			+			
45 Giffordia mitchelliae (Harv.) Ham.		*				
46 Grammathophora marina (Lyngb.) Kutz.	*	*			+	
47 Halydris dioica Gardn.						
48 Hesperophycus harveyanus (Decne.)S. & G.			+			
49 Hydroclathrus clathratus (C.Ag.) Howe		*				
50 Laminaria farlowii S. & G.		*				
51 Licmophora flabellata (Carm.) Ag.	*					
52 Macrocystis integrifolia Bory		*				
53 M. pyrifera (L.) C.Ag.					+	
54 Melosira juergensii C.Ag.	*	*				
55 M. moniliformis (Mull.) Ag.	*	*			+	
56 Nitzschia closterium (Ehr.) E.Smith	*					+
57 Pachydictyon coriaceum (Holm.) Okam.		*				
58 Padina durvillaei Bory						

				+	+		Is	E	-	epf	♀	918
				+			IS	SE	R	epl,Pm	♯	
		+	+	+		+	Is	SE	-	epf	♀	31,134 128,8
		+	+			+	Is	SE	R	epf,epl	♀	
						+	Is	E	R	epl,psa	♀	
+		+				+	Is	E	R	epl,psa	♀	
	+				+	+	L,Is	SE,E	-	epf	♀	5,8,43, 107,134
+			+			+	Ii	P	R	epl	♂♀	
			+				Ii	P	R	epl	♀	
			+			+	Is	E	R	epl,epf.	♀	71
						+	Is	SE	R	epl	♂	
+							Is	E	-	epf	♀	48
						+	Is	E	R	epl	♀	
			+				Ii	P	R	epl	♀	
			+			+	Ii	P	R	epl	♀	
	+		+				Is	SE	-	d/s	♀	
+	+			+	+	+	Is	SE,E	-	epf	♀	8,48,149
+			+	+		+	Is	E	R	epl	♀	
+	+						Is	E	R	epl	♀	
			+				Is	E	-	epf	♀	33,107
			+				Ii	E	R	epl	♀	
		+					Is	SE	-	epf	♀	148
						+	Ii	SE	R	epl	♀	
						+	Ii	SE	R	epl	♀	
	+			+		+	Is	SE	-	epf d/s	♀	8,48, 149
	+				+		Is	SE,P	-	epf	♀	8,48,134
							Is	E	-	epf	♀	8
			+				Is	E	R	epl	♀	
			+			+	Is	E	R	epl	♀	

59 Pelagaphycus porra (Lem.) Setch.						
60 Pelvetiopsis limitata f. lata Gardn.	*				+	
61 Sargassum johnstonii S. & G.		*				
62 S. muticum (Yendo) Fesch.		*			+	
63 S. sinicola L.		*				
64 Scytosiphon dotyi Wynne		*				
65 Tribonema utriculosum (Kutz.) Hazen	*		+			
66 Zonaria farlowii S. & G.						
RHODOPHYTA						
67 Acrochaetium thuretii (Born.) Coll. & Harv.	*		+			
68 Acrosorium uncinatum (Turn.) Kylin			+		+	
69 Ahnfeltia plicata (Huds.) Fries		*				
70 Amphiroa mexicana Taylor	*					
71 A. zonata Yendo	*		+			
72 Bossiella chiloensis (Decaisn) Johan.	*	*	+			
73 B. orbigniana spp. dichotoma (Manza) Johans.	m	*	+			
74 B. orbigniana (Decne.) Silva spp.orbignia-na.	m		+			
75 B. plumosa (Manza) Silva	m					+
76 Botryoglossum farlowianum var. farlowianum Abbot		*	+			
77 Calliarthron tuberculosum (Post. & Rup.) Dawson		*				
78 Callithamnion acutum Kylin		*				
79 C. paschale Borgesen	*				+	
80 Callophyllis violacea J. Ag.						
81 C. violacea v. violacea J. Ag.		*				
82 Centroceras clavulatum (C.Ag.) Mont.						
83 Ceramium codicola J. Ag.	*	*				
84 C. equisetoides Dawson	*	*				

		+					Ii	P	R	epl	o	
		+					Is	E	R	epl	♀	
						+	Is	E	R	epl	♀	
+			+		+		Is	SE	R	epl	♀	
						+	Is	E	R	epl	♀	
						+	Is	SE	R	epl	O	
							Ii	P	-	epf	O	44
			+				Is	SE	R	epl	O	
							Ii	P	-	epf	Mo	48
							Ii	P	-	epf	Mo	48
			+			+	Ii	P,E	-	epf	♀	62,44
				+			Ii	P	R,A	epl,ps	O	
		+					Is	E	R	epl	O	
		+		+		+	Is	E	R	epl	Ø	
		+		+		+	Is,L	E	R	epl,Pm	Ø	
		++		+		+	Is,L	E	R	epl,Pm	Ø	
		+					Is,L	E	R	epl,Pm	Ø	
							Is,L	E	R	epz,Pm	Ø	
		+				+	Ii	P	R	epf	Ø ♀	107 148
			+				Is,L	E	R	epl,PM	♀	
						+	Is	E	-	epf	Ø	122
							Is	E	-	epf	Ø	8
				+			Is	E	R	epl	♀	
						+	Is	E	R	epl	♀	
				+		+	Is,L	E	R	epl,epf	O	8
		+				+	Is	E	-	epf	Ø	8
		+				+	Is	E	-	epf	Ø	107

85 C. serpens S. & G.	*		+			
86 C. sinicola v. sinicola (S. & G.) Daws.		*				
87 C. sympodiale ? Dawson		*				
88 C. viscaionense Dawson		*				
89 Champia parvula (C.Ag.) Harvey	*				+	
90 Chondria californica (Coll.) Kylin	*	*				+
91 Corallina gracilis Lamouroux			+			
92 C. gracilis v. verticillata (Lam.) Daws.	*	*	+			
93 C. janioides Dawson	*					
94 C. officinalis v. chilensis (Dec.) Kutz.						
95 C. pinnatifolia Manza						
96 C. pinnatifolia v. pinnatifolia (Manz.) Daws.	*	*	+			
97 C. pinnatifolia v. digitata Dawson	*	*				
98 C. polysticha Dawson		*				
99 C. vancouveriensis Yendo			+		+	
100 Cryptonemia borealis Kylin	*					
101 Dasya sinicola v. californica (Gard.) Daws.		*				
102 Dermatolithon dispar (Foslie) Foslie		*				
103 Erithrocladia subintegra Rosenvinge	*					
104 Erythrocystis saccata (J.Ag.) Silva		*				
105 Fosliella paschalis (Lemoine) S. & G.	m	*	+	+	+	
106 Gastroclonium coulteri (Harv.) Kyl.	m	*				
107 Gelidium cartilagineum v. robustum Gardn.			+		+	
108 G. coulteri Harvey			+	+	+	
109 G. johnstonii S. & G.	*		+	+		
110 G. polystichum Gardner	*		+			
111 G. pusillum (Stackouse) Le Jolis					+	
112 Gelidiella hancockii Dawson		*				
113 Gigartina intermedia Suringer	*					
114 G. tepida Hollenberg		*				
115 Goniotrichum alsidii (Zan.) Howe		*	+			
116 Gracilaria cerrosiana Taylor	*				+	

							Is	E	-	epf	Ø	73
						+	Is	E	-	epf	Ø	8
						+	Is	SE	-	epf	Ø	Ph
						+	Is	E	-	epf	Ø	136
							Is,L	E	-	epf	♀	Ph
						+	Is	SE	-	epf	Ø	40,43
						+	Is	E	R	epl	Ø ♀	
			+				Is,L	E	R	epl,Pm	Ø	
+							Is,L	E	R	epl,Pm	O	
						+	Is,L	E	R	epl,Pm	Ø	
+							Is,L	E	R	epl,Pm	Ø	
		+				+	Is	E	R	epz	Ø	
		+				+	Is,L	E	R	epz,Pm	Ø	
				+		+	Is	E	R	epl,epz	Ø	
		+		+		+	Is	E	R	epl,epz	Ø	
		+					Is	E	R	epl	O	
			+				Is	E	R	epl	O	
						+	Is,L	E	-	d/s	Ø	
+		+					Is	SE	-	epf	O	3,148, 134
				+			Is	E	-	epf	Ø	134
		+	+	+	+	+	Is,L	E,SE	-	epf	Ø	Ph
		+				+	Is	E	R	epl	Ø	
+		+		+		+	Ii	P	R	epl	Ø ♀	
		+					Is	E	R	epl	Ø ♀	
+		+					Is	E	R	epl	Ø ♀	
+		+					Is	E	R	epl	Ø	
							L	E	R	epl	Ø	
						+	Is	E	R	epl	Ø	
+							Is	E	R	epl	O	
						+	Is	E	R	epl	O	
		+				+	Is	E	-	epf	O	83,73
		+					Is	E	R	epl	O	

117 G. sjoestedtii Kylin		*				
118 G. tepocensis Dawson						
119 G. textorii v. cunninghamii (Farl.) Daws.		*				
120 G. textorii v. textorii (Sur.) J.Ag.		*	+			
121 Grateloupia filicina (Lam.) C.Ag.	*	*			+	
122 Griffithsia pacifica Kylin						
123 Haematocelis rubens J.Ag.		*				
124 Herposiphonia secunda (C.Ag.) Ambronn	*					
125 H. tenella (C.Ag.) Ambronn		*				
126 H. verticillata (Harv.) Kylin	*			+		
127 H. Heterosiphonia erecta S. & G.		*				
128 Hypnea cervicornis J.Agardh	*	*		+		
129 H. johnstonii S. & G.		*				
130 H. pannosa J. Ag.		*				
131 H. spinella (C.Ag.)Kutz.		*				
132 Laurencia hancockii Dawson		*				
133 L. johnstonii S. & G.	*					
134 L. pacifica Kylin	m	*			+	
135 L. papillosa v. pacifica S. & G.		*				
136 L. peninsularis Taylor		*				
137 L. sinicola S. & G.		*				
138 L. spectabilis v. tenuis Dawson		*				
139 L. subopposita (J. Ag.) Setchell		*		+		
140 Leptocladia binghamiae J.Ag.			+			
141 Liagora farinosa Lamouroux		*				
142 Lithophyllum samoense Foslie		*				
143 Lithothamnion pacificum (Foslie) Foslie	*				+	
144 Lithothrix aspergillum Gray					+	
145 Melobesia membranacea (Esper.) Lam.	*		+			
146 M. polystromatica Dawson	*		+			
147 Microcladia coulteri Harvey		*				
148 Plocamium pacificum (L.) Kylin	*		+		+	

				+	+		Is	E	A	s/g	♀	
						+	Is	E	R	epl	Ø	
						+	Is	E	R	epl	Ø ♀	
				+		+	Is	E	R	epl	Ø	
+						+	Is	E	R	epl	O	
						+	Is	E	R	epl	O	
						+	Is	E	-	epz	Ø	
+							Is	E	-	epf	O	75
						+	Is	E	-	epf	O	136
							Ii	E,P	-	epf	O	107
						+	Is,L	E	R	epl,Pm	♀	
+			+			+	L	E	A	epl	O	
						+	L	E	R	epl,Pm	Ø	
						+	L	SE	R	epl	Ø	
						+	L	E	R	epl	O	
						+	Is	E	-	epf	O	9
		+					Is	E	R	epl	Ø	
	+	+		+	+	+	Is	E	R	epl	Ø♀	
				+	+		Is	E	R	epl	♀	
						+	Is	E	-	epl	♂	
						+	Is	E	-	epf	♂	136
						+	Is	E	R	epl	Ø	
	+	+	+				Is	E	-	epf	Ø	59,107 128,148
						+	Is	E	R	epl	Ø	
						+	Is	P	R	s/g	♀	
						+	Is	E	R	epl	Ø	
							Is	E	R	epl,s/g	Ø	
							Is	E	R	epz,s/g	Ø	
							Is,L	SE,E	-	epf	Ø	Ph,44
							Is,L	SE,E	-	epf	Ø	Ph,44
						+	Ii	P	-	epf	Ø	Ph,107
		+	+	+		+	Ii	E,P	-	epf	Ø♀	92,107

149 Polysiphonia johnstonii v. concinna (Holl.) Holl.		*				
150 P. nathanielli Hollenberg	*				+	
151 P. pacifica v. delicatula Holl.	*					+
152 P. pacifica v. pacifica Holl.	*		+			
153 Porolithon pachydermum (Foslie) Fosl.	*	*				
154 Porphyra perforata J. Ag.						
155 Prionitis australis (Ag.) J.Ag.	*	*			+	
156 P. linearis Kylin		*				
157 Pterocladia capillacea (Gmel.) Born. & Thur.	*					
158 P. complanata Loomis	*		+			
159 P. parva Dawson	*					
160 Pterochondria woodii v. pygmaea (S.) Daws.		*				
161 Pterosiphonia dendroidea (Mont.) Falk.						
162 P. pennata (Roth) Falk.	*				+	
163 Rhodymenia dawsonii Taylor						
164 R. pacifica Kylin	*				+	
165 Smithora naiadum (Anders.) Holl.						

SIMBOLOGIA

MODO: Protegido - P, Expuesto - E, Semiexpuesto - S E
FACIES: Rocosa - R, Arenosa - A
PISO: Supralitoral - S; Litoral - L; Infralitoral superior - Is.,
HABITAT: Epífita - epf, Epilítica - epl, Epizoica -epz, Psamófila como: pilotes de madera, plástico, cuerdas, cascos de
ESTADO; Vegetativo - O, Tetrasporas - Ø, oogonios: Phaeophyta, cistocistos: Chlorophyta - G, gametangio Phaeophyta - g, Mono-
LOCALIDADES: ENSENADA; LAS PLAYITAS - I, MALECON - II, ESC. CIENC. ESC. CIENC. MAR. a PTA.MORRO - VII, BAHIA TORTUGAS: PTA EULA ESTACION DE PESCA - XI.
No reportada anteriormente para estas localidades *; Ensenada - En

						+	Is	E	-	epf	ø ♀	40
							Is	E	-	epf	O	108
							Ii	E	R	epl	ø	
							Is	E	R	epl	ø	
		+				+	Is	E	R	epl,epz	ø ♀	
		+					Is,L	E	R	epl	O	
					+	+	Ii	P	R	epl	O	
						+	Ii	P	-	epf	O	107
		+					Is	E	R	epl	ø	
							Is	E	R	epl	O	
	+						Is	E	R	epl	ø	
						+	Ii	P	-	epf	ø♀♂	47
						+	Is	E	-	epf	O	8
							Is	E	R	epf	O	7
						+	Ii	P	R	epl	O	
							Is	E	R	epl	♀	
						+	Is,L	E,SE	-	epf	♀	Ph

Infralitoral inferior – Ii.
– psa , Guijarros s/g, Pozas de marea– Pm, diversos sustratos lanchas, etc. – d/s, Phyllospadix torreyi – Ph.
tocarpos, gonimoblastos y carpogonios: Rhodophyta – ♀ , Gametosporas: Rhodophyta – Mo, heterocistos: Cyanophyta – H.
MAR. – III; DOS ARBOLITOS – IV, TRES HERMANAS – V, MUELLE –VI, GENIA – VIII, LOS MORROS – IX, MUELLE – X, MUELLE A PLAYAS DE

Tortugas – T; m – reportada por Aguilar, R.M.A. en tesis prof.

UN NUEVO REGISTRO DE JUNCUS (JUNCACEAE) PARA EL VALLE DE MEXICO

Raquel Galván-Villanueva
Laboratorio de Botánica Fanerogámica
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional
11340 México, D.F.

En el estudio de la familia Juncaceae para el Valle de Méxcio se determino la presencia de los géneros Luzula (con tres especies) y Juncus (con once especies y siete variedades). Durante la revisión bibliográfica se encontró que Juncus xiphioides E. Mey. ha sido citada erroneámente por Conzatti (1947) de los Morales, D. F., de acuerdo con Hemsley (1879-1888) y Balslev (1982) esta localidad está ubicada en el Estado de San Luis Potosí y corresponde a una colecta de Schaffner. Por tal motivo los sitios que más adelante se indican corresponden en realidad al primer registro de la especie para la zona.

J. xiphioides solo ha sido colectada en la parte SE del Valle en la región de la Sierra Nevada. Prospera en el fondo u orillas de arroyos someros o en sitios encharcados enclavados en praderas húmedas. Se distribuye en el Oeste de los Estados Unidos y México.

La especie alcanza hasta 65 cm de altura, se caracteriza por sus hojas ensiformes y aplanadas de 3 a 7 mm de ancho, vainas no auriculadas o con aurículas inconspicuas, son especialmente estos caracteres los que la delimitan de J. liebmannii Macbr., taxón menos robusto con el cual suele convivir.

Material examinado:

ESTADO DE MEXICO: Alrededores del Llano Grande, arriba de San Rafael, municipio de Tlalmanalco, alt. 3000 m, 7.IX. 1983, J. Rzedowski 38265 (ENCB). La Ciénega, región de Peñas Cuatas, cerca de la cabeza del Ixtaccíhuatl, alt. 3650 m, 14.I.1981, R. Galván 738 (ENCB). Ibid., 17.VII.1982, R. Galván 1228 (ENCB). Ibid., 17.VII.1982,R. Galván 1228 (ENCB). Vertiente NW del Popocatépetl, cerca de Paso de Cortés, alt. 3500 m, 30.IX.1969, J. Rzedowski 26793 (ENCB).

Literatura citada:

Balslev, H. 1982. A systematic monograph of the neotropical Juncaceae. Ph.D. Thesis, City University of New York. 495 pp.
Conzatti, C. 1947. Flora taxonómica mexicana II. Sociedad Mexicana de Historia Natural, México, D.F. 220 pp.
Hemsley, B.W. 1879-1888. Botany. In Godman F.D. and O. Salvin. Biología Centrali-Americana. R. H. Porter, London. Vol. I: 397-400.

ALGAS MARINAS DE LA PARTE SUR DE LA BAHIA DE LA PAZ, BAJA CALIFORNIA SUR.

Laura Huerta-Muzquiz *
A.Catalina Mendoza-González

Lab. de Ficología
Departamento de Botánica
Escuela Nacional de Ciencias Biológicas 11340
Instituto Politécnico Nacional, México, D.F.

Presentamos los resultados obtenidos de un estudio estacional — efectuado sobre la flora marina de la parte sur de la Bahía de la - Paz. El Dr. Oscar Holguín Quiñones, realizó dicho estudio presentándolo como tesis de licenciatura en 1971. La Biól. Ma. Luisa Chávez empezó otro trabajo en la misma región en 1978-1979, pretendía efectuar una apreciación comparativa de sus resultados con el estudio — anterior. Debido a que el trabajo de Holguín se quedó sin publicar y a que Ma. Luisa falleció cuando lo estaba elaborando consideramos — pertinente terminarlo para su publicación. Para ello efectuamos 4 colectas estacionales también, en 1981-82.

Se obtuvieron los siguientes resultados: Total de especies, las - mas abundantes en las diferentes estaciones, las mas frecuentes aunque en biomasa no dan una cantidad considerable, las escasas y llamamos ocasionales de las que encontramos solo un ejemplar.

La Bahía de La Paz pertenece a Baja California Sur y se encuentra dentro del Golfo de California, entre los 24°06' y 24°47' Latitud N. y los 110°18' hasta los 110°45' Longitud W. La región estudiada esta localizada entre Calerita ubicada en el canal de San Lorenzo frente a Isla Espíritu Santo hasta Ensenada Ampe. Presenta varios accidentes geográficos, que son pequeñas bahías, puntas rocosas, islas y - algunas playas tendidas salpicadas de rocas y termina en una ensenada baja con sustrato de arena y limo que en grandes extensiones está bordeada por manglar.

La Bahía de la Paz está sujeta a cambios ambientales muy marcados por estar en la parte sur del Golfo de California tiene la influencia de las características que proporciona la fisiografía de este — golfo. Las variaciones de temperatura ambiental entre verano e invierno, son de 29°C promedio del mes mas cálido, a 20°C promedio del mes mas bajo, lo que se refleja en las temperaturas del agua que deberían ser mucho mas estable, alcanzando cambios de 29,8°C en verano a 20°C en invierno con una diferencia de 9.8°C que, para el agua de mar, es elevada.

La salinidad presenta mayor estabilidad, los cambios van de 35.9 a 36.4, es decir son de 0.5 ‰ unicamente. La precipitación pluvial es baja de 200 mm, y se presenta principalmente en verano, lo que - debía bajar un poco la concentración salina del mar, pero sucede lo contrario, es decir en estos meses es cuando se presenta más elevada, probablemente se debe a que el ambiente terrestre tiene vegetación de matorral xerófilo con una cobertura entre 10 a 15 % unicamente y casi sin aportes terrestres de agua dulce; lo que no produce

ninguna influencia para aminorar la fuerte insolación en esa época, y la evaporación superficial marina debe ser mayor, a lo que podría neutralizar la precipitación, por lo que la concentración salina -- aumenta en primavera y verano en varias décimas de grado, siendo -- muy claro éste fenómeno.

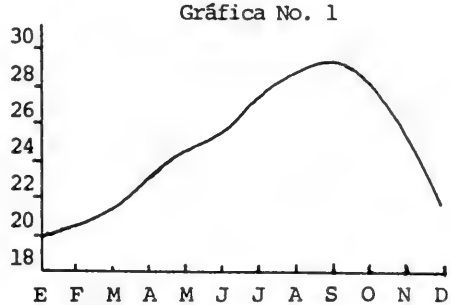
TEMPERATURA Y SALINIDAD DEL AGUA.
(Estación mareográfica, Inst. Geof. U.N.A.M. La Paz, B.C.)

Cuadro No. 1

MES	TEMP.PROM. °C	SAL.PROM. S ‰
ENE	20.0	35.9
FEB	20.5	35.9
MAR	21.6	36.4
ABR	23.1	36.4
MAY	24.6	36.4
JUN	25.2	36.3
JUL	27.4	36.4
AGO	28.7	36.1
SEP	29.8	36.0
OCT	28.4	
NOV	25.1	35.9
DIC	21.9	35.9

PROMEDIO MENSUAL DE TEMPERATURAS EN EL AGUA BAHIA DE LA PAZ, B.C.

Gráfica No. 1



Tomado de Holguín Quiñonez

Las localidades de muestreo se presentan en el mapa 1 y se mencionan por su ubicación de norte a sur:

1.- Calerita. Playa de rocas y arena, con abundantes algas de sustrato rocoso, a 2 ó 3 m de profundidad existe un lecho de rocas, pero además se encuentran algunas especies psamófilas.

2.- Balandra. Pequeña bahía que en los márgenes de la entrada presenta rocas, pero la mayor parte es sustrato de arena y en la parte del fondo manglar con limo.

3.- Isla San Juan Nepomuceno: sustrato arenoso calcáreo en la playa este. Pedregoso en la playa este y sur, rocoso y pedregoso en la playa oeste. (O.H.Q.)

4.- Bahía Falsa. En las puntas de la entrada es pedregoso, en el interior es arenosa-cálcárea y con manglar en el fondo, (O.H.Q.)

5.- Punta colorada. Sustrato rocoso y arenoso calcáreo (O.H.Q.)

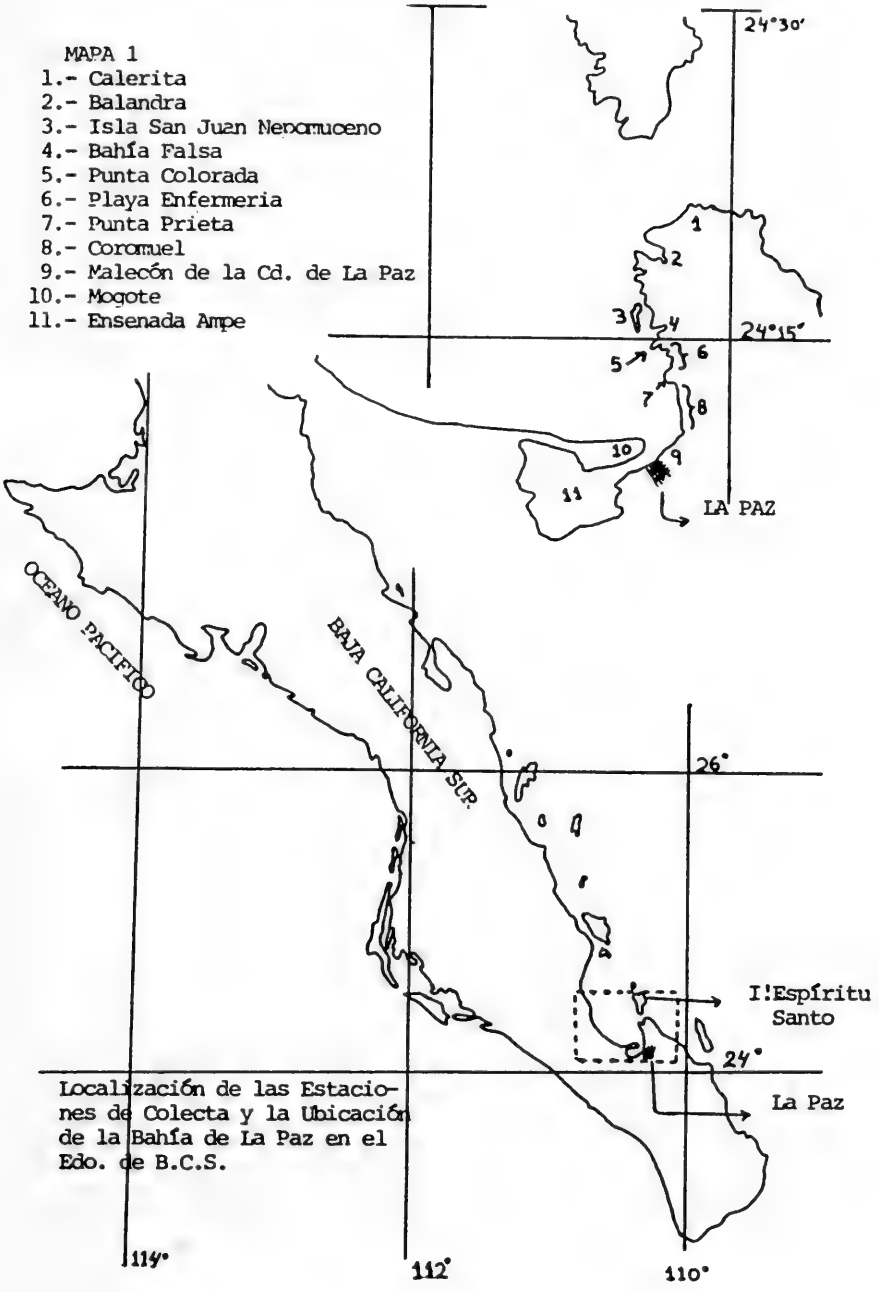
6.- Playa enfermería. Arena, guijarros, pedregoso y algo de manglar en el fondo.

7.- Punta Prieta. Con rocas, arena y guijarros.

8.- Coromuel y Adyacentes. Playa tendida salpicada de rocas.

9.- El Malecón de la Ciudad de La Paz. Fondo de arena con algunos guijarros y piedras, con barda de mampostería y cemento.

10.- Parte sur del Mogote. El Mogote es una península de arena que forma un canal angosto que desemboca en la Ensenada Ampe. En su parte



Localización de las Estaciones de Colecta y la Ubicación de la Bahía de La Paz en el Edo. de B.C.S.

sur, el mogote esta bordeado de manglar con algunos esteros por lo - que presenta fondo de arena y limo con guijarros y conchas.

11.- Ensenada Ampe. Laguna costera baja, de boca angosta y un canal que la comunica al mar, domina el sustrato arenoso, pero tiene - manglares con limo.

12.- San Juan de la Costa. Playa de rocas y guijarros, situados - aproximadamente a 50 Km al NW de La Paz.

Cuadro No. 2
TOTAL DE ALGAS

	Fam.	Gen.	Esp.	Esp.%
CHLOROPHYCOPHYTA	10	16	44	20.46
PHAEOPHYCOPHYTA	7	13	33	15.35
RHODOPHYCOPHYTA	21	50	128	59.53
CYANOPHYTA	4	9	10	4.65
TOTALES	42	88	215	99.99

Cuadro No. 3
TOTAL EN LAS ESTACIONES

	P	V	O	I
	127	85	92	118
TOTAL EN %	59.06	39.53	42.8	54.88

La lista de las especies se presenta en el cuadro No. 4

De los datos anteriores podemos deducir que en primavera se presenta una mayor floración, la cual disminuye considerablemente en verano, quedando en una proporción de un 66.9 % o sea a dos tercios de la anterior, lo que podría interpretarse como aumento de la temperatura de el agua, que podría actuar directamente o sobre alguno de los parámetros en los que interviene dicho aumento como es la disminución - de la solubilidad de O_2 en el agua, lo que abatiría la velocidad de - los procesos respiratorios de las algas.

En otoño, al comenzar el descenso en la temperatura de el agua, -- empieza a recuperarse la flora y en invierno ya se presenta alta siendo en primavera aún mas elevada.

Holguín había encontradouna diferencia aún mas marcada entre primavera y verano bajando hasta un 47.5 % de la flora de primavera. El - total de especies que él encuentra es de 125. Al aumentar considerablemente el número de colectas obtuvimos mayor número de especies y - al escoger unas regiones rocosas con abundante vegetación como Calerita, el tipo de flora varía y los resultados aunque son parecidos - ya no son iguales.

Para las cloroficeas y rodoficeas en verano es cuando estan mas - escasas, para las feoficeas es otoño cuando se presenta mayor disminución.

En cuanto a las facies en que se encuentran las algas podemos decir que a veces corresponde al sustrato pero en otros casos no es así por ejemplo, la facies es el carácter dominante del lugar que puede - ser roca, arena, guijarros, conchas o limo o diferentes combinaciones de ellos. Para las epífitas el alga en la que están implantadas es el sustrato.

Con respecto a las clorofíceas podemos mencionar que la mayor parte de los géneros Enteromorpha, Ulva, Chaetomorpha anteninna, varias especies de Cladophora, Bryopsis, Codium, Caulerpa racemosa, etc. —

son de facies rocosa y el lugar expuesto o semiprotegido y las encon-

tramos en Calerita, I. San Juan Nepomuceno, Punta Colorada, etc. Ace tabularia, Cladophoropsis, Bryopsis, etc. pertenecen al infralitoral superior, sobre guijarros o conchas a veces en rocas y de lugar protegido o semiprotegido como en algunos lugares de la ensenada Ampe - y la parte sur del Mogote. Caulerpa sertularioides y sus variedades son psamófilas, forman prados en la arena a poca profundidad y en - sitios protegidos como en Ampe, en las bahías Balandra, Falsa y Enfermería. Algunas Cladophora y Enteromorpha pueden ser epífitas o - estar mezcladas a otras algas.

Chlorophyta se encuentra todo el año y con mayor abundancia a fines de invierno y primavera, Enteromorpha es un género muy abundante sobre todo las especies E. intestinalis, E. acanthophora y E. compressa, le siguen en abundancia Caulerpa sertularioides y sus diversas variedades las que habitan lugares protegidos en la arena de fondos de bahías. Ulva puede ser abundante en algunos sitios, Codium - también es frecuente.

Sargassum, Dictyota crenulata, Chnoospora minima, algunos Ectocarpus, etc. se encuentran en facies rocosa y expuestos a fuerte oleaje. Otras especies de Sargassum, Colpomenia, Sphacelaria pertenecen a - rocas expuestas pero en lugar semiprotegido. Padina, Dictyota e Hydroclathrus son de guijarros y conchas entre la arena en el infralitoral superior, gregarias formando pequeños prados. Como especies — epífitas con frecuencia encontramos a Ectocarpus, Giffordia, y ocasionalmente Padina y Dictyota.

Durante todo el año podemos observar diversas especies de feofíceas como Sargassum, Padina, Dictyota, etc. pero se vé un claro florecimiento de primavera en el que abundan Colpomenia, Hydroclathrus, Chnoospora, Rosenvingea, Ectocarpus, etc. las que poco a poco desaparecen durante verano y otoño y sólo se encuentra algún ejemplar de ellas ocasionalmente.

Sobre las Rodofíceas podemos mencionar que Liagora, Galaxaura, — Asparagopsis, Gelidium, Pterocladia, etc. son del infralitoral superior, sobre rocas guijarros o conchas. Gelidiella acerosa, Gelidium pusillum, etc. del piso litoral expuestas al oleaje ej. en Calerita, I. Sn. Juan Nepomuceno, etc. Dermonema frappierii es del piso supralitoral en pequeños grupos sobre rocas salpicadas por el romper de las olas.

De las Melobesioideae unas forman cuerpo grueso con protuberancias se encuentran sobre arena en el infralitoral superior. Otras forman una capa que cubren a diferentes substratos principalmente rocas — guijarros o conchas en el litoral o infralitoral superior expuesta a veces a fuerte oleaje. Las corallinaceae articuladas de numerosos — artejos como Amphiroa y Corallina son escasas en la región pero también estan presentes. La que es frecuente es Jania, generalmente epífita de algas mayores.

Gracilaria, Hypnea, Grateloupia, Prionitis, etc., en rocas, generalmente del infralitoral, sólo algunas se encuentran en el litoral y en lugar expuesto. Hypnea spinella y H. pannosa forman tapetes cubriendo extensiones sobre rocas. Hypnea cervicornis y H. valentiae co-

munmente mezcladas a otras algas.

De los Ceramium, Callithamnion, Griffithsia, etc.que en su mayor parte son muy pequeñas, generalmente están epífitas aunque algunas forman tapices sobre rocas, solas o asociadas a otras algas pequeñas. A éste grupo pertenece Spyridia filamentosa, de tamaño regular 15 a 20 cm.de alto, que en este lugar presenta gran abundancia y franca dominancia, pues en todo lugar protegido como son las Bahías y la Ensenada Ampe, sobre todo guijarro, concha, piedra, madero, raíz de mangle, etc, se le encuentra.En octubre esta presente por todas partes, pero se encuentra todo el año. Dawson había mencionado que en Bahía de San Quintín, el alga mas abundante era Spyridia filamentosa y en un estudio bromatológico efectuado por Tapia (1972), en los 3 vegetales más abundantes de las Lagunas Yavaros y Huizache y Caimero, está en primer lugar; Spyridia filamentosa. A su vez, Ruiz Cárdenas (1977), en un estudio de la vegetación de la Laguna de Agiabampo, hace mención a ella como el alga más abundante. En la Bahía de Panamá también es una de las algas más frecuentes.

La familia Rhodomelaceae siempre esta presente en nuestras costas, Polysiphonia es abundante en invierno y primavera, con ejemplares mas o menos grandes hasta de 10cm. de alto, P. johnstonii y P. pacifica son las mas frecuentes, en forma de motas de fibrillas negras Herposiphonia tapiza con fieltros a conchas y guijarros sola o asociada a Taenioma, Ceramium, etc. Bostrychia radicans sobre raices de mangle.

Chondria es frecuente y algunas especies de Laurencia johnstoni, pacifica, papillosa, etc, son comunes aunque no forman gran biomasa.

Para numerosas de las especies mencionadas La Paz constituye una nueva localidad.

AGRADECIMIENTOS

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BIBLIOGRAFIA

Abbott, Isabella A. y George J. Hollenberg.1976 Marine Algae of California. 1-827pp. Stanford University Press.

Dawson, E.Y. 1944 The Marine Algae of the Gulf of California, Allan Hancock Pacific Expeditions. 3(10): 189-453 pp. The University of Southern California Press.

Dawson, E.Y. 1953. Marine Red Algae of Pacific Mexico.Part. I Bangiales to Corallinaceae subfamilia Coralli noideae. Allan Hancock Pacific Expeditions.17(1): 1- 239pp. The University of Southern California Press.

1954.Ibid. Part. 2. Cryptonemiales(Cont.)Ibid. 17(2): 241-397pp.

1960.Ibid.Part.3. Cryptonemiales,Corallinaceae subf-Melobesioideae Pacific Naturalist 2 (1) :1-125pp. Contributions From The Beudette Foundation For Biological Research.

1961. Ibid.Part.4. Gigartinales.Ibid. 2 (5-6):190-343 pp.

1963.Ibid.Part VI Rhodymeniales. Nova Hedwigia, V(3/4): 437-476, Tab. 77-95.

1962 Ibid.Part. 7 Ceramiales:Ceramiaceae,Delesseria---ceae. Allan Hancock Pacific Expeditions.26(1): 1-207pp.

1963. Ibid Part. 8 Ceramiales:Dasyaceae, Rhodomelaceae, Nova Hedwigia V (3/4): 401-484, Tab. 126-171

Holguín Quiñonez O.E. 1971 (tesis profesional)Estudio florístico estacional de las Algas Marinas del Sur de La Bahía de la Paz B.C. 1-115pp. Escuela Nacional de Ciencias Biológicas I.P.N.

Hollenberg,G.J. 1961 Marine Red algae of Pacific Mexico. Part. 5. The genus Polysiphonia .Pacific Natura list., 2(5-6):345-75

Ruíz Cardenas,N.J.1977 Estudio parcial de la vegetación sumergida de la Laguna de Agiabampo, Son.Sin.

Setchell,W.A. and N.L. Gardner.1920 The marine algae of -- the Pacific cost of North America. II. Chlorophyceae. Univ. Calif. Publ. Bot. 8:139-345. 25pls

1925. The marine algae of the Pacific coast of North America. III. Melanophyceae.Proc.Calif.Acad.Sci. 4th ser.,8:383-739. 73pls

1930. Marine algae of the Revillagigedo Islands Expeditions in.

1925. Proc. Calif.Acad.Sci.4thser.,19:109-215,12pls.

Smith,G.M. 1944. Marine Algae of the Monterrey Peninsula, California Stanford.Calif. 622pp.98pls.

Tapia,R.C. 1972. Estudio Químico preliminar de tres vegetales de las Lagunas de Yavaros,Son.Huizache y Caimanero, Sin.Tesis de la Facultad de Ciencias U.N.A.M.

Taylor,W.R. 1945. Pacific marine algae of the Allan Hancock Expeditions to the Galapagos Island.Allan Hancock Pacific Expeditions, 12:1-528, 100pls.

ALGAS MARINAS DE LA PARTE

CHLOROPHYCOPHYTA	CALERITA	BAHIA BALANDRA	I. SAN JUAN NEPOMUCENO	BAHIA FALSA
Fam. Chaetophoraceae				
Entocladia viridis Reinke		I		
Fam. Ulvaceae				
Enteromorpha acanthophora Kütz	P I		O	P
E. micrococca Kutz.	P			
E. intestinalis (L.) Link		P I	PVOI	P I
E. compressa (L.) Grev.				I
E. flexuosa (Wulf.)J. Ag.				
E. prolifera (Müll.) J.Ag.		P		
E. tubulosa (Kutz.) Kutz.				
Ulva lactuca L.	I	PV I	P I	
U. lactuca V. rigida (C.Ag.) Le Jolis		PV I	P	
U. dactylifera Setch. y Gard.				
U. californica Wille	P I			P I
U. expansa (Setch.) S. y G.	P	I		
Fam: Cladophoraceae				
Chaetomorpha antennina (Bory) Kutz.	P OI			
Ch. linum (Müll.) Kutz.				I
Ch. minimaColl. y Herv.				
Rhizoclonium riparium (Roth) Harv.				P I
R. implexum Dill. Kütz.		P I		
R. hierogl phicum (C.Ag.) Kutz				PV
Cladophora hesperia S. y G.				
C. insignis (Ag.) Kutz				
C. glomerata (L.) Kutz.				
C. crispata (Roth.) J. Ag.				
C. microcladioides Coll.				
C. trichotoma (C.Ag.) Kutz.			I	
C. bertolonii V. hamosa (Kuntz.) Ard.				P
Fam: Dasycladaceae				
Acetabularia calyculus Quoy y Gai.				
A. pusilla (Howe) Coll.			O	

SUR DE LA BAHIA DE LA PAZ

PUNTA COLORADA	PLAYA ENFERMERIA	PUNTA PRIETA	COROMUEL Y ADYACENTES	EL MALECON	PARTE SUR DEL MOGOTE	ENSENADA AMPE	SN. JUAN DE LA COSTA	PISO	FACIES	MODO	ESTADO	PRESENCIA
								Is	Epf	Pr	V	O
P			P I	PVOI	P OI	I		L-Is	GoC	Se	V	Ab
								Is	Epl	P	V	Es
	PV I		OI	PVOI	PV	VO		Is	GoC	P	V	Ab
			P I	P I	I	OI	I	L	Epl	E	V	Ab
			P I	PV I				Is	Epl	Se	V	Fr
				P I	O			Is	Goc	P	V	Fr
				P				L	EPL	Se	V	Es
		P	P I	P I	O			L	Epl	Se	V	Ab
			P I			P I		L	Epl	Se	V	Fr
				O				L	Epl	E	V	Es
					I			Is	Epl	Se	V	Es
			P I		P I			Is	Epl	Se	V	Fr
								L	Epl	E	V	Es
								Is	Mf	Sp	V	Es
							I	Is	Epf	P	V	O
		P OI						Is	Mf	P	V	Es
								Is	Mf	P	V	O
			P I	I		OI		Is	Ma	P	V	Fr
						O		Is	Epf	P	V	Es
			P I	I		OI		Is	GoC	P	V	Es
			I	P I		OI		Is	GoC	P	V	Es
						OI		Is	GoC	P	V	Es
				P				L	Epl	Sp	V	O
	P	O		V				Is	Epl	Sp	V	Es
					I			L	Epl	Se	V	Es
						I		Is	GoC	P	Ci	Es
								Is	C	P	V	O

Fam. Valoniaceae					
Valonia macrophysa Kutz	P				
Ernodesmis verticillata (Kutz.)Borg	O	O			
Struvea sp. Sonder	P				
Cladophoropsis membranacea (C.Ag.)Borg.					
Fam. Derbesiaceae					
Derbesia marina (Lyngb.) Kjellman					
Fam. Bryopsidaceae					
Bryopsis hypnoides Lamx.					
B. pennatula J.Ag.	O				
Fam. Codiaceae					
Codium cuneatum S. y G.	PVOI	V			O
C. magnum Dawson					
Fam. Caulerpaceae					
Caulerpa peltata Lamx.	OI	V	P		
C. racemosa V. turbinata (J.Ag.)Eubank				P	
C. racemosa V. chemnitzia (Esper.) Webervan Bosse	V				
C. sertularioides(Gm.) Howe	VOI	PVOI		P	OI
C. sertularioides F. longiseta (Bory) Sved.		PVOI			
C.arenicola Taylor			V	P	
Fam. Udoteaceae					
Halimeda discoidea Decaisne	OI		P		O
XANTHOPHYCEAE					
Fam. Vaucheriaceae					
Vaucheria sp. De Candolle					
PHAEOPHYCOPHYTA					
Fam. Ectocarpaceae					
Ectocarpus bryantii S. y G.			V	P	
E. breviarticulatus J.Ag.					
E. corticulatus Saund.					
Giffordia mitchellae (Harv.) Ham.				P	I
Fam. Sphacelariaceae					
Sphacelaria brevicornis S. y G.			PV	IP	I
S. furcigera Kutz					
S. tribuloides Meneg			P	P	

								Ils	Epl	P	V	Es
								Is	G	P	V	Es
								Is	Ma	P	V	Es
						OI		Is	GoC	P	V	Es
						P		Is	Ma	P	V	Es
		O		PV				Is	GoC	P	V	Es
								Is	Epl	P	V	O
			OI	V I	I	I	V	L-Is	Epl	E	Ga	Ab
						I	OI	L-Is	Epl	Sp	V	Es
				P		VO		Is	GoC	P	V	Es
				P		V		Is	GoC	P	V	Es
								Is	GoC	P	V	Es
	P O	PVO		PVO	PVOI	PVOI	V	Is	Ps	P	V	Ab
					PVOI	P I		Is	Ps	P	V	Fr
					P			Is	Ps	P	V	Es
	VO	VOI	I	PVOI				Is	Epl	Se	V	Fr
						O		Is	Ps	P	V	Es
	P			P	P			Is	Epf	P	Ga	Fr
					O	O		L	Epl	E	Ga	Fr
					I	OI		Is	Epf	Se	Ga	Es
				PV	P I	OI		L	Epf	Se	Ga	Fr
P	P	PV		V	P I			L	Epf	Se	Pr	Fr
PV	PV				P			Is	Epf	P	Pr	Es
					PV			Is	Epf	Se	Pr	Fr

Fam: Dictyotaceae					
Dictyota crenulata J.Ag.	O				
D. dichotoma (Hud.) Lamx.	VOI				
D. flabellata (Coll.) S. y G.				P I	P
D. volubilis (Kutz.) sensu Vickers					
D. divaricata Lamx.	PV I				
Padina durvillaei Bory	P OI			P	
P. mexicana Dawson	PV			P	
P. vickersiaeHoyt	O				
Dictyopteris delicatula Lamx.		P	I		
Fam: Ralfsiaceae					
Ralfsia sp. Berkeley	PV				
Fam: Spermatochnaceae					
Nemacystus brandegeei (S. y G.) Kylin				P	
Fam: Scytosiphonaceae					
Colpomenia sinuosa (Roth) Derb. y Sol	PV				
C. tuberculata Saund					
Rosenvingia intricata (J.Ag.) Börg.	O		I		
Hydroclathus clathratus (C.Ag.) Howe	V		I	P	P
Chnoospora minima (Her.) Papen.	V				
Fam: Sargassaceae					
Sargassum camouii Dawson					
S. horridum S. y G.					
S. lapazeanum S. y G.	P I	V		P	
S. macdougalli Dawson				P	
S. palmerii Grunou				P	
S. sinicola S. y G.	V			P	
S. sinicola V. sinicola Dawson	V				
S. liebmannii J. Ag.	V			P	P
S. pacificum Bory					
S. howellii Setch	I	V	I		
RODOPHYCOPHYTA					
Fam: Goniotrichaceae					
Asterocytis ramosa (Twaites) Gobi					
Goniotrichum alsidii (Zanard.) Howe					
Fam: Erythropeltidiaceae					
Erythrocladia subintegra Rosenv.					
E. recondita Howe y Hoyt			I		
E. irregularis Rosenv.		P			
Erythrotrichia carnea (Dillw.) J.Ag.	P				

				P I	P I		L-Is	Epl	E	V	Fr
			P	O			Is	GoC	Se	V	Fr
							L-Is	Epl	Sp	V	Es
					V		Is	GoC	Sp	V	Es
	P			P			Is	GoC	P	Ga	Fr
P	P		P I	PV	PO		Is	GoC	P	Ga	Fr
			P I				Is	GoC	Se	Ga	Fr
			P I			V	Is	GoC	Se	V	Es
							Is	GoC	P	V	Es
		PV					L	Epl	E	e	Es
				P			Is	Epl	Se	V	Es
	P	P	P		P	V	L	Epl	E	Ga	Ab
				P I			L	Epl	Se	Ga	Es
P			P I	P I	P	O	Is	GoC	Sp	Ga	Fr
	P	P	I	P I	P I	P I	Is	Epl	Sp	V	Ab
				P I	P O		L	Epl	E	V	Es
				P			L	Epl	E	G	Es
		P		P			Is	Epl	Sp	Ga	Es
							Is	Epl	Sp	Ga	Es
						I	Is	Epl	Sp	Ga	Es
				P			L	D	-	V	Es
P				P I	PVOI		L-Is	Epl	Se	Ga	Ab
				V		O	L	Epl	E	V	Fr
	PV	PV			I		L	Epl	E	Ga	Fr
			I	I		I	L-Is	Epl	Se	V	Es
				I			L	Epl	E	V	Es
				O			Is	Epf	P	V	Es
				V I			Is	Epf	P	V	Es
		V					Is	Epf	P	V	Es
							Is	Epf	P	V	O
							Is	Epf	P	V	Es
							L	Epf	P	V	Es

E. tetraseriata Gardner		I		
Fam: Bangiaceae				
Porphyra perforata J.Ag.	P			
Bangia fuscopurpurea (Dillw.) Lyngb.	P I			
Fam. Acrochaetiaceae				
Acrochaetium hancockii (Daws.) Papen.				
A. pacificum Kylin				
A. pectinatum (Kyl.) Ham.	V			
Fam: Helminthocladiaceae				
Liagora magniinvolucra Daws.			P	
L. farinosa Lamx.	I			
L. abbottae Dawson	I			
Dermonema frappierii (Mont. y Millard)Borg.	O		O	
Fam: Chaetangiaceae				
Galaxaura arborea Kjell.	OI			
G. squalida Kjell.	I			
G. veprecula Kjell.	OI			
Fam: Bonnemaisoniaceae				
Asparagopsis taxiformis (Delile) Trevisan	I		I	
Fam: Gelidiaceae				
Gelidium pusillum (Stack.) Le Jolis			V	
Gelidiella hancockii Dawson	O			
G. acerosa (Forssakal) Feld. y Ham.	V			I
Pterocladia capillaceae (Gmel.)Born.y Thur.				
Fam: Wurdemanniaceae				
Wurdemannia miniata (Drap.) Feld. y Ham.				
Fam: Squamariaceae				
Peyssonnelia sp. Decaisne	I			
Cruoriella hancockii Daws.				
Fam: Hildenbrandiaceae				
Hildenbrandia prototypus Nardo	O			
Fam: Corallinaceae				
Heteroderma minutula)Fos.) Fos.				
Lithothamnion australe (Fos.) Fos.			P	
Lithophyllum diguettii (Harriot) Heydrich				
L. lithophylloides Heydrich				
L. margaritae (Harriot) Heydrich			P	
L. pallescens (Fos.) Heydrich	V			I
L. trichotomum (Heydr.) Lemoine				
L. veleroae Dawson				

								L-Is	Epf	Se	V	Es
								L	Epf	E	V	Es
								L	Epl	Se	V	ES
				V				Is	Epf	Se	mo	Es
								Is	Epf	P	mo	O
				I				Is	Epf	P	mo	O
								Is	Epl	Se	V	Es
							V	Is	Epl	Sp	♀ ♂	Es
								Is	Epl	Se	♀o	Es
				O				Sl	Epl	E	♀o	Es
								Is	Epl	Sp	V	Es
								Is	Epl	Sp	V	Es
								Is	Epl	Sp	V	Fr
								Is	Epl	Sp	V	Fr
				V				Is	GoC	Se	V	Fr
								L	Epl	E	V	Es
			V		O			L	Epl	E	V	Fr
							O	L	Epl	Se	V	Es
	P							Is	Ma	P	V	Es
								L	Epl	E	V	Es
		P						L	GoC	Sp	V	Es
								L-Is	Epl	E	e	Es
				PV				Is	Epf	P	-	Es
								Is	Epz	P	Ga	Es
						PV		Is	Ps	P	Ga	Fr
					P	I P		Is	Ps	P	Ga	Fr
								Is	Ps	P	Ga	O
	P	P	P		P	I P		Is	Epz	P	Ga	Ab
	P							Is	Ps	P	Ga	O
	P				P	P		Is	Ps	P	Ga	Fr

L. imitans Fos.						
Fosliella paschalis (Lem.) S. y G.	O					
F. farinosa (Lamx.) Howe	O					
Amphiroa dimorpha Lemoine	P					
A. mexicana Taylor	O					
A. subcylindrica Daws.	O					
Jania adherens Lamx.						
J. mexicana Taylor						
J. decusato-dichotoma (Yendo) Yendo					P	
J. tenella (Kutz) Grun.	O				I	
J. subpinnata Dawson					P	
Corallina gracillis var. verticillata Daws.						
C. pinnatifolia (Manza) Daws.	O					
C. pinnatifolia var. digitata Daws.	O					
Fam: Grateloupiaceae						
Grateloupia filicina (Wulf.) C.Ag.					I	
Prionitis kinoensis Dawson						
P. abbreviata S. y G.						P
Fam: Hypneaceae						
Hypnea cervicornis J.Ag.	V		I	P I	P I	P
H. spinella (C.Ag.) Kutz.	P O		I	VOI	VOI	P
H. valentiae (Turn.) Mont.	O	V		PVOI	P	PVO
H.pannosa J. Ag.	I					
Fam: Gracilariaceae						
Gelidiopsis tenuis S. Y G.				O		
Gracilaria crispata S. y G.						
G. andersonii (Grun.) Kylin						
G. veleroae Dawson						
G. verrucosa (Huds.) Papen		V		O	O	
G. sjoestedtii Kylin	O	P	I			
G. textorii (Sur.) J.Ag.						
G. pachydermatica S. y G.	O					
G. turgida Dawson	O					
Fam: Phyllophoraceae						
Gymnogongrus leptophyllus J.Ag.						
Fam: Gigartinaceae						
Gigartina papillata (C.Ag.) J.Ag.						
G. tepida Hollenberg		P				

P				P			L-Is	GoC	P	V	Es
							L	Epf	Se	e	Es
							L	Epf	Se	V	Es
							Is	Epl	Sp	V	Es
							L	Epl	E	V	Es
							L	Epl	Se	e	Es
					P		Is	Epf	P	V	Es
						O	L	GoC	Sp	e	Es
							L	Epf	E	V	O
							LLIs	Epf	Se	V	Es
				P			L	Epf	E	V	Es
					P		L	Epl	E	V	Es
							Is	Epl	P	V	Es
							Is	Epl	Sp	e	Es
P				P			Is	GoC	Se	V	Fr
				V			L	Epl	E	V	Es
				PV I			L-Is	Epl	E	V	Fr
				I	P I		V	Is	GoC	P	e	Ab
P			I	VI	P			L-Is	Epl	E	V	Ab
PV	P I	P	I	P I	P OI	P O	V	L-Is	GoC	Se	V	Ab
								Is	Epl	Se	V	Es
								Is	G	P	V	O
				P	O			Is	GoC	P	V	Es
						O		L	Epl	E	V	Es
						O		Is	G	P	Ci	O
			I	PVOI	PVOI			Is	GoC	P	e-Ci	Fr
					P I	I		Is	Ps	P	Ci	Fr
						V		Is	GoC	P	V	Es
								L	Epl	E	V	Es
								Is	GoC	P	V	Es
						P		Is	Ps	P	V	Es
					P I			L	Epl	E	V	Es
	V			P				LIs	GoC	Sp	V	Es

Fam: Champiaceae					
Champia parvula (C.Ag.) Harvey			O	I	
Fam: Ceramiaceae					
Anthithamnion sp. Naegeli					P
Callithamnion marshallense Dawson					
C. ramosissimum Gard.	V				
C. breviramosum Gard.					
Ptilothamnion codicolum (Daws.) Abbott					
Spyridia filamentosa (Wulfen) Harvey	VOI	I	O	PVOI	PV
Griffithsia tenuis C. Ag.				P I	P
Ceramium codicola J. Ag.					
C. camouii Daws.					
C. equisetoides Daws.					
C. fimbriatum S. y G.		I	P O	P I	P
C. serpens S. y G.				P	
C. sinicola S. y G.					
C. clarionense S. y G.			P	O	
C. gracillimum V. byssoideum (Harv.) Feld. Mazoyer		I	P O	P	PV
C. affine S. y G.					
C. procumbens S. y G.					
C. taylorii Daws.					
C. paniculatum Okam.	I				
C. mucronatum Segi.				I	
C. caudatum S. y G.				P	
Centroceras clavulatum (C. Ag.) Mont.			P O	P I	
Fam: Delesseriaceae					
Taenioma perpusillum (J. Ag.) J.Ag.					
Hypoglossum attenuatum abyssicolum (Taylor) Daws.					
Fam: Dasyaceae					
Dasya pedicellata V. stanfordiana (Farlow) Daws.					
D. sinicola V. sinicola (S. y G.) Daws.			P		
Fam: Rhodomelaceae					
Tayloriella dictyurus (J.Ag.) Kylin	OI				
Polysiphonia hancockii Daws.					
P. johnstonii V. johnstonii S. y G.			P	I	

V			I	P			Is	Epf	P	Ci	Fr
							Is	Epf	Se	V	Es
				V			Is	GoC	P	V	Es
							L-Is	Epf	P	e	Es
			OI				Is	Epf	Se	V	Es
		V					Is	Epf	Se	V	Es
PVOI	PV	PVOI	PVOI	PVOI	PVOI		Is	GoC	P	e	Ab
P	PV		V I	P	P		Is	Epf	P	V	Fr
			V				LIs	Epf	Se	e	Fr
P				V I			Is	Epf	P	e	Fr
				I			Is	Epf	P	e	Es
P	PVO		P I	PV I	P I		L-Is	Epf	Se	e	Ab
				P			Is	Epf	P	V	Es
			P				Is	Epf	Se	e	Es
P				P			Is	Epf	Se	e	Fr
P	V		P I	PV			Is	Epf	P	e	Fr
			O				Is	Epf	Se	V	O
						O	L-Is	Epf	Se	V	O
		I					L-Is	Epf	Se	e	Es
					I		Is	Epf	Se	V	Es
			P	V I			L-Is	Epf	Se	V	Es
P			P	I		V	Is	GoC	Se	e	Fr
			P				L-Is	Epl	E	e	Es
				P			L	D	-	V	O
P			P	P OI			L-Is	Epl	E	e-Ci	Fr
		I	I				L	Epf	E	V	Fr
			O				L	Epl	E	e	Es
					I		Is	Epf	P	e	Es
P			PVOI	P OI	P I		L-Is	Epf	P	e	Ab

P. johnstonii V. concina (Hollenb.) Hollenb.			P	OI	O	
P. mollis Hook. y Harv.	O	I	P		P	I
P. bifurcata Hollenb.	V					
P. scopulorum V. villum (J.Ag.) Hollenb.	O					
P. homoia S. y G.						
P. hendryi Gard.						
P. beaudettei Hollenb.			P			
P. simplex Hollenb.					P	
P. pacifica V. delicatula Hollenb.			P			
P. pacifica V. gracilis Hollenb.						
P. decussata Hollenb.	O					
P. pacifica V. pacifica Hollenb.						
Digenia simplex (Wulf.) C.Ag.	I				P	I
Bostrichia radicans (Mont.)Mont. f. radicans		I				
B. radicans f. moniliforme Post.		OI		I		
Herposiphonia tenella (C.Ag.) Ambron			P	O	PV	I P
H. secunda (C.Ag.) Ambron			P	O		I P
Chondria dasyphylla (Woodw.) C.Ag.	O		P	I	P	P
C. californica (Coll.) Kylin					PV	
C. repens Borg.				O		
Laurencia hancockii Daws.						I
L. subcorymbosa Daws.						P
L. sinicola S. y G.		I	P	O		
L. johnstonii S. y G.	V		P		P	I P
L. pacifica Kylin	V	I		O	P	I P
L. papillosa V. pacifica S. y G.	V		P	O	P	O
L. masonii S. y G.						
L. decidua Daws.						
L. lajolla Daws.		I				
CYANOPHYCOPHYTA						
Fam: Chroococcaceae						
Agmenellum thermale (Kutz.) Drouet. y Daily						I
Fam: Oscillatoriaceae						
Oscillatoria submembranacea Ard, y Straff,						
Schizothrix mexicana Gom.		V				
S. arenaria (Berk.) Gom.				V		
Artrospira neapolitana (Kutz.) Drouet.				V		
Microcoleus lyngbyaceus (Kutz.) Crouan			PVOI		PVOI	P O

P			PVOI	PVO	I		Is	Epf	P	e	Ab
P	PVO	I	PV I	PVOI	P I		L-Is	Epf	Se	eCi	Ab
							Is	GoC	Se	V	Es
							Is	Epf	Se	V	Es
						V	Is	Epf	Se	V	Es
					O		Is	Epl	Se	e	Es
							Is	Epf	Se	V	Es
				P I			Is	Epf	P	Ci	Es
		I			I		L	GoC	Se	-	Fr
		I		I	I		L	Epl	E	V	Fr
							Is	Epl	Se	V	Es
		I	I	I	OI		L-Is	Epl	Se	V	Fr
							L	Epl	E	V	Fr
							Is	Epf	P	e	Fr
	V			VOI	OI		Is	Epf	P	e-Ci	Fr
PV	PVO		PVOI	P O	P		Is	Epf	P	V	Fr
P	P				O		Is	Epf	P	V	Fr
P	P			P O			L-Is	Epf	Se	e-Ci	Fr
P	P		PV	P	I		Is	Epf	Se	e	Fr
							Is	Epf	P	V	Es
P											
							L	Epl	Se	V	Es
							Is	Epf	P	V	Es
O	O				P I		L-Is	Epf	Se	e	Fr
P O			P	V I			Is	GoC	Se	V	Ab
P O	P	I	V I	P	P		L-Is	GoC	Se	e	Ab
P O	P		P				Is	GoC	Se	e	Ab
				O			Is	GoC	P	V	Es
		I		I			L	Epl	E	V	Es
		1					Is	Epl	Se	V	Es
							Is	Epf	P	V	Es
P											
					I	I	Is	Epf	P	V	Es
						OI	Is	Epf	P	V	Fr
							Is	Epf	P	V	Es
P	P O		V I		I	OI	Is	Epf-Mf	P	V	Es
							Is	Epf	P	V	Ab

Fam: Nostoccaceae					
Calothrix crustacea Schous. y Thur.	V		PV	P I	
Nostoc spumigena (Mertens) Drouet.	V			V	
Fam: Stigonemataceae					
Mastigocoleus testarum Langer.				I	
Brachytrychia quoyi (C.Ag.) Born. y Flah,	V		V		

S I M B O L O G I A

ESTACIONES

P = Primavera
V = Verano
O = Otoño
I = Invierno

PISO

L = Litoral
Is = Infralitoral superior
Sl = Supralitoral

MODO

E = Expuesto
P = Protegido
Se = Semiexpuesto

ESTADO

V = Vegetativo
e = Esporas
Ci = Cistocarpos
C = Cistos
Pr = Propagulos
Ga = Gametocistos
♀ = Femeninos
♂ = Masculinos

P			V	I			Is	Epf	P	V	Ab
	V		V				Is	Epl	E	V	Fr
							Is	C	P	V	Es
					P		Is	GoC	P	V	Es

FACIES

Epl = Epilitico ó en rocas
Epf = Epifitico ó sobre otras plantas
Epz = Epizoica
G = Guijarros
C = Conchas
D = Dragado por las olas
Mf= Motas flotantes
Ma= Mezclado a otras algas

PRESENCIA

Es= Escaso
Fr = Frecuente
Ab = Abundante
O = Ocacional

Microphlebodium, un nuevo nombre genérico (Polypodiaceae)

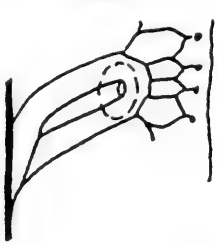
por Luis D. Gómez P.
Museo Nacional de Costa Rica
POB 749 1000 San Jose C.R.

En 1903 H. Christ describió una especie oaxacana de polipodio muy peculiar con el nombre Polypodium mÜnchii, cuya distribución hacia el sur ahora se conoce hasta El Salvador. Por sus características, Copeland (Amer. Fern J. 43: 15. 1953) la asignó al género Micrograma y en 1975 A. R. Smith la combinó como especie de Pleopeltis (P. Calif Acad. Sci. 40:230. 1975). En 1976 (Brenesia 8: 46. 1976) indiqué la afinidad pleopeltídea de P. mÜnchii y lo inadecuado de su posición entre las especies de Polypodium. El examen de varias colecciones, así como las observaciones de campo, me conducen a la erección de un nuevo género para esta especie de Christ:

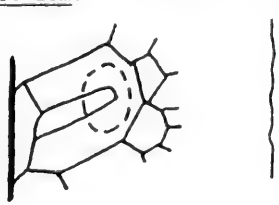
Microphlebodium gen. nov., planta epiphytica rhizomate pruinosus, paleaceus, reptans. Laminae pinnatisectae, 2-3(raroplures)-lobulata, segmentis lanceolatis apicem rotundatis vel obtusis, basim pauciter constrictis adnatis, paleis dimorphiceis pauce vestitae. Venatio Phlebodio(Br.)J.Sm. similiter sed simpliciter, subphlebodioide vocamur. Microphlebodium mÜnchii (Christ)L.D.Gómez comb. nov. (Polypodium mÜnchii Christ, Bull. Herb. Boiss. ii. 3: 147. 1903) sp. unica est.

Holotypus: Oaxaca, MÜnch 90 P (! US 2256278). Otros materiales: Oaxaca: Mickel 1141; Chiapas: Webster et al. 11734; Carlson 1680; Breedlove 6692, 7811; Guatemala: Williams et al. 27357, 23161; Standley 62713, 84560; Molina et al. 16354; Williams 14275. El Salvador: Tucker 1070, 1118. Todos en United States Nat. Herbarium.

Una de las más salientes características de la especie es la venación, mucho más simple que la de Phlebodium:



Microphlebodium



Phlebodium (R.Br.)J.Sm.

NUEVOS REGISTROS DE PTERIDOFITAS PARA EL ESTADO DE NUEVO LEON, MEXICO.

Ma. de la Luz Arreguín-Sánchez
Laboratorio de Botánica Fanerogámica
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional
México, D.F. Becario de COFAA.

Rodolfo Aguirre-Claverán
Instituto Nacional de Estadística
Geografía e Informática. Dirección Regional Noreste, Monterrey Nuevo León.
Av. Eugenio Garza Sada 1702 Sur
Col. Nuevo Repueblo. 64000 N.L.

Como resultado de la investigación sobre la pteridoflora del Estado de Nuevo León iniciada en 1975, fué posible detectar algunas pteridófitas que no se encontraron en la literatura para éste objeto revisada y tampoco en los herbarios de la Escuela Nacional de Ciencias Biológicas (ENCB), Instituto de Biología de la Universidad Nacional Autónoma de México (MEXU) y el herbario de la Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León (UNL).

Tales hallazgos, han sido posibles gracias a una serie de colectas realizadas en Nuevo León, fundamentalmente en los municipios de Allende, Garza García, Guadalupe, Monterrey, Santa Catarina, Santiago y Zaragoza, así como a la revisión exhaustiva de los herbarios arriba citados.

Cheilanthes marginata H.B.K.

Planta herbácea de 15 a 25 cm , se caracteriza por presentar el margen reflejo ciliado y decurrente sobre los ejes. Se conocía de Durango (?) Guanajuato, Michoacán, Costa Rica, Guatemala, Honduras, Colombia, Venezuela, Bolivia, Perú, Ecuador a Uruguay y Argentina.

Ejemplar examinado: MEXICO: ESTADO DE NUEVO LEON, MUNICIPIO GENERAL ZARAGOZA: El Salto; 27-VII-1982, alt. 1500 m, bosque caducifolio. S.Favela 52 (ENCB,UNL.)

Cheilanthes villosa Davenp.

Planta herbácea de 15 a 30 cm, con pínnulas orbiculares, pubescentes sobre ambas superficies. La distribución conocida de este taxa es del oeste de Texas al sureste de Arizona y Chihuahua.

Ejemplares examinados: MEXICO: ESTADO DE NUEVO LEON, MUNICIPIOS SANTA CATARINA Y MONTERREY: Trayecto del Cañón de la Huasteca al Cañón del Diente 25-26-VIII-1976, alt. 750 m, matorral submontano y bosque de Quercus-Pinus, R.Aguirre s/n (ENCB). MUNICIPIO DE SANTIAGO: Puerto Agua Fría, 3-4-XII-1976. alt. 2000 m. Bosque de Pinus-Quercus, R.Aguirre s/n (ENCB).

Cheiloplecton rigidum (Sw.) Fée

Planta herbácea de 15 a 40 cm, lámina deltoide, coriácea, venas conspícuas, margen reflejo contínuo, rizoma suberecto. Se ha colectado en San Luis Potosí, Jalisco, Colima, Michoacán, México, Hidalgo, Puebla, Veracruz, Guerrero, Oaxaca, Chiapas, Guatemala y El Salvador.

Ejemplares examinados: MEXICO: ESTADO DE NUEVO LEON, MUNICIPIO -- SANTIAGO: Trayecto Cola de Caballo a Las Adjuntas, 26 a 28-IX-1975, alt. 900 m, bosque de Quercus-Pinus, R.Aguirre 500 y 510 (ENCB, -- UNL).

Diplazium lonchophyllum Kunze

Planta herbácea de 50 a 70 cm, lámina pinnada-pinnatífida, pinnas inequilaterales, pinnulas con ápice obtuso a subagudo, indusio li--- near, doble. La distribuciónconocida de esta especie era San Luis -- Potosí, Jalisco, México, Michoacán, Veracruz, Oaxaca, Chiapas, Guatemala, El Salvador, Nicaragua y Costa Rica.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO SANTIA-- GO: Cola de Caballo, 8-VII-1979, bosque de encino, E.González No. - herb. 010206 (UNL.)

Elaphoglossum pilosum (Humb. & Bonpl. ex Willd.) Moore

Planta herbácea de 15 a 33 cm, lámina estéril escamosa con pelos estrellados, escamas del rizoma de color naranja a café rojizo. Su - distribución conocida comprendía Chihuahua, Sinaloa, Nayarit, Jalisco, Michoacán, México, Puebla, Guerrero, Oaxaca, Veracruz, Chiapas, Guatemala, Costa Rica, Colombia y Venezuela.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO GENERAL ZARAGOZA: Cañada La Claraboña "La Escondida", 27-VII-1982, alt. - 2210 m, bosque de pino, S.Favela 13, planta litofitica (ENCB, -- UNL).

Notholaena greggii (Kuhn) Maxon

Planta herbácea de 15 a 25 cm, lámina deltoide a deltoide-lanceolada, bipinnada a bipinnada-pinnatifida, indumento blanco-ceroso, - escamas del rizoma con una banda central negra, peciolo y raquis surcado. Se le conocía de Texas, Chihuahua, Coahuila y Durango.

Ejemplares examinados: MEXICO, ESTADO NUEVO LEON, SANTA CATARINA y MONTERREY: Trayecto del Cañón de La Huasteca al Cañón del Diente, 25-26-VIII-1976, alt. 750 m, matorral submontano y bosque de Quercus-Pinus, R.Aguirre s/n (ENCB). MUNICIPIO SANTA CATARINA: Trayecto Cañón del Pajonal y Cañón de La Sandia, 26-VIII-1976, alt. 1500 m, matorral submontano, R.Aguirre s/n (ENCB).

Notholaena incana Presl

Planta herbácea de 15 a 40 cm, lámina deltoide, tripinnada en la base, indumento blanco-ceroso, escamas del rizoma lineares, últimas pínnulas articuladas. Se ha colectado en Sonora, Chihuahua, San -- Luis Potosí, Jalisco, Michoacán, México, Distrito Federal, Morelos, Puebla, Guerrero, Oaxaca, Chiapas, Guatemala y República Dominicana.

Ejemplares examinados: MEXICO, ESTADO NUEVO LEON, MUNICIPIO SANTIAGO, Trayecto de Las Adjuntas a Potrero Redondo, 6-XII-1976., - alt. 900 a 1400 m, bosque de Pinus-Quercus, planta abundante, --- R.Aguirre 1068, 1118, 1119 y 1152 (UNL), 1068, 1090, 1092, 1093, - 1094, 1097, 1099, 1102, 1123 y 1124 (ENCB).

Pellaea ternifolia (Cav.) Link var. ternifolia

Planta herbácea de 20 a 45 cm, lámina linear, pinnas inferiores ternadas, las superiores enteras. Esta variedad se ha colectado en el sureste de Arizona y Texas, Baja California, Sonora, Chihuahua, - Coahuila, Sinaloa, Durango, Zacatecas, San Luis Potosí, Guanajuato, Jalisco, Michoacan, Guerrero, Hidalgo, Queretaro, México, Tlaxcala, Morelos, Puebla, Oaxaca, Veracruz, Guatemala, Nicaragua, República Dominicana, Venezuela, Colombia, Ecuador, Perú, Bolivia, Argentina y Chile.

Eejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO SANTIAGO: Trayecto de Las Adjuntas a Potrero Redondo, 6-XII-1976, alt. - 900 a 1400 m, bosque de Quercus-Pinus, R.Aguirre 1205 (UNL)

Phlebodium aureum (L.) J. Sm.

Planta herbácea de 15 a 50 cm, lámina pinnatifida, glabra, venas anastomosadas, soros alimentados por dos venillas. Esta especie se - conocía de Chihuahua y San Luis Potosí a Chiapas, Guatemala a Panamá, Colombia y Bolivia, Brasil y norte de Argentina.

Ejemplar examinado: MEXICO: ESTADO NUEVO LEON, MUNICIPIO DE SANTIAGO: Cola de Caballo, 15-V-1979, D.E. Rodríguez A. No. herb. --- 010205, riparío, nombre común "helecho macho". (UNL).

Phyllitis scolopendrium (L.) Newm. var. americana Fernald

Planta de 40 a 45 cm, lámina entera con soros lineares, venas libres. Esta variedad se conocía de New Brunswick, New York, Ontario y Tennessee.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO GENERAL ZARAGOZA: Km 16 Camino a La Encantada, 8-III-1983, bosque de Pinus-Quercus, S.Favela 217, planta terrestre (ENCB, UNL).

Polypodium fallacissimum Maxon

Planta de 3 a 7 cm, lamina entera a pinnatífida, con solo 3 lobulos, envés con escamas densas. Esta especie se le conocia sólo del Cañón de San Lorenzo en Saltillo, Coahuila.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO SANTIAGO: Cañón El Alamo 1-III-1980. E. Ramírez No. herb. 015026, planta saxícola (UNL).

Polypodium hartwegianum Hook.

Planta herbácea de 30 a 40 cm, lámina pinnatifida, pilosa, venación libre. Esta especie se ha colectado en Chihuahua, Durango, Guerrero, Michoacán, Oaxaca, Hidalgo, México, Distrito Federal, Morelos, Puebla, Veracruz, Chiapas, Guatemala y El Salvador.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO GENERAL ZARAGOZA: Segunda Cañada del Agua de San Nicolás "La Encantada", 25-VI-1982, bosque de encino, S.Favela 33 (UNL).

Woodsia mollis (Kaulf.) J.Sm.

Planta herbácea de 20 a 40 cm, lámina pinnada-pinnatifida a bipinnada, pilosa, soros envueltos por un indusio en forma de copa y globoso. La distribución conocida de ésta planta era Baja California Sur, Chihuahua, Durango, Sinaloa, Nayarit, Jalisco, San Luis Potosí, Guanajuato, Hidalgo, Tlaxcala, Morelos, Puebla, México, Distrito Federal, Michoacán, Guerrero, Oaxaca, Veracruz, Chiapas, Guatemala y Nicaragua.

Ejemplar examinado: MEXICO, ESTADO NUEVO LEON, MUNICIPIO GENERAL ZARAGOZA: El Salto, 27-VII-1982, alt. 2100 m. S.Favela, No. herb. 014486 (ENCB, UNL).

Consideraciones generales.

1) Para Nuevo León, encontramos 13 taxa que no se han citado para el Estado, pertenecientes a 10 géneros, 13 especies y 2 variedades.

2) Resulta particularmente importante los siguientes hallazgos: Diplazium lonchophyllum especie reportada fundamentalmente de zonas tropicales y ocasionalmente en bosque de pino-encino, en Nuevo León se colectó en la "Cola de Caballo", mpio. Santiago en bosque de encino y la distribución más al norte conocida era San Luis Potosí y Jalisco.
Phyllitis scolopendrium var. americana, especie conocida en localidades restringidas de Canadá y Estados Unidos de Norteamérica, éste es el primer reporte conocido para México. El hallazgo de ésta variedad en la República Mexicana resulta particularmente interesante, por lo que, en un próximo artículo se comentará más de ésta planta. En Nuevo León es una planta muy escasa, colectada en el mpio. de General Zaragoza.

3) Los nuevos registros para Nuevo León, provienen fundamentalmente de los municipios de Santiago y General Zaragoza, ésto se puede explicar por lo poco exploradas que se encuentran estas zonas.

4) Creemos importante continuar con un programa intensivo de colectas, pues podrían existir otros taxa no conocidos para el Estado.

Resumen:

Especies citadas por primera vez para el Estado de Nuevo León, México: Cheilanthes marginata H.B.K., Cheilanthes villosa Davenp., Cheiloplecton rigidum (Sw.) Fée, Diplazium lonchophyllum Kunze, Elaphoglossum pilosum (Humb. & Bonpl. ex Willd.) Moore, Notholaena greggii (Kuhn) Maxon, Notholaena incana Presl, Pellaea ternifolia (Cav.)Link var. ternifolia, Phlebodium aureum (L.) J. Sm., Phyllitis scolopendrium (L.) Newm. var. americana Fernald, Polypodium fallacissimum Maxon, Polypodium hartwegianum Hook. y Woodsia mollis (Kaulf.) J. Sm.

Summary

The following species are cited for the first time from Estado de Nuevo León, México: Cheilanthes marginata H.B.K., Cheilanthes villosa Davenp., Cheiloplecton rigidum (Sw.) Fée, Diplazium lonchophyllum Kunze, Elaphoglossum pilosum (Humb. & Bonpl. ex Willd.) Moore, Notholaena incana Presl, Pellaea ternifolia (Cav.) Link var. ternifolia, Phlebodium aureum (L.) J. Sm., Phyllitis scolopendrium (L.) Newm. var. americana Fernald, Polypodium fallacissimum Maxon, Polypodium hartwegianum Hook. and Woodsia mollis (Kaulf.) J.Sm.

Bibliografía consultada:

Aguirre, C.R. 1983. Contribución al conocimiento de la pteridoflora del Estado de Nuevo León, México. Tesis profesional, Fac. de Cienc. Biol. Universidad de Nuevo León.

Clausen, R.T. 1950. Ferns of the Monterrey región, México. Am. Fern. Journ. 40 (1): 89-97.

Favela, L.S. 1983. Estudio de la flora pteridológica del municipio de General Zaragoza, Nuevo León. Tesis profesional, Fac. de Cienc. Biól. Universidad de Nuevo León.

Fernald, M.L. 1935. Critical plants of the upper Great Lakes region of Ontario and Michigan. Rhodora 37: 197-222.

Knobloch, I.W. & D.S. Correll, 1962. Ferns and fern allies of Chihuahua, México. Texas Research Foundation. Renner, Texas, 198 p.p.

Knobloch, I.W. 1976. Morphological characters in Cheilanthes together with a Key to North and Central American species.

Flora Bd. 165: 507-522.
Löve, A. & D. Löve. 1973. Cytotaxonomy of the boreal taxa of -- Phyllitis, Acta Bot. Acad. Sci. Hung. 19:201-206.
Maxon, W.R. 1915. Studies of tropical american Ferns No. 6. Contr. - U.S. Nat. Herb, 10 (7): 542-600.
Rojas, M.P. 1965. Generalidades sobre la vegetación del Estado de -- Nuevo León y datos acerca de su flora. Tesis doctoral UNAM, México.
Smith, A.R. 1981. Flora of Chiapas Part. 2 Pteridophytes. The Calif. Acad. of Sciences 370 p.p.
Tryon, R.M. 1956. A revision of american species of Notholaena. -- Contr. Gray Herb. Harvard Univ. 179-:1-106.
Tryon, A.F. 1957. A revision of the fern genus Pellaea section -- Pellaea. Ann. Missouri Bot. Gard. 44 (2): 125-193.

FLORA PALINOLOGICA DEL VALLE DE MEXICO

PRESENTACION

Rodolfo Palacios-Chávez*
David Leonor Quiroz-García
Delfina Ramos-Zamora
Ma. de la Luz Arreguín Sánchez *
Escuela Nacional de Ciencias Biológicas,
Instituto Politécnico Nacional, Dpto.
Botánica, 11340, México D.F.
* Becarios de COFAA.

Dentro del Proyecto Flora y Vegetación del Valle de México, se han venido realizando investigaciones ecológicas y florísticas. Los resultados de estas últimas se presentan en forma de descripciones y claves para familias, géneros, especies y variedades de las plantas silvestres del Valle de México.

Como complemento a los estudios de la flora, se ha considerado necesario emprender las investigaciones palinológicas tanto para proporcionar mas información de interés taxonómico como por su utilidad en la identificación de palinomorfos en el registro fósil, en la ecología de la polinización, en la alergología y en la melisopalinología.

Los granos serán acetolizados con la técnica de Erdtman (1943) levemente modificada, el montaje será en gelatina glicerinada y las preparaciones serán depositadas en la palinoteca del Departamento de Botánica de la Escuela Nacional de Ciencias Biológicas del I.P.N.

Las descripciones morfológicas del polen se harán en base de los taxa incluidos en la Flora Fanerogámica del Valle de México de Rzedowski & Rzedowski (1979), la secuencia descriptiva será fundamentalmente la de Hyde &Adams (1958). La terminología utilizada será basicamente la de Erdtman (1966) y la de Faegri & Iversen (1964).

Se incluirán claves dicotómicas para separar los diferentes taxa en caso de que ésto sea posible y se propocionarán datos sobre aspectos taxonómicos, evolutivos o paleopalinológicos.

Todas las descripciones irán ilustradas con fotomicrograficas en blanco y negro al microscopio de luz a exepción de aquellos taxa que no sean posibles diferenciarlos con éste aumento, entonces se recurrirá al microscopio electrónico de barrido.

Las descripciones de las familias o de los géneros se irán publicando, no necesariamente en el orden establecido por Rzedowski & Rzedowski (1979). Una vez que se complete el conocimiento de los granos de polen de las especies que se encuentran en el Valle de México, se elaborarán claves generales para todos los taxa.

Las muestras de polen estudiadas provendrán de preferencia de los ejemplares de herbario en que se han basado los estudios florísticos.

RESUMEN

El proyecto Flora y Vegetación del Valle de México, ha estado auspiciando la realización de investigaciones ecológicas y florísticas. Dentro del mismo marco se ha considerado necesario ampliar la investigación a aspectos palinológicos. El objetivo de la serie de publicaciones que se inicia es conocer la flora palinológica del Valle de México.

SUMMARY

Within the scope of Flora y Vegetación del Valle de México, different floristic and ecological topics are being carried on. It has been considered necessary to expand the research with palinological aspects. The main objetive of this series of publications is to do a palinological study of the Flora of Valle de México.

BIBLIOGRAFIA CITADA

1) Erdtman, G. 1943. An introduccion to pollen analisis. The Ronald Press Co. New York. 239 pp.
2) Erdtman, G. 1966. Pollen morphology and plant taxonomy. Angiosperms (An Introduction to Palynology I). Hafner Publishing Co. New York and London. 553 pp.
3) Faegri, K. & J. Iversen. 1964. Texbook of pollen analysis. Hafner Publishing Co. New York. 273 pp.
4) Hyde, H. A. & F.F. Adams. 1958. An atlas of airborne pollen grains. The Mac Millan Co. Ltd. London. 112 pp.
5) Kremp, G.O.W. 1968. Morphologic Encyclopedia of Palynology. The University of Arizona Press. Tucson. 263 pp.
6) Rzedowski, J. & G.C. Rzedowski. 1979. Flora Fanerogámica del Valle de México. Vol. 1. 401 p.p. CECSA, México.

MORFOLOGIA DE LOS GRANOS DE POLEN DE LAS ESPECIES DEL GENERO BERBERIS DEL VALLE DE MEXICO

Rodolfo Palacios-Chávez *
María de la Luz Arreguín-Sánchez *
D. Leonor Quiroz-Garcia
Delfina Ramos-Zamora

Departamento de Botánica
Escuela Nacional de Ciencias Biológicas.
Instituto Politecnico Nacional 11340
México, D.F. * Becarios de COFAA

Berberis es un amplio género Asiático de aproximadamente 175 especies de las cuales 50 especies, 8 variedades y una subespecie se citan para América del Norte; 32 de estas especies existen en México y para el Valle de México se conocen solo 2 especies, B. moranensis y B. schiedeana,

Dentro de la familia Berberidaceae. los géneros Berberis y Mahonia son muy cercanos, sin embargo algunos autores como Ahrendt (1961) los consideran taxa diferentes separándolos fundamentalmente por los tipos de hoja, simples en Berberis e imparipinnado-compuestas para Mahonia, asimismo, la presencia de espinas en los tallos es propio para el primero y la ausencia de ellas del segundo, pero autores como Marroquín (1972) considera a Mahonia como un subgénero de Berberis.

El criterio de delimitación de los taxa seguido por Rzedowski & Rzedowski (1979) fué el de Marroquín (1972) y la diferencia fundamental entre las 2 especies de Berberis del Valle de México es el número de folios; ambas especies son arbolitos bajos o arbustos que se encuentran en altitud que varian entre los 2400 y 4000 m, en bosques de Pinus, Abies o Quercus.

Los propósitos fundamentales de este trabajo, son dar a conocer la morfología de los granos de polen de las dos especies anteriormente referidas. Hasta ahora no hay evidencias que el polen de Berberis, se halla encontrado en el registro fósil.

ANTECEDENTES

Entre los diversos autores que han descrito el polen de Berberis, se encuentran Faegri e Iversen (1964), quienes lo incluyen entre los granos sincolpados, con surcos en forma de espiral y con la exina superficialmente perforada o perfosulada. Erdtman (1966) lo describe como espiroaperturado, con la sexina más gruesa que la nexina y con la ornamentación levemente reticular. Kapp (1969) en su descripción indica que existen aperturas que tienen la apariencia de ser 4, unidas en espiral y con la superficie verrugosa y hace la aclaración que algunos granos de polen tienen la exina dividida en

6 ó más placas hexagonales, lo que puede ser un estado de maduración tardia o bien el polen es dimorfico. González (1969) describe dos especies del Valle del Mezquital como granos sincolpados, tectados y fosulados. Heusser (1971) en su estudio palinológico de la flora de Chile, hace la descripción del polen de seis especies, con las siguientes características; monadas, apolares, sincolpadas con aberturas espiraladas, perforadas o perfosuladas.

Markgraf & D'Antoni (1978) para tres especies argentinas de Berberis, encuentran que su polen es sincolpado, variando en su ornamentación de perforado a perfosulado y Newicke y Skvarla (1981) en un estudio más profundo de la familia Berberidaceae, consideran que el polen de Berberis es semejante al de Mahonia y las aberturas de ambos géneros pueden ser clasificadas como irregulares o espiraladas y superficialmente la exina puede ser fosulada o perforada (punteada).

DESCRIPCION DEL POLEN DE LAS ESPECIES DE BERBERIS DEL VALLE DE MEXICO

Berberis moranensis Hebenstr. & Ludw.

Sta. Catarina del Monte
Texcoco, Méx.
Ventura 754 (ENCB) Figs. 1 a 5

Polen sincolpado, espiralado, tectado, esferoidal, de 40 (42.6) 48.1 X 39 (42.1) 45.5 micras. Exina de 2 micras de grosor con la sexina mucho más gruesa que la nexina y superficialmente es punteada o fosulada. Colpos irregularmente espiralados, con las márgenes dentadas y membranas escabrosas. En algunos granos los colpos dividen al grano en 5 ó 7 pequeñas placas y no parecen ser espiralados.

Berberis schiedeana Schl.

Desierto de los Leones, D.F.
Paray 590 (ENCB) Figs. 6 a 10

Polen sincolpado, espiralado, tectado, esferoidal de 39 (42.1) 45.5 X 37 (41.6) 45.5 micras. Exina de 2.6 micras de grosor, con la sexina más gruesa que la nexina y superficialmente es punteada o fosulada. Colpos irregularmente espiralados, con las márgenes dentadas y membranas escabrosas. Al igual que en la descripción anterior, las aberturas en algunos granos se disponen de tal manera que dividen a estos en 5 ó 7 pequeñas placas.

DISCUSION Y CONCLUSIONES

De acuerdo a las observaciones y descripciones que se incluyen en este trabajo, el polen de Berberis puede presentar dimorfismo, puesto que en algunos granos las aberturas son espiraladas y en otros las aberturas se disponen de tal manera que dividen al grano en 5 ó 7 pequeñas placas, característica que ya ha sido observada también por otros autores. Salvo el grosor de la exina que es un poco mayor en el polen de B. schiedeana no existen otras diferencias en las microsporas de ambas especies.

Nowicke y Skvarla (1981) llegan a la conclusión que el polen de Berberis es muy semejante al de Mahonia y no puede ser diferenciado con el microscopio de luz ni con el microscopio electrónico de barrido o el de transmición y consideran que tanto en Berberis como en Mahonia existen granos inaperturados pero presentan rompimientos que pueden ser clasificados en irregulares y espiralados. La categoria de irregular se aplica a los granos que presentan grietas o rompimientos y ocasionalmente los surcos delimitan la superficie del grano en pequeñas áreas como placas. La abertura en espiral puede ser considerada como preformada (se forma en un estadio temprano de la meiosis), pero la configuración en los surcos no es uniforme. Esta semejanza entre los granos de polen de Berberis y Mahonia apoya el criterio de algunos autores de considerarlos como el mismo género.

Por lo que respecta a los granos de polen de B. moranesis y B. schiedeana que se estudian en este trabajo, se puede inferir que las características de dichos granos coinciden con la mayor parte de los autores que han descrito el polen de otras especies de este taxon exceptuando a Erdtman (1966) y a Kapp (1969) quienes consideran respectivamente, que la ornamentación es levemente reticular y verrugada, pero probablemente esto se deba a errores en la interpretación de la superficie de la exina.

Cabe agregar que el polen de las dos especies que se estudian en este trabajo no han sido descritos en la bibliografia palinológica.

RESUMEN

En este trabajo se estudian los granos de polen de dos especies del género Berberis, que se encuentran en el Valle de México, (B. moranesis y B. schiedeana) los cuales resultaron ser sincolpados, espiralados y esferoidales. El polen de ambas especies presenta dimorfismo, los colpos generalmente son espiralados, pero en algunos granos se agrupan de tal manera que pueden dividir al grano en 5 ó 7 pequeñas placas. La ornamentación puede ser fosulada o punteada. Muy pocas diferencias existen en el polen de ambas especies.

SUMMARY

In this paper are studied pollen grains of Berberis moranensis and B. schiedeana from Valle de México, which are syncolpate, spiralate and spheroidals. Pollen grains of both species can show dimorphism, the colpi usually is spiralate but some grains can be divided for the furrow in 5 or 7 small plates. The ornamentation is fossulate or punctate. Few differences there are in pollen grains of both species.

BIBLIOGRAFIA CONSULTADA

Ahrendt, L.W.A. 1961. Berberis and Mahonia. A taxonomic revision Journ. Linnean Soc. of London 57 (369): 1-410

Erdtman, G. 1966. Pollen morphology and plant taxonomy Angiosperms. Hafner Publishing Co. 553 pp.

Faegri, K. & J. Iversen. 1964. Textbook of pollen analysis. Hafner Publishing Co. 237 pp.

Gonzalez Q., L. 1969. Morfología polínica: la flora del Valle del Mezquital, Hidalgo. I.N.A.H. Paleoecologia 3: 1-185.

Heusser, C.J. 1971. Pollen and spores of Chile. The University of Arizona Press. 167 pp.

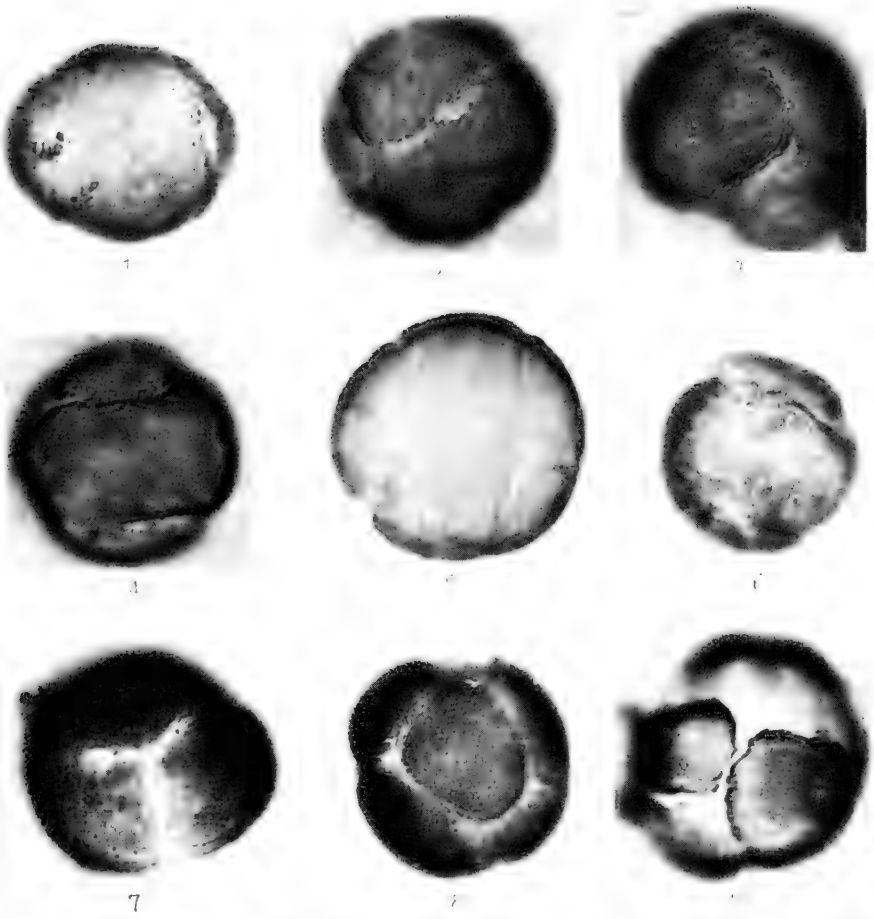
Markgraf, V. & H. L. D'Antoni 1978 Pollen flora of Argentina. The University of Arizona Press. 208 pp.

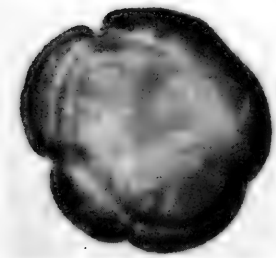
Marroquín, J.S.A. 1966. Notas sobre la distribución geográfica de dos especies de Mahonia (Berberidaceae) en el Norte de México. The Southwestern Naturalist 11(2): 238-244.

Marroquín, J.S.A. 1972: A monographic study of the genus Berberis L. in México. Northeastern University. Ph. D. Thesis. ined. 177 p.p.

Nowicke, J.W. & J.J. Skvarla. 1981 Pollen Morphology and phylogenetic relationships of Berberidaceae. Smithsonian Institutions Press. 50: 1-83.

Rzedowski, J. & G.C. de Rzedowski. 1979. Flora Fanerogámica del Valle de México. Compañia Editorial Continental S.A. 1: 207-208.





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Berberis moranensis: 1) Vista superficial mostrando la ornamentación X 1200. 2) Vista superficial mostrando la abertura X 1200. 3) Vista superficial mostrando el rompimiento de las aberturas X 1200. 4) Colpo espiralado X 1200. 5) Corte óptico X 1200. Berberis schiedeana: 6) Vista superficial mostrando la ornamentación X 1200. 7) Vista superficial mostrando ornamentación y abertura X 1200. 8) Vista superficial con la abertura dividiendo al grano en pequeñas placas X 1200 9) Vista superficial donde se aprecia el rompimiento de las aberturas X 1200. 10) Corte óptico X 1200.

MORFOLOGIA DE LOS GRANOS DE POLEN DEL GENERO *Linum* (LINACEAE) DEL VALLE DE MEXICO *

Ma. de la Luz Arreguín-Sánchez **
Rodolfo Palacios-Chávez **
David Leonor Quiroz-García
Delfina Ramos-Zamora
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional
Dpto. Botánica, 11340, México D.F.

INTRODUCCION

El género *Linum* incluye plantas de flores azules y de flores amarillas; estas últimas han sido segregadas por algunos autores dentro del género *Cathartolinum*; en este género también se incluía *C. digynum* (Gray) Small taxa que actualmente ha sido considerado como un género diferente monoespecífico *Sclerolinon digynum* (Gray) Rogers. Se conocen en la actualidad alrededor de 25 especies de *Linum* con flores amarillas y 5 de flores azules para Norte y Centroamérica. En México se han citado 4 especies con flores azules y 19 de flores amarillas. Para el Valle de México se conocen 4 de flores amarillas y 2 de flores azules.

El propósito fundamental de éste trabajo, consiste en dar a conocer la morfología de los granos de polen del género *Linum* en el Valle de México y por medio de una clave se pretende separar las especies.

ANTECEDENTES

Entre los trabajos que tratan la morfología polínica de *Linum*, encontramos el de Saad (1961), quién estudio 44 especies, dando especial atención a la estratificación del esporodermo, además marcó algunas tendencias evolutivas del género basándose en los caracteres palinológicos y sugirió se realice una reclasificación tomando en consideración el polen. Xavier & Rogers (1963), estudiaron 14 especies y 6 variedades del género *Linum*, e incluyen una clave para separar los taxa por medio del polen, breves descripciones y reunen las especies estudiadas en cuatro grupos en base a la morfología del polen, ubicando en el grupo I las especies primitivas y en el grupo IV las mas avanzadas. En la bibliografía revisada se han encontrado descripciones del polen de *L. usitatissimum*, especie muy común en America introducida del Antiguo Mundo; de *L. rzedowskii*, especie muy localizada en el mpio. de Ixtapaluca, Edo. Méx., además de algunos datos polínicos de *L. schiedeanum*, del resto de las especies no se tienen descripciones.

MATERIALES Y METODOS

Los granos de polen fueron tratados mediante la técnica de Erdtman (1943) levemente modificada y las medidas se hicieron tomando en consideración por lo menos 20 granos de polen, en las descripciones se proporcionan las medidas extremas y la media entre un parentésis; las primeras corresponden al eje polar y las segundas al eje ecuatorial.

* Trabajo parcialmente subsidiado por el Consejo Nacional de Ciencia y Tecnología, México.

** Becarios de COFAA del I.P.N.

CLAVE PARA DIFERENCIAR LAS ESPECIES DEL GENERO Linum DEL VALLE DE MEXICO.

1.- Polen periporado..... L. australe var. glandulosum
Figs. 1,2,3

1.- Polen tricolpado

2.- Ornamentación con procesos piloides o baculados o bien con báculos y verrugas

3.- Granos de polen esféricos con ornamentación formada por báculos y verrugas..... L. mexicanum
Figs. 4,5,6

3.- Granos de polen esférico o semiangular con ornamentación pilada o baculada

4.- Polen menor de 45 micras de diámetro, índice área - polar media..... L. schiedeanum
Figs. 13, 14

4.- Polen mayor de 50 micras de diámetro, índice área - polar grande..... L. usitatissimum
Figs.15,16,17 y 18

2.- Ornamentación con procesos verrugados o gemados

5.- Nexina de más o menos 1 micra de grosor, ornamentación de 1.5 a 2.5 micras de largo, índice área polar grande ..... L. rzedowskii
Figs.10,11 y 12

5.- Nexina de 1.5 a 2.5 micras de grosor, ornamentación menor de 1.5 micras de largo, índice área - polar ausente..... L .orizabae
Figs.7,8 y 9

DESCRIPCION E ILUSTRACION DE LOS GRANOS DE POLEN

Linum australe var. glandulosum Rogers
Cerro del Pino, Ixtapaluca, Méx.
M.L. Arreguín 346, XI-1972
(ENCB). Figs. 1,2 y 3

Polen periporado, intectado, esferoidal de 51.5(63) 70 micras por 52 (62.5) 69 micras; índice P/E = 1.01. Exina de 4 a 5 micras de grosor, sexina de 3.5 a 4 micras de grosor con la superficie baculada - de 1 a 2 micras de largo, nexina menor de 1 micra. Poros diez, de - 8.5 a 12.5 micras de diámetro.

Linum mexicanum H.B.K. — Cerca de San Andrés Pedregal de San Angel, D.F. J. Rzedowski 1661, 31-VIII-1952 (ENCB). Figs. 4,5 y 6

Polen tricolpado, intectado, esferoidal de 56(61) 66 micras, índice P/E = 1.01. Vista polar circular de 56.5 (65) 72 micras por 61 — (67) 77 micras de diámetro. Exina de 4.5 micras de grosor, sexina de 3.5 micras, ornamentación formada por báculos y verrugas de 1 a 2 micras de largo, nexina de más o menos 1 micra. Surcos de 33.5 a 46.5 micras de largo por 3.3 a 7 micras de ancho. Indice del área polar 0.73, grande.

Linum orizabae Planch. — 3 km al E de San Rafael, Mpio. Tlalmanalco, Méx. J.Rzedowski 19848, 27-V-1965 (ENCB). Figs. 7,8 y 9.

Polen tricolpado, intectado, esferoidal a suboblato de 50.5(54) 59 micras por 49(53)63.5 micras; índice P/E = 1.02. Vista polar circular de 50.5(57)63.5 micras por 51.1 (57.5) 62.5 micras de diámetro. Exina de 4 a 4.5 micras de grosor, sexina de 2.5 a 3 micras y la superficie con verrugas o gemas de 1 a 1.5 micras de largo, nexina de 1.5 micras. Surcos de 23 a 27 micras de largo por 1.5 a 2.5 micras de ancho. Indice del área polar O, ausente.

Linum rzedowskii Arreguín — Llano Pinahua, 8 km al SW de Río Frío, Mpio. Ixtapaluca, Méx. J. Rzedowski 37283, 24-V-1981 (ENCB). Figs. 10, 11 y 12

Polen tricolpado, intectado, esferoidal de 52(58)59 micras; índice P/E = 1.07. Vista polar circular de 54(58)65 micras por 56(58)72 micras de diámetro. Exina de 5 a 6 micras de grosor, sexina de 4 a 5 micras y la superficie con gemas o verrugas de 1.5 a 2.5 micras de largo, nexina de más o menos 1 micra. Surcos de 17 a 34 micras de largo por 4 a 6 micras de ancho. Indice del área polar 0.60, grande.

Linum schiedeanum Schl. & Cham. — Cerro del Tigre al NW de Atizapán, México. J.Rzedowski 32045, 4-VIII-1974 (ENCB). Figs. 13 y 14.

Polen tricolpado, intectado, vista ecuatorial poco frecuente, oblato de 35.5(41.5) 47 micras por 33(37.5)42 micras; índice P/E = 1.10. Vista polar circular o semiangular de 33.5(40.5)45 micras por 34.5(40) 45 micras de diámetro. Exina de 3 micras de grosor, sexina de 2 micras con la superficie pilada de menos de 1 micra de largo, nexina de más o menos 1 micra de grosor. Surcos de 20 a 25 micras de largo por 2 a 4 micras de ancho. Indice del área polar 0.36, media.

Linum usitatissimum L. 2 km al S del Guarda, D.F. M. Villegas 626, 25-IX-1966 (ENCB). Figs. 15,16,17 y 18

Polen tricolpado, intectado, suboblato de 53(56) 61 micras por 53 (56.5)57.5 micras, índice P/E=0.99. Vista polar circular o semiangular de 54(57)60 micras por 55(57.5)60 micras de diámetro. Exina de 3.5 micras de grosor, sexina de 2 a 2.5 micras con la superficie pilada, ornamentación de menos de 1 micra de largo, nexina de más o menos 1 micra. Sucros de 29 a 36 micras de largo por 3.5 a 14 micras de ancho. Indice del área polar 0.51, grande.

DISCUSION Y CONCLUSIONES

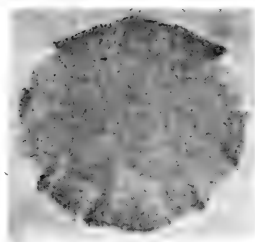
1) Small (1907) segregó las especies norteamericanas de flores amarillas dentro del género Cathartolinum, mientras que las de flores azules las conservó en Linum. morfología del polen no confirma la validez de esta segregación, pues las especies con flores azules presentan el mismo tipo polínico que algunas con flores amarillas.

En el caso particular de las especies estudiadas, L.schiedeanum y L. usitatissimum palinológicamente son muy semejantes, sin embargo, la primera especie tiene flores amarillas y la segunda azules, lo mismo sucede con L. rzedowskii de flores azules y L. orizabae de flores amarillas, cuyos granos de polen son muy semejantes.

2) Rogers (1968), no reconoce la segregación hecha por Small (1907), desconoce al género Cathartolinum considerando sus especies como miembros de Linum, y las plantas de flores amarillas las ubica en dos grandes grupos a los que llama el complejo de "L. schiedeanum" y complejo de "L. rigidum" .

El primer grupo lo considera como un grupo primitivo por presentar un amplio espectro de caracteres así como una gran variación, la mayoría de las especies de éste complejo se encuentran en el este y centro de México. Puesto que esta zona fue colonizada por plantas desde el Cretácico, Rogers (op. cit.) cree que pudo ser el sitio de establecimiento y diferenciación temprana del género en Norteamérica. Las especies aquí incluídas presentan polen tricolpado.

El complejo "L. rigidum" según el mismo autor es un grupo muy evolucionado por su morfología uniforme y la capacidad de muchas de las especies a hibridizarse. Las especies aquí incluidas presentan polen periporado, en nuestra área el representante de éste complejo es L. australe var. glandulosum.



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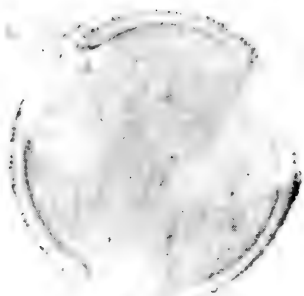

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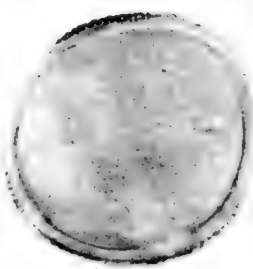

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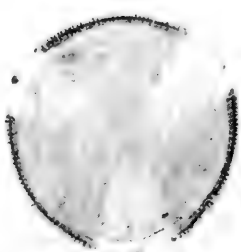

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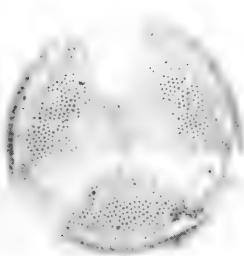

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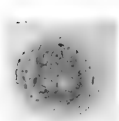

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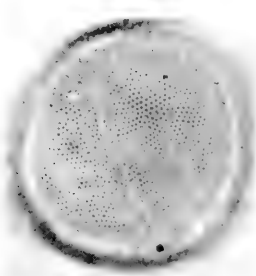

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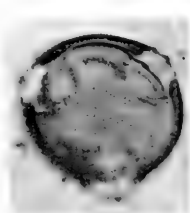

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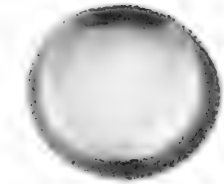
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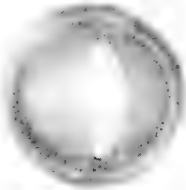
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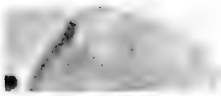
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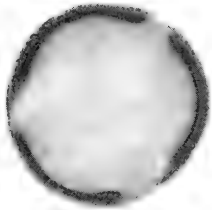
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L. australe var. glandulosum: 1) exina X 400. 2) detalle exina y poro X 1000. 3) vista superficial X 400. L. mexicanum: 4) vista polar, exina y ornamentación X 1000. 5) vista ecuatorial, exina y ornamentación X 1000. 6) vista superficial y colpo X 1000. L. orizabae: 7) vista polar, exina y ornamentación X 1000. 8) vista superficial X 1000. 9) vista ecuatorial con colpo X 1000. L. rzedowskii: 10) vista ecuatorial, exina X 1000. 11) superficial X 1000. 12) ecuatorial con colpo X 1000. L. schiedeanum: vista polar, colpos y grosor de la exina X 1000. 14) detalle colpo y ornamentación X 1000. L. usitatissimum: 15) vista polar, exina X 1000. 16) superficial X 1000. vista ecuatorial y colpo X 1000, 18) detalle colpo y exina X 1000.

3) Los resultados de este trabajo confirman la opinión de Saad (1961) así como la de Xavier y Rogers (1963) de que en el género Linum se pueden diferenciar las especies por la morfología de sus granos de polen, ya que fué posible separar los 6 taxa estudiados.

RESUMEN

El género Linum en el Valle de México comprende seis especies. De acuerdo con el análisis realizado se observa que los granos de polen son periporados y tricolpados. Fué posible distinguir cuatro tipos de ornamentación: baculada, pilada, gemada y verrugada.

Se elaboró una clave para separar las especies de acuerdo a la morfología de los granos de polen y los principales caracteres que se utilizaron para separar las especies fueron: aberturas, ornamentación, forma, tamaño del grano, grosor de la nexina e índice del área polar.

SUMMARY

The genus Linum in the Valle de México is represented by six species. Pollen grains are periporate and tricolpate Four types of ornamentación were observed; baculate, pilate, verrucate and gemmate.

A key to separate species based on pollen characters is included and the principal characters useful for identification are: apertures, ornamentation, form, size, nexine thickness and polar area index.

BIBLIOGRAFIA CONSULTADA

1) Arreguín-Sánchez, M.L. 1985 Una nueva especie de Linum (Linaceae) del Valle de México. Phytologia 57(4): 261-266.
2) Erdtman, G. 1943. An introduction to pollen analysis. The Ronald Press Co. New York. 239 p.p.
3) Erdtman, G. 1966. Pollen morphology and plant taxonomy Angiosperms (An Introduction to Palynology I). Hafner Publishing Co. New York and London 553 pp.
4) Faegri K. & J. Iversen 1964. Texbook of pollen analysis. Hafner Publ. Co. New York, 237 p.p.
5) Kremp, G.O.W. 1968. Morphologic Encyclopedia of Palynology. The University of Arizona Press. Tucson. 263 p.p.
6) Rogers, C.M. 1968 Yellow-flowered species of Linum in Central America and Western NorthAmerica. Brittonia 20(2): 107-135.
7) Rogers, C.M. 1966. Sclerolinon a new genus in the Linaceae. Madroño 18: 181-184
8) Rzedowski, J. & G.C. Rzedowski. 1979. Flora Fanerogámica del Valle de México. 1:368-371. CECSA, México.
9) Saad, S.I. 1961 Pollen morphology and sporoderm stratification in Linum. Grana Palynol. 3: 109-129.
10) Small, J.K. 1907. Linaceae in North Amer. Flora 25: 67-87.
11) Xavier, K.S. & C.M. Rogers. 1963. Pollen Morphology as a taxonomic tool in Linum. Rhodora 65: 137-145.

NEW COMBINATIONS IN *HOUSTONIA* AND *OLDENLANDIA* (RUBIACEAE)

Edward E. Terrell
Department of Botany, University of Maryland,
College Park, Maryland 20742

Recent studies of North American *Houstonia* and *Oldenlandia* have shown that the following new combinations are needed.

Houstonia greenei (A. Gray) Terrell, comb. nov.

Oldenlandia greenei A. Gray, Proc. Amer. Acad. 19: 77. 1883. Lectotype: Pinos Altos Mountains, New Mexico, 1880, *E. L. Greene* 149 (GH!); syntype: Ramsey's Canyon, Arizona, 1882, *Lemmon* 2719 (GH!, PH!).
Hedyotis greenei (A. Gray) W. H. Lewis, Rhodora 63: 222. 1961.

This species is native to southern Arizona and southern New Mexico. It is closely related to *Houstonia arenaria* Rose, which occurs in Baja California.

Houstonia nigricans var. *floridana* (Standley) Terrell, comb. nov.

H. floridana Standley, N. Am. Fl. 32(1): 36. 1918. Type: Cocoanut Grove, Biscayne Bay, Florida, July 1895, *A. H. Curtiss* 5484 (Holotype, US!; isotypes, FLAS!, NY!)
Hedyotis purpurea var. *floridana* (Standley) Fosberg, Castanea 19: 36. 1954.

Houstonia nigricans var. *pulvinata* (Small) Terrell, comb. nov.

H. pulvinata Small, Bull. N.Y. Bot. Garden 1: 289-290. 1899. Lectotype: sandy soil, St. Augustine, Florida, July 1876, *Mary C. Reynolds* (NY!; isotype, NA!); syntypes: same locality and date, *A. P. Garber* (NY!, US-2!)
Hedyotis nigricans var. *pulvinata* (Small) Fosberg, Castanea 19: 37. 1954.

These two varieties are the result of a detailed study of *Houstonia nigricans* in the southern United States and will be discussed further in a separate paper.

Oldenlandia drymarioides (Standley) Terrell, comb. nov.

Houstonia drymarioides Standley, Jour. Wash. Acad. Sci. 18: 162. 1928. Type: Mexico. Mountains south of Victoria, Tamaulipas, alt. 1000 m., 9 April 1926, Robert Runyon 870 (Holotype: US!; Isotype: F!). Paratype: same locality and date, Robert Runyon and B. C. Tharp 4039 (TEX!, US!).

Hedyotis drymarioides (Standley) W. H. Lewis, Rhodora 63: 221. 1961.

This species is known only from the collections cited. Seed and all other morphological characteristics indicate that it is closely related to Oldenlandia ovata S. Watson (Hedyotis watsonii W. H. Lewis) and O. microtheca (Schlechtendahl & Chamisso) DC., which are native to northern and central Mexico.

Seymeria cassioides (Walt.) Blake: New to Arkansas

by

R. Dale Thomas, Sherri Leslie, and Susan Hooks. The NLU Herbarium, Stubbs Hall 232, Dept. of Biology, Northeast Louisiana University, Monroe, 71209-0502.

Recent field work in southern Arkansas has produced several interesting species. One of these, Seymeria cassioides (Walt.) Blake, is nes to the state. The only species of this scrophulariaceous genus given by Smith (1978) is S. macrophylla Nutt. Correll and Johnston (1970) give the range of S. cassioides as being from the Bahamas and from pinelands of east Texas, Florida, and Louisiana and north to Virginia, Tennessee and Alabama. It is scattered in pine woods in Louisiana and was collected during a recent survey of the plants of nearby Union Parish in Louisiana (Moore 1984).

During August, 1984, Thomas, Leslie, and B. E. Dutton collected this species from Bradley County, Arkansas while doing a survey of the plants of that county for Leslie's M.S. thesis study at NLU. The citation is:

> BRADLEY, ARKANSAS: Johnsville Prairie, 5.9 miles south of Johnsville and Ark. 189, off unnamed dirt county road in pine woods, Sec. 22, T16S, R9W, 5 August 1984, Thomas 90268 and Leslie 295. The population was visited and collected from again on 21 August 1985 (Thomas 93437 and Leslie 1238) and again on 28 August 1985 (Leslie 1430).

While doing field work for the survey of plants of Ashley County, Arkansas for the M.S. thesis project of Susan Hooks, two of the authors found a large population of Seymeria cassioides near the Ouachita River in that county. The citation is:

> ASHLEY, ARKANSAS: Along roads in pine woods south of U.S. 82 and east of the Ouachita River in Felsenthal National Wildlife Refuge west of Crossett, Sec. 18, T18S, R9W, Thomas 93193 and Hooks 1199, 2 August 1985. The site was collected from again on 14 August 1985 (Thomas 93377 and Hooks 1357) and again on 10 October 1985 (Hooks 1405).

Both these populations are large and well established. Vouchers are deposited at NLU and are available for study.

LITERATURE CITED

Correll, D. S. and M. C. Johnston. 1970. Manual of the Vascular Plants of Texas. Renner: Texas Research Foundation. 1881 p.

Moore, D. C. 1984. A Preliminary Survey of the Vascular Plants of Union Parish, Louisiana. Unpublished Masters of Science Thesis, Northeast Louisiana University, Monroe. 118 p.

Smith, E. B. 1978. An Atlas and Annotated List of the Vascular Plants of Arkansas. Fayetteville: The University of Arkansas Book Store. 592 p.

ANNOUNCEMENT

NORTHEAST LOUISIANA UNIVERSITY publishes a series of articles about the Flora of Louisiana entitled "Contributions of the Herbarium of Northeast Louisiana University." To date six numbers have been published as follows:

1. 1980. A Checklist of the Vascular Plants of Morehouse, Richland, and West Carroll Parishes of Northeast Louisiana. Now out of print.
2. 1981. A Checklist of the Woody Plants of Louisiana. Now out of print.
3. A Preliminary checklist of the dicotyledons of Louisiana. $5.00. Published in 1982.
4. A Preliminary checklist of the Pteridosperms, Gymnosperms, and Monocotyledons of Louisiana. 3.00. Published in 1984.
5. A Preliminary Checklist of the Vascular Flora of Allen Parish, Louisiana. 2.00. Published in 1984.
6. A Preliminary Checklist of the Vascular Flora of Washington and St. Tammany Parishes, Louisiana. 3.00. Published in 1985.

The last four publications are available from Dr. R. Dale Thomas, Director of the NLU Herbarium, Department of Biology, 232 Stubbs Hall, Northeast Louisiana University, Monroe, La. 71209-0502.

BOOK REVIEWS

Alma L. Moldenke

"RANCHO LA BREA: TREASURES OF THE TAR PITS" edited by John M. Harris & George T. Jefferson, vii & 87 pp., 69 color & 10 b/w pl., 4 color maps, & 3 color & 2 b/w tab.. University of Washington Press, Seattle, Washington 98105. 1985. $9.95 paperbound.

This very attractive, informative book was prepared by the involved scientific staff of the Natural History Museum of Los Angeles and of the Page Museum of La Brea Discoveries in Hancock Park, a new satellite facility of the former in Los Angeles, California. Here is both an important tourist and study site for these tar or asphalt pit-caught animals and plants that, when restored, provide a detailed picture of life in North America during the closing phases of the last great Ice Age in the Pleistocene. It is much more than a souvenir because it explains how the area was previously used, "how the asphalt deposits were formed, how the fossils came to be preserved, and how they were later discovered and excavated. Each group of fossils is described, illustrated, and placed in context," including the mammals, birds, reptiles, amphibians (all topheavy with carnivores over herbivores), fish, invertebrates and plants -- some even stuck between fossil teeth.

"PLANET EARTH 2000" by David Lambert in Your World 2000 Series edited by Isaac Asimov, 64 pp., 59 color photo., 22 fig., 12 maps, 2 tab, 1 b/w map & 5 b/w photo. Facts on File Publications, Inc., New York, N. Y. 10016. 1985. $9.95.

With very effectively and colorfully illustrated chapters on mankind's increasing numbers, profligate and abusive treatment of our air, water, land and energy supplies during the last few centuries we human beings have certainly changed the face of the earth! The famous editor of this book series for easy reading states that "we must look squarely at the dangers and problems..... There are a number of things that can be done, so this is a book of hope as well as of warning."

"TECHNOLOGY 2000" by Peter Evans in Your World 2000 Series edited by Isaac Asimov, 64 pp., 71 color photo, 20 color draw., 3 b/w draw & 1 b/w photo. Facts on File Publications, Inc., New York, N. Y. 10016. 1985. $9.95.

In this easy reading, effectively and copiously illustrated book we are told "what the technological world of the year 2000 might be if we proceed in a sensible way" for the welfare and comfort of human

beings in terms of expansion of information, transportation and communication, health and medicine, work and leisure, education and space.

"MUSKEG AND THE NORTHERN ENVIRONMENT IN CANADA" edited by N. W. Radford C. O. Brawner for the Muskeg Subcommittee of the NRC Associate Committee on Geotechnical Research. xi & 399 pp., 192 b/w fig. incl. 65 photo. & 28 maps, 40 tab. & 3 color maps. University of Toronto Press, Toronto, Ontario, Canada M5S1 A6 or Buffalo, New York 14203. 1977. $35.00.

Muskeg is an Algonquin Indian term for peatland covered mainly with *Sphagnum* mosses, tussocky sedges and sometimes scrubby trees covering over a million sq. km.. This book is composed of 14 papers discussing man's present and projected uses from simple peat fuel or soil fertilizer to more elaborate agricultural and industrial utilization and to access to oil and gas fields by road or rail which are proven more destructive than properly constructed pipelining. If destroyed, muskeg with its nutrient and moisture sources is irreplaceable and adversely effective upon adjacent land and waterways. The last chapter considers conservation, wildlife viewing and preservation, and naturalist and simple pleasure oriented recreation.

"MEMBRANE BIOCHEMISTRY - A Laboratory Manual on Transport and Bioenergetics" edited by Ernesto Carafoli & Giorgio Semenza, x & 175 pp., 50 b/w fig. incl. 4 photo., & 10 tab. Springer-Verlag, Berlin & Heidelberg, Germany & New York, N. Y. 10010. 1979. $14.80 paperbound.

These topics and techniques are still valid for today's university classes and can be synchronized well with some of the better companion texts. These exercises are based on 4 advanced courses in the Swiss Federal Institute of Technology requiring relatively unsophisticated instrumentation. Some of the 17 programs include: transport of sugars in bacteria, calcium transport in resealed erythrocytes and in sarcoplasmic reticulum vescicles, anion and calcium transport in mitochondria and the function of the purple membrane in *Halobacterium halobium*. I sincerely hope that no staff members lecturing or in the lab would attempt to assign students to this important work involved without actually doing the experiments first themselves. This statement is meant not only for this clearly stated book, but for all kinds of sets of laboratory direction texts.

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SIX NEW SPECIES OF NORTH AMERICAN ZEPHYRANTHES

Lorraine B. Spencer
Wake Forest University*

Zephyranthes, indigenous and limited to the Western Hemisphere, is an entirely American genus of the Amaryllidaceae. Some sixty species occur in warm temperate to tropical areas, from near sea level to plateau and mountainous regions. Although several North American species have been reported in recent years, other accessions have not been described. Of these taxa, one is from Guatemala, three from Mexico, one is a natural hybrid found in Panama by the late Ira Nelson, and one is a greenhouse volunteer seedling hybrid.

Zephyranthes guatemalensis L. B. Spencer, sp. nov. Bulbo globoso 2.2 cm diametro, collo 3.5 cm longo; foliis ad 35 cm longis, 4-6 mm latis, primo erectis, concavis, subviridissimis; scapo 14-18 cm longo, prope basin rubello; pedicello 4-7 mm longo; ovario 1.5-3 mm; spatha 2-2.3 cm longo, bifida in dimidio superiore; perianthi tubo 1.7-2.5 cm longo; perianthio albo 5 cm longo. segmentis oblanceolatis, sepalis 1-2 cm latis, petalis 9 mm latis; filamentis 3 cm longis; antheris 1 cm longis; stylo 4 cm longo; stigmate trifido, antheras superanti. Chromosomatum numerus: 2n-36 (Flagg unpub.).

Bulb globose, 2.2 cm diam, neck 3.5 cm long; leaves to 35 cm long, 4-6 mm wide, erect at first, concave, very light green; scape 14-18 cm long, reddish near base; pedicel 4-7 mm; ovary 1.5-3 mm; spathe 2-2.3 cm long, bifid 1/2 way; perianth tube 1.7-2.5 cm long; perianth white, 5 cm long; segments oblanceolate, sepals 1-2 cm wide, petals 9 mm wide; filaments 3 cm long; anthers 1 cm long; style 4 cm long; stigma trifid, exceeds anthers. Chromosome number: 2n-36 (Flagg unpub.).

Type specimen: Antigua, Guatemala, O. E. White, 1 Jul 1947; brought to BEF 4 Oct 1947, BEF 11433-47-54, spec. from cult., 12 June 1962, rof (WFU). Holotype (WFU); Isotype (WFU).

* Present address: St. Augustine's College, Raleigh, NC 27511

Zephyranthes latissimafolia L. B. Spencer, sp. nov. Bulbo ad 2.5 cm diametro, collo 3.5 cm longo; foliis plerumque quinque, 8-19 cm longis, 7-9 mm ad basim latis, 3-4 mm ad apicem obtusum; scapo 7 cm longo, tenuissimo, ad 16 cm fructifero; ovario sessili 7 mm longo; spatha 2.5 cm longa, bifida; perianthi tubo 1 cm longo; perianthio albo externe rubescenti; segmentis 3 cm longis, 1 cm latis; filamentis in duobus collocationibus; antheris surrectis; stigmate trifido antheras subtendenti. Chromosomatum numerus: 2n-48 (Flagg, unpub.).

Bulb 2.5 cm diam; neck 3.5 cm; leaves usually 5, 8-19 cm long, 7-9 mm wide at base, 3-4 at obtuse tip; scape 7 cm long; very delicate, elongates to 16 cm in fruit; ovary 7 mm sessile; spathe 2.5 cm, bifid; perianth tube 1 cm; perianth white with pink flush without; segments 3 cm long, 1 cm wide; filaments at 2 levels, anthers sub-erect; stigma trifid, subtends anthers. Chromosome number: 2n-48 (Flagg, unpub.).

Type specimen: Mexico: Mexico 45, 11 mi S of Mexico 80 in Jalisco, near Guanajuato state line, bulbs collected 4 June 1961, BEF 15289-61, Flory and Flagg 48, spec. from cult., 6 Jul 1962 (WFU). Holotype (WFU); Isotype (WFU).

Zephyranthes katheriniae L. B. Spencer, sp. nov. Bulbo ovoideo ad 2 cm diametro, collo ad 1.5 cm longo, tunicis umbrinis; foliis erectis 25-35 cm longis, 2-3 mm latis; scapo 18-25 cm longo; spatha rosea, bifida, 2.7-3 cm longa; pedicello 2.8-3.8 cm longo; ovario 4 mm; perianthi tubo gracili, 2 cm longo; perianthio (cum tubo) 5.5-6 cm longo, flavo et profunde rubescenti; segmentis obovatis, acuminatis; staminibus dimidio quam segmentis brevioribus; stigmate breviter trifido, antheras subtendenti. Chromosomatum numerus: 2n-48 (Flagg, 1961).

Bulb ovoid, 2 cm diam; neck 1.5 cm long, dark brown tunics; leaves erect, from 25-35 cm long, 2-3 mm wide; scape 18-25 cm long; spathe pink, bifid, 2.7-3 cm long; pedicel 2.8-3.8 cm long; ovary 4 mm; perianth tube slender, 2 cm long; perianth 5.5-6 cm including tube, yellow heavily flushed with red; segments obovate, acuminate; stamens 1/2 length of segments; stigma shortly trifid, subtends anthers. Chromosome number: 2n-48 (Flagg, 1961).

Type specimen: Mexico: near Jacala, Mrs. Morris Clint M 618, 30 Sep 1957, bulbs BEF 14164-57, 27 Dec 1961, spec. from cult., (WFU). Holotype (WFU); Isotype (WFU).

Zephyranthes subflava L. B. Spencer, sp. nov. Bulbo subgloboso 8-12 cm diametro, collo 5-6 mm longo; foliis 27 cm longis, 2-3 mm latis, aliquantum tortis; scapo 21 cm longo; spatha bifida aut fenestrata, 2.2 cm longa; pedicello 3.5 cm longo; ovario 4 mm; perianthi tubo 1.2 cm longo; perianthio eburneo 5 cm longo; segmentis acutis, sepalis 10-11 mm latis, petalis 9 mm latis; filamentis eiusdem coloris quam perianthio, 13 mm longis; antheris flavis, 1 cm longis; stylo 2.7 cm longo; stigmate trifido antheras superanti. Chromosomatum numerus: 2n-24 (Flagg unpub.).

Bulb subglobose, 8 mm diam; neck 5-6 mm long; leaves 27 cm long, 2-3 mm wide, somewhat twisted; scape 21 cm long; spathe bifid or fenestrate, 2.2 cm long; pedicel 3.5 cm long; ovary 4 mm; perianth tube 1.2 cm; perianth ivory-yellow, 5 cm long; segments acuminate, sepals 10-11 mm wide, petals 9 mm wide; filaments color of perianth, 13 mm long; anthers yellow, 1 cm long; style 2.7 cm long; stigma trifid, exceeding anthers. Chromosome number: 2n-24 (Flagg unpub.).

Type specimen: Mexico: State of San Luis Potosi, in valley E of El Naranjo (Maiz Road), Mrs. Morris Clint M-550, 15 Oct 1961, bulbs BEF 14182-57, spec. from cult., 27 Dec. 1961 (WFU); Isotype (WFU).

Zephyranthes x flaggii L. B. Spencer, sp. nov. Bulbo subgloboso ad 2.2 cm diametro, collo 12-13 mm longo; foliis 12-15 cm longis, 2-3 mm latis; scapo 8-12 cm longo; pedicello 1.5-2.1 cm longo; ovario 2 mm; spatha subrosea, bifida, plerumque quam pedicello longiore, 1.8-2.1 cm longa; perianthio pallide roseo (cum tubo) 2.5-3.5 cm longo; segmentis oblanceolatis, 6-8 mm latis; filamentis binatim 1.2 cm longis; antheris 6-8 mm longis, flavis; stylo 2-2.5 cm longo; stigmate penitus trifido, antheras multo superanti. Chromosomatum numerus: 2n-21 (Flagg unpub.).

Bulb subglobose 2.2 cm diam, neck 12-13 mm long; leaves 12-15 cm long, 2-3 mm wide; scape 8-12 cm long; pedicel 1.5-2.1 cm long; ovary 2 mm; spathe pinkish, bifid, usually longer than pedicel, 1.8-2.1 cm long; perianth delicate pale pink, 2.5-3.5

cm long including tube; segments oblanceolate, 6-8 mm wide; filaments in 2 sets, 1.2 cm long; anthers 6-8 mm long, yellow; style 2-2.5 cm long; stigma deeply trifid, far exceeding anthers. Chromosome number: 2n-21 (Flagg unpub.).

Type specimen: (apparently natural hybrid between Z. albiella and Z. rosea), described on wrapping "No. 8-2-A; pink Zephyranthes from Panama." BEF 13302-56, spec. from cult., 14 Dec 1961 (WFU). Holotype (WFU); Isotype (WFU).

Zephyranthes x floryi L. B. Spencer, sp. nov. Bulbo 1.9-2.5 cm diametro, collo 2.0-2.8 cm longo, libere prolificanti; foliis 37 cm longis, 4 mm latis; scapo 16 cm longo; spatha rosea, bifida, 2.6 cm longa; ovario 4 mm; perianthio roseo (cum tubo) 4.3-5 cm longo; segmentis oblanceo latis; filamentis 2 cm longis; antheris 1 cm longis; stylo 3-3.2 cm longo; stigmate trifido antheras superanti. Chromosomatum numerus: 2n-45 (Flagg unpub.).

Bulb 2.5 cm diam, neck 2 cm long, proliferates freely; leaves 37 cm long, 4 mm wide; scape 16 cm long; spathe pink, bifid, 2.6 cm; ovary 4 mm; perianth pink, 4.3-5 cm long including tube; segments oblanceolate; filaments 2 cm long; anthers 1 cm long; style 3-3.2 cm long; stigma trifid, exceeds anthers. Chromosome number 2n-45 (Flagg unpub.).

Type specimen: BEF 14589-59, found by W. S. Flory in 1947, as a volunteer seedling in pot containing Z. x Ajax and Z. grandiflora; self incompatible (WFU). Holotype (WFU).

Reference Cited

Flagg, R. O. 1961. Investigations in the Tribe Zephyrantheae of the Amaryllidaceae. Ph.D. thesis, Alderman Library, Univ. Va.

A NEW SPECIES OF SENECIO (ASTERACEAE) FROM TAMAULIPAS, MEXICO

B. L. Turner

Department of Botany, University of Texas, Austin TX 78713

Routine identification of Compositae from northeastern Mexico has revealed the following novelty. I am grateful to Ted Barkley for his evaluation of the taxon and to M. C. Johnston for the Latin diagnosis. Linda Vorobik provided the illustration.

SENECIO BARKLEYI B. L. Turner, sp. nov. Fig. 1.

S. arizonicus accedens sed foliis parvioribus, petiolis brevioribus, capitulescentiis magnioribus, ligulis longioribus, achaeniis glabris.

Perennial, stoloniferous herbs 6-20 cm high. Stems at first flocculose but soon glabrate. Leaves mostly basal, clasping, 3-5 cm long, 1.5-2.5 cm wide, flocculose but soon glabrate; petioles winged, 5-10 mm long; blades oblanceolate to oval or somewhat deltoid, pinnately veined, irregularly serrulate; stem-leaves much-reduced, remote, lanceolate. Heads terminal, 1-2 per stem, the peduncles 4-8 mm long (from upper-most, bract-like, leaf). Involucre broadly campanulate, 9-10 mm high, 10-14 mm wide; bracts ca 11, sparsely flocculose, but soon glabrate, acute and somewhat tufted at the apex. Ray florets 11; corollas yellow, the ligules ca 12 mm long, 2-3 mm wide. Disk florets numerous; corollas yellow, glabrous, tubular, 7-8 mm long. Achenes glabrous, ca 1.5 mm long; pappus of numerous white bristles, 6-8 mm long.

TYPE: MEXICO. TAMAULIPAS: Cerro Peña Nevada, exposed open areas, limestone-derived soils, 1 Jun 1974, T. F. Patterson 1522 (holotype, TEX).

According to Ted Barkley (pers. comm.), for whom it is named, the Senecio is unfamiliar to him "and apparently is a member of the Lugentes assemblage, perhaps a cousin to S. arizonicus".

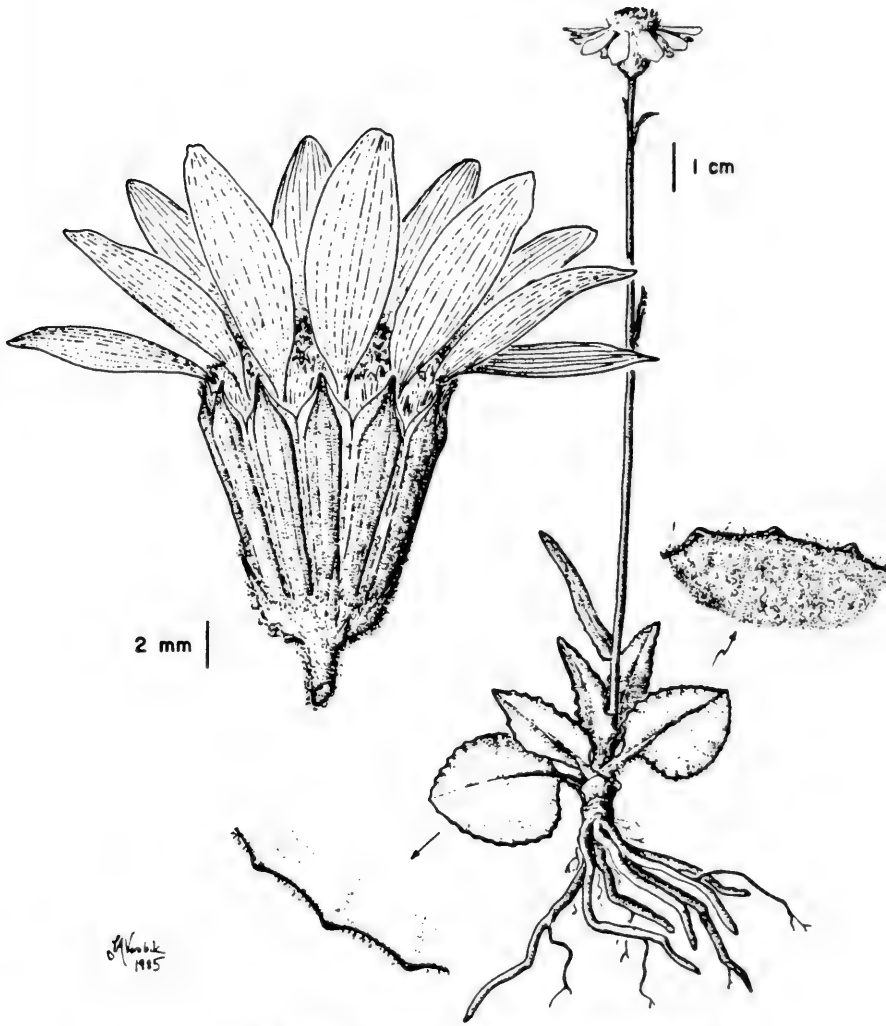

Fig. 1. Senecio barkleyi, from holotype.

A NEW SPECIES OF GALINSOGA (ASTERACEAE-HELIANTHEAE) FROM DURANGO, MEXICO

B. L. Turner

Department of Botany, University of Texas, Austin TX 78713

Routine identification of recent collections from northern Mexico has revealed the following novelty:

Galinsoga spellenbergii B. L. Turner, sp. nov.

G. longipes accedens sed achaeniis compressis ad marginem ciliatis, paleis linearibus, receptaculis valde conicis, etc.

Erect slender annuals 15-20 cm high. Stems striate, pubescent with glandular trichomes. Leaves opposite, ovate, 1.5-2.5 cm long, 0.7-1.0 cm wide; petioles 2-5 mm long; blades 3-nervate from the base, glabrous or nearly so, the margins remotely deticulate. Heads 1-3 to a branch, borne terminal or axillary, the ultimate peduncles glandular-pubescent, 1.5-4.5 cm long, usually bearing but a single bract. Involucre glabrous, hemispheric 3.0-3.5 mm high, 5.5-6.5 mm across, 2-seriate; bracts (outer) ovate, somewhat keeled, the inner bracts broadly oblanceolate, somewhat scarious. Receptacle conical, ca 4.5 mm high, ca 2 mm across, the chaff linear and unlobed, seemingly persistent. Ray florets 5; corollas white, the tubes ca 1.5 mm long, pubescent, the ligules 4-5 mm long, 3-lobed, the sinuses ca 2 mm. Disk florets numerous; corollas yellow, ca 2 mm long, the tube ca 0.7 mm long, the throat campanulate, ca 1.3 mm long, the lobes ca 0.5 mm long, reflexed. Anthers ca 1.1 mm long, the appendages eglandular. Ray and disk achenes similar, ca 3.5 mm long, ca 2 mm wide, broadly obovate, decidedly flattened and incurved, glabrous with striking hyaline ciliate margins, the latter ca 0.3 mm wide; pappus of 8 membranous erose scales ca 1 mm long, orepappose.

TYPE: MEXICO. DURANGO: 106 road mi NW of Santiago Papasquiaro, on road to Topia, 1 mi W of Cienaga Nuestra Senora, ca 2200 m, R. Spellenberg & J. Zimmerman 6652 (holotype TEX; isotypes, according to label data, CIANOC, MEXU, NMC, NY).

Galinsoga spellenbergii superficially resembles G. longipes Canne and was so identified by Cronquist. It will key to that species in Canne's (1977) revision of Galinsoga. It is different in possessing conical receptacles, unlobed linear pales, campanulate corollas, flattened, incurved, broadly obovate, achenes with strikingly ciliate margins. Indeed, because of the achenal characters, it is difficult to position in any of the several sections of Galinsoga recognized by Canne. It has the receptacle and pales of Sect. Stenocarpha, the elongate peduncles of Sect. Elata (which appears to be as well situated in the genus Sabazia as

in Galinsoga), and the ray florets of Sect. Galinsoga. But the flattened, incurved, marginally ciliate, achenes are unique (The width of the ciliation is considerably exaggerated in Fig. 1, below). Nevertheless I would position the species in Galinsoga as currently circumscribed (Canne, 1978), but the genus has certainly become a very heterogeneous grouping and perhaps should be combined with the earlier Sabazia, for the sect. Elata of Galinoga would sit with equal equanimity in the latter genus, as perhaps would Alliospermum, as noted, but not favored, by Robinson (1979). If all three were united, oh woe, the earliest generic name would become the recently resurrected Alliospermum (Robinson, 1979). But it might come to that given a rigorous reappraisal.

The present species was collected in an "overgrazed opening in canyon bottom with fir, pine, oak." It is named for the first listed collector, a sound systematist, and prolific collector of the desert southwest who is a Professor of Biology at New Mexico State University, Las Cruces, New Mexico.

LITERATURE CITED

Canne, J. 1977. A revision of the genus Galinsoga (Compositae: Heliantheae). Rhodora 79: 319-389.

Canne, J. 1978. Circumscription and generic relationships of Galinsoga (Compositae: Heliantheae). Madrono 25: 81-93.

Robinson, H. 1979. Additions to Alliospermum, Galinsoga and Tridax. Phytologia 44: 425-435.

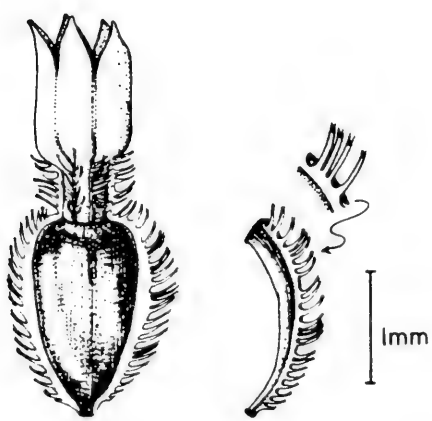

Fig. 1. Detail of disk floret.

A NEW KOPSIA FROM MALAYSIA (APOCYNACEAE)

L. Allorge* et L.E. TEO**

* Laboratoire de Phanérogamie, 16, rue Buffon, 75005, Paris, France
** Department of Chemistry of Malaya, Kuala Lumpur, Malaysia.

F. Markgraf's revision of the genus Kopsia (Apocynaceae) includes 16 species in Malaysia (1972). While determining new material collected by J-R. Deverre for chemical studies, I noticed the occurence of a new Kopsia species among it. This is described below.

Kopsia deverrei L. Allorge, sp. nov.

Arbuscula circa 8m alta. Rami oppositi vel quaterni verticillati, internodio defecto. Folia opposita, integra, membranacea, coriacea, 7,5-12cm longa, 2,5-4cm lata, 6-7 paribus secondariorum nervorum arcuatorum munita, margine aliquid revoluta. Acumen caniculatum, 0,5-1cm longum, apice glande prominenti triangulari munitum. Petiolus 1,3cm longus.

Inflorescentiae multiflori terminales, pedunculo 0,6-1cm longo, gracillimo. Florescencia annua per circa 15 dies.

Bracteae calycesque margine pubentes, 1mm longi. Corolla alba dextrorsa fauce purpureo-rubra. Lobi corollae diaphani vix asymmetrici, margine tegenti ciliati, 1,25cm longi ; 0,6cm lati. Tubus corollae 2-3cm longus, gracillimus fauce inflata stamina gerenti. Stamina antheris omnino fertilibus, filamentis 1mm longis supra clavunculam. Ovarium pubens ; carpella duo cum duabus brevioribus sterilisque squamis alternantia. Stylus gracillimus, 2-3cm longus. Clavuncula cylindrica hirsuta, pilis inferioribus longioribus tubum faciantibus. Appendices clavunculae duae minutae.

Typus (Holo-,P) Deverre 25, Malaysia, Johor, road from Mersing to Johor-Bahra, milestone 87. Primary exploited forest on sandy soil near a stream, on flat ground 2km from seashore.

Further material : Stone and Chew. 6230, Johore, N.E. of Lombong, Kota Tinggi Gunong Panti, West Ridge. 4.4.1966 (fl.) L. ; Corner (SFN 28680), Sungei Kayu Area, 12 th m.s., Mayai, Jamaluang road, 20.1.1935 (fl.) L. ; Corner (SFN 37067), Bukit Tinjau Laut E of Johore, 1000 ft, 6.8.1939 (fl.) L.

Kopsia singapurensis Ridl., although it shares Kopsia deverrei's flower color, differs in its longer corolla tube and lobes, and its leaves 14-16cm long by 7-11cm wide, with prominent veins, among them 12-14 pairs of secondary ones. Kopsia lancifolia Markgraf differs in its sessiles leaves and white flowers, Kopsia tenuis Leenh. and van Steenis, in its two times smaller flowers.

Literature Cited :

Markgraf, F., 1972, Florae Malesianae Praecursores LIII. Apocynaceae II. 6. Urnularia, 7. Willughbeia, 8. Kopsia. Blumea 20 (2) : 407-425. Deverre, J-B., 1985, Contribution à l'étude de la Flore Malaysienne ; Recherche de substances naturelles d'origine végétale et d'intérêt biologique. 19.6.1985, n° 298/83. Paris XI.

NUEVOS REGISTROS DE GRAMINEAS PARA EL ESTADO DE DURANGO

Yolanda Herrera Arrieta
Herbario CIIDIR-IPN, Unidad Durango, Zarco 113,
Vicente Guerrero, Durango, México, C.P. 34890

INTRODUCCION:

El Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional, del I.P.N., Unidad Durango, inició en 1984 como parte de su programa del Estudio y Aprovechamiento de la Flora y Fauna del Estado, el proyecto "Agrostología de los pastizales de Durango".

De la revisión bibliográfica y de ejemplares de herbario realizada para los antecedentes del mencionado proyecto, así como de las colectas recientes de material botánico con motivo del estudio florístico en desarrollo, se encontraron 15 taxa de la familia Gramineae cuya localización en Durango amplía su distribución conocida. Así también se encontró que existen otras 11 especies que tampoco han sido definitivamente citadas de Durango en la literatura para este objeto revisada, no obstante su esperada existencia en el área, ya sea por su amplia distribución en México o porque se conoce de otras localidades del NW de México.

Los taxa de esta familia han sido citados en general para México por: Hitchcock (1913 y 1951), Beetle (1977), varios autores en North American Flora (1909-1939) y para algunas áreas en particular como: McVaugh (1983), Wiggins (1980), Gould & Morán (1981), Shreve & Wiggins (1964), Johnston (1943) y Gould (1975).

Andropogon pringlei Scribn. & Merr. Durango: mpio. de Pueblo Nuevo, 4 miles E of El Salto, 2710 m, area of pine-oaks-junipers, 1o. Oct. 53, Reeder & Reeder 2560, (ENCB). 2 miles E of El Salto, 2560 m, pine-oak region, 28 Jul. 58, Reeder & Reeder 3131, (ENCB).
Se conoce según McVaugh (1983: 49) de Jalisco, Michoacán y Distrito Federal; y según Beetle (1977: 322) de las montañas del centro de México en Puebla, Veracruz y Oaxaca.

Brachypodium mexicanum (Roem. & Schult.) Link. Durango: mpio. de Pueblo Nuevo, 5 miles E of El Salto, 2560 m, in shady canyon, 28 Jul. 85, Reeder & Reeder 3132, (ENCB). About 28 miles E of Sta. Lucía, road from Mazatlan to Durango, 2195 m, in rather dry ledge, 28 Sept. 53, Reeder & Reeder 2491, (ENCB). La Laja Victoria, cerca del Salto, 2560 m, bosque de coníferas, 25 Ag. 69, Agustín May Nah 2227, (ENCB). El Salto, 2390 m, bosque de pino, 2 Ag. 69, A. May Nah 2328, (ENCB).
Esta especie se distribuye en bosque húmedo de pino según McVaugh (1983: 98) en Baja California Sur, Aguascalientes y Nuevo León al N de Sudamérica.

Bromus unioloides HBK. Durango: mpio. de Nombre de Dios, 2 km al S de Nombre de Dios, pastizal con nopalera, 25 abril 85, Herrera 599 y 602 (CIIDIR, ENCB).

Maleza introducida, se distribuye según Soderstrom & Beaman (-- 1968: 487) en Coahuila, Hidalgo, Distrito Federal, Guatemala y Costa Rica. Valdés, Beetle & González (1975: 53) y Beetle (1977: 336) la mencionan de Chihuahua.

Cyclostachya stolonífera (Scribn.) J. & C. Reeder. Durango: mpio. de Peñón Blanco, 12 miles SW of Yerbanis, in thorn savanna, 1980 m, 5 Oct. 74, Reeder & Reeder 6493, (ENCB). Mpio. de Santa Clara, 9 miles N of Zacatecas state line along Hwy. 49, 1980 m, Acacia savanna with nopal cacti, 4 Oct. 74, Reeder & Reeder 6473, (ENCB). Mpio. de Guadalupe Victoria, 47 km NE of Durango on Mexico # 40 to Torreon, 2 000 m, Bouteloua-Sporobolus grassland, 15 Sept. 78, Iltis & Lassaigne 186, (ENCB). Mpio. de Poanas, Rancho El Ojo, pastizal de navajita, 23 Oct. 85, Herrera 810, (CIIDIR).

Planta conocida de Zacatecas y San Luis Potosí según Reeder & -- Reeder (1963: 198); de Aguascalientes según McVaugh (1983: 127) y de Hidalgo y México según Beetle (1977:342).

Digitaria patens (Swallen) Henr. Durango: mpio. de Rodeo, 6 km al NW de las Higueras, 1470 m, matorral espinoso con Brahea-Cnidoscolus, 4 Sept. 83, Torrecillas 150, (CIIDIR, MEXU). Mina La Amparo, 15.7 km al W de la desviación de las Higueras, 4 Sept. 83, Torrecillas 191, (CIIDIR, MEXU).

Henrard (1950: 527) lo cita de Texas. Beetle (1977: 345) lo reconoce de Texas; Sonora, Coahuila y Nuevo León.

Digitaria ternata (Rich.) Stapf. Durango: mpio. de Canatlán, 11 km al N de Benjamín Aranda, pastizal en el límite del bosque de encinos, 18 Sept. 83, Herrera 298, (CIIDIR, ENCB).

Planta de los trópicos y subtrópicos del viejo mundo, introducida como maleza según McVaugh (1983: 146) en Aguascalientes, Guanajuato, Jalisco, Estado de México, Michoacán e Hidalgo.

Elymus riparius Wiegand. Durango: mpio. de Villa Unión, Los Molinos, 15 km al SW de Villa Unión, 9 Dic. 80, maleza en orilla de canal, González & Herrera 1554, (CIIDIR, ENCB).

Especie escasa en la orilla de canales de riego, el tipo es: MacDaniels 3567, New York. Se distribuye según Hitchcock (1951: 261) en Quebec, Maine a Wisconsin y Nebraska, Caroline, Arkansas y Kansas. Los recientes hallazgos de esta planta en Durango, quizá son los primeros que se mencionan de México.

Hordeum arizonicum Covas. Durango: mpio. de Poanas, Los Molinos, 15 km al SW de Villa Unión, a la orilla de canal de riego, 17 Jun. 80, González 1175, (CIIDIR, ENCB).

Especie escasa en la orilla de canales de riego, el tipo es: - Thornber 536, Arizona. Wiggins (1980: 926) lo cita de campos irrigados y canales de riego de Arizona; del NE de Baja California y N de Sonora.

Lasiacis nigra Davidse. Durango: mpio. del Mezquital, 3 km al N de Temohaya, 1400 m, bosque tropical caducifolio, 20 Oct. 84, Y. Herrera 455, (CHAPA, CIIDIR, ENCB, MEXU).

Esta especie se encuentra en barrancas y laderas con pastizal, matorral de Bursera, Karwinskia e Ipomoea arborescente en bosque seco de encino o encino-pino, entre los 1000 y 2000 m de altitud. Se conoce según McVaugh (1983: 207) de Nayarit y Guanajuato a Puebla y Guerrero, y de Tamaulipas a Chiapas; Centro América; Sudamérica.

Muhlenbergia brevivaginata Swallen. Durango: mpio. de Súchil, potrero La Tinajita a 2 km al NE de San Juan de Michis, 2050 m, pastizal en claros del bosque de encino, 13 En. 81, Y. Herrera 19, (CIIDIR, ENCB). Mpio. del Mezquital, alrededores del rancho La Escondida, bosque de encino-pino, 15 Jun. 85, Y. Herrera 662, (CIIDIR).

Especie escasa de bosque seco de encino o encino-pino. Entre 1800 a 2500 m de altitud. Conocida según McVaugh (1983: 234) del S de Zacatecas y W de Jalisco. El tipo: McVaugh 13671, Jalisco.

Muhlenbergia diversiglumis Trin. Durango: mpio. del Mezquital; W de Santa Ma. de Ocotán, vegetación riparia en mediodel bosque de pino-encino, 16 Oct. 84, González y Acevedo 1498, (CIIDIR, ENCB).

Esta especie ha sido reportada (McVaugh, 1983: 238), Sinaloa a Michoacán, México, Morelos y Chiapas; Centro América.

Paspalum crinitum Chase. Durango: mpio. de Súchil, 2 km al N de Súchil, orilla de ojo de agua, 25 Jul. 84, S. González 2862 y 2875, (CIIDIR, ENCB).

Reportada por McVaugh (1983: 312) de áreas separadas: Coahuila, San Luis Potosí, Puebla y Jalisco.

Paspalum notatum Flügge. Durango: mpio. del Mezquital, 31 km de La Guajolota por el camino a Charcos, 2000 m, estanque en medio del bosque de encino-pino, 8 Oct. 84, S. & M. González 2705, (CIIDIR, ENCB).

Especie conocida según McVaugh (1983: 319) del SE de EUA; Nayarit, Aguascalientes al S hasta Oaxaca, y de Tamaulipas y Nuevo León hasta Chiapas; Sudamérica. Este registro constituye el primer reporte del NW de México.

Paspalum tinctum Chase. Durango: mpio. de Durango, 10 km al E de Durango, pastizal con Acacia schaffneri, 6 Sept. 84, Y. Herrera 445, (CIIDIR, ENCB). Mpio. de Nombre de Dios, El Saltito, matorral xerófilo, 25 Abril 85, Y. Herrera 608, (CIIDIR, ENCB). Mpio. del Mezquital, cerca de la Escondida, por el camino a Charcos, bosque de pino, 19 Sept. 84, Jimenez & Acevedo 60, (CIIDIR).

Especie muy escasa, citada por Chase (1929) de 4 localidades: Jalisco, Guanajuato, Morelos y Michoacán.

Vulpia myuros (L.) K.C. Durango: mpio. de Súchil, 4 km al SW de Piedra Herrada, bosque de pino, 3 May. 81, S. & M. González 1624 y 1639, (CHAPA, CIIDIR, ENCB).

Maleza ampliamente distribuida en Norte América desde Alaska y Columbia Británica a México; según Valdés y Hatch (1984: 260) se conoce de San Luis Potosí, Hidalgo, México, Puebla, Morelos, Michoacán y Chiapas.

Especies cuya existencia se esperaba en el área de estudio pero que no se han encontrado definitivamente citadas para Durango en la literatura:

Bromus porteri (Coult.) Nash	Distribuida de Sonora a Nuevo León al S hasta Campeche y Chiapas.
Digitaria ciliaris (Retz.) Koel.	Maleza común a través de México.
Digitaria panicea (Swartz) Urban.	Maleza de los trópicos del viejo mundo citada en América de: N de México, Guatemala, Cuba, Jamaica y Trinidad.
Eriochloa lemmonii (Vasey) Scribn.	Maleza conocida de Arizona; Chihuahua, Coahuila, Sinaloa, Jalisco y Colima.
Hackelochloa granularis (L.) Kunth	Maleza pantropical de amplia distribución en México.
Lolium perenne L.	Planta escapada de cultivo ampliamente distribuida en México.
Muhlenbergia confusa (Fourn.) Swallen	Distribución conocida del N de México hasta Guatemala.
Paspalum humboldtianum Flügge	Bosques de pino de México (excepto Yucatán) a Panamá y Argentina.
Polypogon monspeliensis (L.) Desf.	Planta introducida de Baja California Norte a Coahuila y Puebla.
Sorghastrum nutans (L.) Nash	Planta nativa de pastizales, citada de Canada al S hasta México; Sudamérica. En México conocida de Baja California, Sonora, Zacatecas, Guanajuato, Jalisco y Michoacán.
Sorghum bicolor (L.) Moench.	Planta introducida como forraje y escapada de cultivo a tra

vés de México.

LITERATURA CITADA:

Beetle, A.A. 1977. Notheworthy grasses from Mexico V. Phytologia - Vol. 37(4): 317-407.

Chase, A. 1929. The North American species of Paspalum. Contr. U.S. Nat. Herb. 28(1): 310.

Gould, F.W. 1975. The grasses of Texas. College Station, Texas A. & M. Univ. Press. 653 pp.

Gould, F.W. & R. Morán. 1981. The grasses of Baja California, México. San Diego Society of Nat. Hist. Memoir 12. 140 pp.

Henrard, J.M. 1950. Monograph of the genus Digitaria. Leiden. 999 pp.

Hitchcock, A.S. 1912. Mexican grasses in the United States National Herbarium. Contr. U.S. Nat. Herb. 171: 181-389.

---------- 1951. Manual of the grasses of the United States, U. S. Dept. Agr. Misc. Publ. 200 ed. 2, revised by Agnes Chase. Washington, D.C. 1051 pp.

Johnston, I.M. 1941. Plants of Coahuila, Eastern Chihuahua and adjoining Zacatecas and Durango II. Jour. Arn. Arb. 24: 375-421.

McVaugh, R. 1983. Flora Novo-Galiciana. Vol. 14 Gramineae. Univ. of Michigan. 1032 pp.

North American Flora. Vol. 17 Gramineae. 1909-1939. The New York Botanical Garden. 8 parts.

Reeder, J. & C.G. Reeder. 1962. Notes in Mexican grasses. II. Cyclostachya, a new dioecious genus. Bull. Torr. Bot. Club. Vol. 90, No. 2: 193-201.

Valdés, J., A. Beetle & M. González. 1975. Gramíneas de Chihuahua. Boletín pastizales, Rancho-Exp. La Campana, INIP-SAG. Vol. VI No. 3: 1-6.

Valdés, R.J. & S.L. Hatch. 1984. New Grass (Poaceae) Distribution records for Mexico. SIDA 10(3): 259-262.

Soderstrom, T.R. & J.H. Beaman. 1968. The genus Bromus (Gramineae) in Mexico and Central America. Public. of the Museum Michigan State Univ. Biological Series Vol. 3. No. 5: 465-520.

Wiggins, I.L. 1980. Flora of Baja California. Stanford University Press. 1025 pp.

NOTES ON THE GENUS *CLERODENDRUM* (*VERBENACEAE*). XII

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CLERODENDRUM Burm.

Additional & emended bibliography: L. in Torner, Cent. Pl. 2: 23. 1756; Osbeck, Dagbok Ostind. Resa [Itin.] 92, 215. & 228. 1757; L., Amoen. Acad. 4: 320. 1759; Osbeck, Voy. China E. Indies 1: 369, pl. 11. 1771; Pers., Sp. Pl. 3: 362--366. 1819; Steud., Nom. Bot. Phan., ed. 1, 207--208, 578, & 889--890. 1821; Lindl., Edwards Bot. Reg. 11: pl. 945 (1826) and 12: pl. 956 & 1035. 1826; Hook. & Arn., Bot. Beech. Voy. 205. 1836; Hassk., Flora 25: Beibl. 27. 1842; Hance in Walp., Ann. Bot. Syst. 3: 238. 1852; Lem., Jard. Fleur. 4: Misc. 47--48. 1855; Seem., Bot. Voy. Herald 405. 1857; F. Muell., Fragm. Phyt. Austral. 3: 144--145 (1863) and 9: 5. 1875; F. Muell., Descrip. Notes Papuan Pl., imp. 1, 5: iii & 90--91. 1875; F. Muell., First Census 103. 1882; F. M. Bailey, Syn. Queensl. Fl. 381. 1883; F. M. Bailey, Proc. Roy. Soc. Queensl. 1: 71. 1884; Palmer, Proc. Roy. Soc. N. S. Wales 17: 108. 1884; Henriq., Bol. Soc. Brot. 3: 144, 1885; F. M. Bailey, Queensl. Woods 93. 1888; TATE, Handb. Fl. Extratrop. S. Austral. 156 & 254. 1890; Moore, Handb. Fl. N. S. Wales 357. 1893; Tepper. Bot. Centralbl. 54: 260. 1893; Sims, Sketch Check-list Fl. Kaffr. 63. 1894; Tate in Horn, Sci. Exped. Cent. Austr. 3: 175. 1896; Schinz, Abhandl. Senckenb. Naturf. Gesell. 21: 90. 1897; Durand & DeWild., Bull. Soc. Roy. Bot. Belg. 37: 124. 1898; F. M. Bailey, Queensl. Woods 106. 1899; Banks & Soland., Illust. Austral. Pl. 2: [Bot. Cook Voy.] 75, pl. 239. 1901; Voeltzkow, Abhandl. Senckenb. Naturf. Gesell. 26: 552. 1902; F. M. Bailey in Meston, Expl. Bell.-Ker (Parliam. Rep.) 14. 1904; DeWild, Ann. Mus. Cong. Belg. Bot., ser. 5, 3: 122, 131--138, & 255, pl. 11 & 23. 1909; F. M. Bailey, Queensl. Agric. Journ. 27: 67. 1911; Hemsl., Kew Bull. Misc. Inf. 1919: 128. 1919; Galpin, Bot. Surv. S. Afr. Mem. 7: 13. 1925; Domin, Bibl. Bot. 22 (89): 1112. 1928; E. D. Merr., Sunyatsenia 1: 30. 1930; Watt & Breyer-Brandwijk, Med. Poison. Pl. S. East Afr., ed. 1, 154--155 & 230. 1932; W. F. Hoffm., Lingn. Sci. Journ. 16: 301. 1937; J. Hutchins., Botanist S. Afr. 339, 363, & 672. 1946; R. O. Williams, Useful Ornament. Pl. Zanzib. 61, 63, 66, 95, & 358. 1949; Backer, Blumea 6: 359. 1950; Menninger, 1950-1951 Offering 300 Diff. Flow. Trop. Trees [3]. 1950; Wild, Rhodes. Agric. Journ. 49: 289. 1952; Wild, Veg. South. Rhodes. Term. 11. 1952; Menninger, 1953 Cat. Flow. Trop. Trees 33. 1953; Menninger, 1954 Price List [2] (1954) and 1956 Price List [4]. 1955; Pardy, Rhodes. Agric. Journ. 52: 414. 1955; Wild, Observ. Veg. Sabi 8. 1955; Wild, Rhodes. Agric. Journ. 52: 538. 1955; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1955: 63. 1956; Menninger, 1959 Price List [2]. 1958; Killick, Bot. Surv. S. Afr. 32: 50, 70, & 112. 1959; Martin & Neal, Fl. Albany Bathhurst 92. 1960; Menninger, Flow. Trees World 282, 283, 313, 314, 317, 320, & 325. 1962; T. White, For. Fl. North. Rhodes. 365 & 367. 1963; J. S. Beard, Descrop. Cat. W. Austral. Pl., ed. 1, 91. 1966; R. H. Compton, Journ. S. Afr. Bot. Suppl. 6: 66 & 156. 1966; C. A. Sm., Comm. Names S. Afr. Pl. 106, 439, 469, 498, & 600. 1966; Moll, For. Trees Natal 139. 1967; J. M. Watt, Lloydia 30: 2, 4, & 12. 1967; Moll, Journ. S. Afr. Bot. 34: 75. 1968; Wild, Kirkia 7: 29 & 53. 1968; Gledhill, East. Cape Veld Fls. 201, fig. 2. 1969; Richards

& Morony Check List Fl. Mbala 236 & 237. 1969; Stearn, Notes Rec. Roy. Soc. Lond. 24: 83. 1969; Van der Schijff, Check List Vasc. Pl. Kruger. Natl. Park 81. 1969; Farnsworth, Pharmacog. Titles 5 (1): v & titles 13561, 14758, & 15121. 1970; Fosberg, Atoll Res. Bull. 136: 109. 1970; Fosberg & Renvoize, Atoll Res. Bull. 136: 64, 109, & 152. 1970; Gillett, Numb. Check-list Trees Kenya 46. 1970; Stoddart, Benson, & Peake, Atoll. Res. Bull. 136: 127. 1970; D. R. W. Alexander, Hong Kong Shrubs 25 & 28. 1971; Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971; Fosberg, Phil. Trans. Roy. Soc. B.260: 218 & 225. 1971; Renvoize, Phil. Trans. Roy. Soc. B. 260: 230. 1971; Palmer & Pitman, Trees South. Afr., ed. 2, 3: 1963--1965 & 1967. 1972; Venter, Journ. S. Afr. Bot. 38: 231. 1972; Altschul, Drugs Foods 247 & 248. 1973; Jacobson, Kirkia 9: 172. 1973; Moriarty, Wild Fls. Malawi 139 & 140, pl. 70, fig. 1--4. 1975; Renvoize, Kew Bull. 30: 151. 1975; Venter, Journ. S. Afr. Bot. 42: 216 & 230. 1976; Lebrun & Stork, Ind. Cart. Répart. Pl. Vasc. Afr. 32. 1977; Hocking, Excerpt, Bot. A.30: 419--421. 1978; Isaacson, Flow. Pl. Ind. 1:335. 1979; F. Muell., Descrip. Notes Papuan Pl., imp. 2, 5: 90--91 & iii. 1979; Fosberg & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Aldabra] 7 & 219--222, fig. 35 (3 & 4). 1980; Pal, Bull. Bot. Surv. India 22: 96--99. 1980; Ahmed, Chander, & Pereira, Int. Pest Control 23: 170--175. 1981; Francis, Austral. Rain-for. Trees, ed. 4, 367. 1981; Anon., Biol. Abstr. 75: 4154 & 9495. 1983; Mold., Phytologia 58: 432--462. 506, 507, 509, 511, & 512. 1985; Thompson & Morgan, Seed Cat. 1986: 55. 1985; Trujillo, Ernstia 35: 18. 1985.

CLERODENDRUM ANAFENSE Britton & P. Wils.

Additional bibliography: Grey & Hubbard, List Pl. Atkins Inst. 59; 1933; Mold., Phytologia 57: 476--478. 1985.

CLERODENDRUM ANGUSTIFOLIUM (Poir.) Spreng.

Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Mold., Phytologia 57: 482--484. 1985.

The *Clerodendrum angustifolium* R. A. Salisb. (1796), which appears at first glance to invalidate the *C. angustifolium* (Poir.) Spreng, does not do so because Salisbury's use of the epithet was superfluous (being merely a substitute name for *C. fortunatum* of Linnaeus) and therefore was illegitimate and invalid.

CLERODENDRUM BUCHANANI (Roxb.) Walp.

Additional bibliography: Mold., Phytologia 58: 283--294, 339, & 345. 1985.

A key for distinguishing this species from some other cultivated taxa is given under *C. bethunianum* Low in this present series of notes.

CLERODENDRUM BUCHANANI var. *GLABRUM* (H. J Lam) Mold.

Additional bibliography: Mold., Phytologia 58: 291 & 293--294. 1985.

A key for distinguishing this taxon from some other commonly cultivated taxa in this genus is given under *C. bethunianum* Low in the present series of notes.

CLERODENDRUM BUCHHOLZII Gürke
Additional bibliography: A. Chev., Étud. Fl. Afr. Cent. Franç. 1: 245. 1913; Mold., Phytologia 58: 294--300. 1985.
Chevalier (1913) lists an unnamed "var." of *Clerodendron schifferi* A. Chev., based on *Chevalier 10905*, from lower Ubangi in the Central African Republic, which may belong here.

CLERODENDRUM BUCHNERI Gürke
Additional bibliography: Prain, Ind. Kew. Suppl. 5, imp. 1, 61 (1921) and imp. 2, 61. 1960; Mold., Phytologia 58: 330, 426, & 435. 1985.

CLERODENDRUM BUNGEI Steud.
Additional & emended bibliography: Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 87--89, 108, 109, iii, & viii. 1921; Mold., Phytologia 58: 332--348, 407, 416, & 460. 1985.

CLERODENDRUM CALAMITOSUM L.
Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Mold., Phytologia 58: 401--409 & 460. 1985.
A key to distinguish this species from some other commonly cultivated taxa in this genus may be found under *C. bethunianum* Low in the present series of notes.

CLERODENDRUM CAPITATUM (Willd.) Schum. & Thonn.
Additional synonymy: *Clerodendron francavilleanum* "Buchinger ex Baker" apud Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 86 & 109 in syn. 1921. *Clerodendron francivilleanum* Buch. ex Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: viii in syn. 1921.
Additional & emended bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 105 & 502. 1858; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 86, 109, & viii. 1921; Mold., Phytologia 58: 432--442. 1985.
The *Clerodendron capitatum* var. *subdentatum* DeWild., included in the synonymy of *C. capitatum* by me up until now, proves, instead, to belong in the synonymy of *C. frutectorum* S. Moore.
A key to distinguish *C. capitatum* from some other commonly cultivated taxa of this genus may be found under *C. bethunianum* Low in the present series of notes.

CLERODENDRUM CAPITATUM var. *CEPHALANTHUM* (Oliv.) J. G. Baker
Additional bibliography: Mold., Phytologia 58: 432--436. 1985.
A key to distinguish this taxon from other commonly cultivated species and varieties in this genus will be found under *C. bethunianum* Low in the present series of notes.

CLERODENDRUM COLEBROKIANUM Walp.
Additional synonymy: *Clerodendron glandulosum* "Colebr. ex O. Ktze." apud Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 109 in syn. 1921.

Additional & emended bibliography: Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 87, 88, 108, 109, & viii. 1921; P'ei, Mem. Sci. Soc. China 1 (3): 125 & 158--159. 1932; Fletcher, Kew Bull. Misc. Inf. 1938: 405, 425, & 430. 1938; Mold., Phytologia 58: 454--462. 1985.

A key to distinguish this species from some other commonly cultivated taxa in this genus is given by me under *C. bethunianum* Low in the present series of notes.

CLERODENDRUM COMANS Mold.

Additional bibliography: Mold., Phytologia 58: 462. 1985.

Midrib very slender, flat above, prominulous beneath; secondaries very slender, 7--10 per side, arcuate-ascending, usually indiscernible above, subprominulous beneath; vein and veinlet reticulation mostly indiscernible on both surfaces; cymes aggregated at the tips of the branchlets, few-flowered, persistently bracteate, densely fulvous-tomentellous throughout; peduncles slender, about 1.5 cm. long, densely fulvous-tomentellous; pedicels slender, 2--3 mm. long, densely fulvous-tomentellous; bracts numerous, persistent, conspicuous, foliaceous, elliptic-obovate, to 1 cm. long and 4 mm. wide, short-pubescent on both surfaces; bractlets and prophylla comparatively large, linear or oblong, more or less foliaceous, densely short-pubescent on both surfaces; calyx membranous, obconic-tubular, brunnescent in drying, 1.4--1.7 cm. long, to 1 cm. wide, rather dendely puberulent on the outer surface, the rim distinctly 5-lobed, the lobes ovate, about 3 mm. long and wide, apically acute; corolla infundibular, its tube gradually ampliate from base to apex, about 2 cm. long, externally obscurely and irregularly pulverulent-puberulent, the limb 5-lobed, the lobes 1--1.5 cm. long, apically rounded; fruiting-calyx and fruit not known.

This species is based on *Richard Baron 5909*, collected somewhere in Madagascar and deposited in the Paris herbarium. A key to distinguish it from the other known taxa in Madagascar is given by me under *C. baronianum* Oliv. in this present series of notes. Thus far it is known only from the original collection.

Citations: MADAGASCAR: *Baron 5909* (E--photo of type, F--photo of type, Ld--photo of type, N--fragment of type, N--photo of type, P--type).

CLERODENDRUM CONDENSATUM Miq.

This taxon, included among the accepted taxa in my 1980 "Sixth Summary", is now regarded by me as a synonym of *C. bracteatum* var. *sumatranum* Ridl., which see.

CLERODENDRUM CONFUSUM H. Hallier, Meded. Rijks Herb. Leid. 37: 65--66. 1918.

Synonymy: *Clerodendrum infortunatum* Miq. ex H. Hallier, Meded. Rijks Herb. Leid. 37: 65 in syn. 1918 [not *C. infortunatum* Auct., 1935, nor Dennst., 1959, nor Gaertn., 1778, nor Hassk., 1918, nor L., 1753, nor Lindl., 1918, nor Lour., 1935, nor Retz., 1772, nor Vent., 1821, nor Wight, 1918, nor Willd., 1976, nor *Clerodendron infortunatum* Auct., 1963, nor Blume, 1918,, nor Bot. Reg., 1895, nor Dennst.,

1893, nor L., 1858, nor F.-Vill., 1882, nor Gaertn., 1885, nor Lam., 1947, nor Lour., 1793, nor Schau., 1847, nor Walp., 1843, nor Wight, 1850]. *Clerodendron confusum* H. Hallier apud H. J. Lam, Verbenac. Malay. Arch. 290 & 363. 1919.

Bibliography: H. Hallier, Meded. Rijks Herb. Leid. 37: 65--66. 1918; H. J. Lam, Verbenac. Malay. Arch. 290 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 90, 108, iii, & viii. 1921; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Bakh., Journ. Arnold Arb. 16: 70--71 & 472. 1935; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 63, 64, 68, 72, & 89. 1942; Mold., Alph. List Cit. 1: 16 (1946), 3: 941 (1949), and 4: 987. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 143, 144, 150, 158, & 180. 1949; Mold., Résumé 187, 189, 190, 204, 215, & 449. 1959; T. C. Whitmore, Guide For. Brit. Solom. Isls. 173. 1966; Altschul, Lloydia 33: 195--198. 1970; Farnsworth, Pharmacog. Titles 5 (10): vii & title 11888 (1970) and 5 Cum. Gen. Ind. 1971; Mold., Fifth Summ. 1: 322, 340, & 358 (1971) and 2: 864. 1971; Foreman, Div. Bot. Dept. For. N. Guin. Bot. Bull. 5: 63. 1972; Altschul, Drugs Foods 247. 1973; Mold., Phytol. Mem. 2: 313, 330, 348, & 535. 1980; Mold., Phytologia 50: 253 (1982) and 58: 291 & 353. 1985.

A shrub or tree, to 20 m. tall; trunk to 35 cm. in girth; bark pale-brown, inner bark pinkish; sapwood soft, pale-yellow; branchlets rather slender, 3-5--6 mm. in diameter, obtusely tetragonal or terete, rather densely appressed-puberulent with short, cinereous or brownish, strigose hairs, often somewhat flattened at the nodes; nodes obscurely annulate; principal internodes 5.5--9 cm. long; leaves decussate-opposite; petioles stout, 2--19 cm. long, appressed-puberulent like the branchlets, mostly collapsing basally in drying; leaf-scars not borne on spurs; leaf-blades thin-chartaceous, dark-green above, light-green beneath, ovate or obcordate, 9--20 cm. long, 6--14 cm. wide, apically abruptly acuminate, marginally entire or obsoletely and irregularly repand-dentate, basally varying from acute (on smaller leaves) to truncate, very sparsely scattered-pilose or -strigillose above, more densely so on the larger venation, more densely strigillose beneath, especially on the larger venation, with cinereous hairs, prominently palmate- and clathrate-veined and minutely glandular-punctulate beneath and usually marked with a few, rather large, crateriform glands near the base and along the larger veins, the base slightly bullate; midrib slender, flat or subprominulent above, rounded-prominent beneath; secondaries slender, 5--7 per side, ascending, not much arcuate, obscurely joined in many loops at the very apex or else not joined, mostly flat above, prominulent beneath; tertiaries numerous and conspicuous, issuing at right angles to the larger veins and connecting them, parallel, flat but plainly visible (rarely obscure) above, prominulent beneath; veinlet reticulation rather sparse, indiscernible above; inflorescence terminal, paniculate, the panicles 15--19 cm. long, 9--10 cm. wide, with 3--5 pairs of opposite, rather distant branches, each branch rather few-flowered and widely divergent; peduncles elongate, 5.5--7 cm. long, along with the rachis densely appressed-puberulent like the branchlets, the sympodia 1.5--4 cm. long, usually elongate; bracts usually

1 pair at the base of the lowest pair of inflorescence-branches or a pair subtending each pair of branches, the lowest largest, foliaceous, to 6 cm. long and 2.5 cm. wide, long-stipitate, similar to the leaves in all respects or more elliptic, the upper ones usually much smaller; pedicels about 2 mm. long; calyx cyathiform, green or light-green, externally cinereous-pubescent, basally marked with rather large discoid nectary glands 5-fid to 1/3 or ½ its length, the tube about 5 mm. long, the lobes about 4 mm. long, apically acuminate, with a rather inconspicuous median vein; corolla hypocrateriform, white, the tube about 1 cm. long, slightly surpassing the calyx-lobes, externally cinereous-pubescent, the lobes 6--8 mm. long, dorsally cinereous-pubescent; stamens about 3 cm. long, long-exserted; style long-exserted; fruiting-calyx much enlarged, coriaceous, venose, partly enclosing the fruit, the tube 6--8 mm. long, the lobes 6--10 mm. long; fruit drupaceous, globose, about 8 mm. long and wide.

Hallier's description of this much misunderstood species is "Praecedenti [*C. infortunatum* L.] arcte affine, sed notis compluribus bene distinctum. Ramuli teretes vel obtuse tetragoni, brevissime cinereo-puberuli. Foliorum petiolus longus, lamina ovata vel cordata, acuminata, integerrima vel obsolete et irregulariter repando-dentata, subtus prominenter palmato- et clathrato-nervosa, utrinque in nervis pubescens et praeterea ubique pilis sparsis patulis scabra, subtus ubique minute glanduloso-punctulata et imprimis prope basin et nervos robustiores glandulis pezizaeformibus quam in sp. praecedente rarioribus et multo majoribus praedita, basi haud bullata. Calyx cyathiformis, usque 1/3 vel ½ longitudinis tantum 5-fidus, extus cinereo-pubescens et praeter basin glandulis discoideis sat magnis obspersus, lobis acuminatis, nervo mediano quam in sp. praecedente multo minus conspicuo, circa fructum tantum magis prominente, in fructu valde auctus, coriaceus, nervosus, coloratus, drupam (globosam) subinvolucrans. Corollae tubus calycis lobos parum excedens, extus sicut lobi cinereo-pubescens. Genitalia longe exserta. Ramuli 3,5--6 mm crassi. Foliorum petiolus 2--19 cm longus, lamina 9--20 cm longa, 6--10 cm lata. Pedicellus 2 mm, calycis tubus c. 5 mm, lobi 4 mm, corollae tubus 1 cm, lobi 6--8 mm, stamina 3 cm longa. Calycis fructigeri tubus c. 6--8 mm, lobi 6--10 mm longi. Drupa c. 8 mm diametro."

The species is based on *Boerlage s.n.* from Buitenzorg, Java, collected on December 19, 1888, *Boerlage s.n.* from Kampong Baruh [=Neudorf] near Buitenzorg, collected October 27, 1888, a *Collector undetermined s.n.* from Karimandjawa, and a *Teijsmann s.n.* sent in 1867 from the Buitenzorg botanical garden and said to have originated in Sumatra. Hallier (1918) records the vernaculat name "kembang bugang" and classifies the species in Schauer's Section *Paniculata*.

Collectors have encountered this plant at the edges of forests and Kajewski states that on Bougainville island it is common in rainforests. His *no. 1687* has especially elongated calyces. The species has been collected from sealevel to 1200 m. altitude, in anthesis in March, July, and October, and in fruit in March, October, and November. Whitmore (1966) cites *Brass 2919* & *3403* from the Solomon Islands, while Foreman (1972) -- whose publication was issued in

1972, not "1971" as stated on the titlepage -- cites *Kajewski 1687, 1925, & 1978* from Bougainville.

The corollas are uniformly described as "white" (viz., *Kajewski 1687, McKee 1606, Petrus & Patrick SAN.90643*).

Kajewski lists the vernacular names "kaka-fair" and "koru-kopu", and tells us that on Bougainville the natives us this plant medicinally -- the wet sappy part of stripped bark is applied to sore spots on the body, the leaves are boiled in water and the decoction is then applied to sore legs, and body sores and skin diseases are treated with a mash made from leaves that have been allowed to rot in water.

In the synonymy listed above the *Clerodendron/Clerodendrum infortunatum* accredited to "Auct." [auctorum or unidentified authors], to Blume, and to Schauer is a synonym of *C. viscosum* Vent., while that credited to Dennstedt, to Hasskarl, to Walpers, and to Wight is *C. villosum* Blume, that credited to Lindley and "Bot. Reg." [Botanical Register] is *C. speciosissimum* Van Geert, to Fernandez-Villars is *C. minahassae* Teijsm. & Binn., to Lamarck is *C. petasites* (Lour.) S. Moore, to Retzius and to Ventenat is *C. infortunatum* L., to Linnaeus is in part *C. infortunatum* L. and in part *C. villosum* Blume, to Loureiro is in part *C. kaempferi* (Jacq.) Sieb. and in part *C. viscosum* Vent., and to Gaertner and to Willdenow is in part *C. infortunatum* L. and in part *C. viscosum* Vent.

Baknuizen (1935) cites *Kajewski 1687, 1925, & 1978* from Bougainville, *Kajewski 2341* from Malaita, *Kajewski 2502* from Gaudalcanal, *Brass 2919* from San Cristoval, and *Brass 3403* from Ysabel in the Solomon Islands, recording the vernacular names there "ambus-gor-lele", "e-ya-papor", "fuho", "kaka-fair", and "koru-kopu". He comments tha "This species is closely related to *C. buruanum* Miq. which differs in the much longer corolla-tube and also to *C. infortunatum* L., which has a glabrous corolla and a longer corolla-tube. Nevertheless all these species may perhaps be considered as only extreme forms of *C. infortunatum* L."

It seems probable that the *Koorders s.n.* citd below is actually the *Collector undesignated s.n.* collection referred to by Hallier among his cotypes (syntypes) of this species, although in 1893 the sheet containing this specimen was annotated by Hallier himself as *C. blumeanum* Schau.

Material of *C. confusum* has been misidentified and distributed in some herbaria as *C. blumeanum* Schau. (a very different species) and as the very closely related *C. infortunatum* L. and *C. viscosum* Vent., while Backer has suggested that *Backer 22055* and *Hallier s.n.* [14. VIII.1896] may represent a natural hybrid between *C. infortunatum* and *C. villosum* Blume. On the other hand, the *Brass 2919 & 3403* and *Kajewski 1925 & 1978*, distributed as and cited by some authors (above) as *C. confusum*, are actually *C. buruanum* f. *lindawianum* (Lauterb.) Bakh.

Citations: GREATER SUNDA ISLANDS: Java: *Backer 22055* (Bz--19072, Bz--19073, Bz--19074, Bz--19075, Bz--19076. Bz--25496, K, Ld--photo, Mi--photo. N, N--photo, Ut--63768); *Bakhuizen 6311* (Br, Bz--19064, Bz--19065, Bz--19066, Bz--25493, Ca--301398, Ut--80177); *Franssen*

s.n. (Bz--19078); *H. Hallier s.n.* [17.III.1893] (Bz--19070, Bz--19071), *s.n.* [14.VIII.1896] (Bz--19067, Bz--19068, Bz--19069); *Slooten 560* (Bz--19062, Bz--19063, Bz--19077, K); *Van Steenis 587* (Bz--19061). Karimandjawa: *Karta 192* (B, Bz--19083, Bz--25492); *Koorders 41242b* (Bz--19079), *41466b* [108*] (Bz--19080), *s.n.* (Bz--19081--cotype, Bz--19082--cotype, Ld--photo of cotype, N--photo of cotype). Kemoedjan: *Karta 391* (Bz--19083, Bz--25492). Sabah: *Petrus & Patrick SAN.90643* (Ld). Sumatra: *Jacobson 3013* (Bz--19085). SOLOMON ISLANDS: Bougainville: *Kajewski 1687* (Bi, Bz--19087, Bz--19100). Malaita: *McKee 1606* (Ng). CULTIVATED: Java: *Teijsmann 2648HB* (Bz--19059--cotype, Bz--19060--cotype), *s.n.* [Hort. Bogor. 1867] (Ld--photo, Le, N--photo, S--photo), *s n.* [Hort. Bogor. 1868] (K).

CLERODENDRUM CONGOLENSE Gürke ex Vergiat, Journ. Agr. Trop. Bot. Appliq. 17: 335 [as "*Clerodendron*"] 1970; Mold., Fifth Summ. 1: 228. 1971.

Synonymy: *Clerodendron congolense* Gürke ex Vergiat, Journ. Agr. Trop. Bot. Appliq. 17: 335. 1970.

Bibliography: Vergiat, Journ. Agr. Trop. Bot. Appliq. 17: 335. 1970; Mold., Fifth Summ. 1: 228 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218 & 535. 1980.

The original description given by Vergiat (1970) is: "Sous-arbrisseau dressé de forêt, taille 1 m à 1,50 m à très larges feuilles, tige ligneuse et tubulaire. Floraison: gros capitules à bractées violettes, fleur blanc crème à très long tube, de 15 cm minimum." He also reports that a decoction of the seeds is poisonous, producing symptoms of intoxication, nervous trembling, cold chills, vertigo, and swooning. As an antidote he recommends a decoction of the bark of *Berlinia acuminata*, a caesalpiniaceous legume.

Nothing else is known to me of this taxon and it is not listed in the Index Kewensis. Possibly it may be an error for *C. congense* Engl. [now known as *C. umbellatum* var. *congense* (Engl.) Mold.], although the description and the use of the authority "Gürke" render this unlikely.

CLERODENDRUM CONSORS S. Moore, Journ. Bot. Brit. 57: 248 [as "*Clerodendron*"]. 1919; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 39, 68, & 92. 1936.

Synonymy: *Clerodendron consors* S. Moore, Journ. Bot. Brit. 57: 248. 1919. *Clerodendron lupakense* S. Moore, Journ. Bot. Brit. 57: 247--248. 1919. *Clerodendrum lupakense* S. Moore apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 68 in syn. 1936.

Bibliography: S. Moore, Journ. Bot. Brit. 57: 247--249. 1919; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 39, 68, & 92. 1942; Mold., Alph. List Inv. Names 18. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48 & 89 (1942) and ed. 2, 115 & 180. 1949; Mold., Résumé 141, 266, & 449. 1959; Mold., Fifth Summ. 1: 228 & 450 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218 & 535. 1980; Mold., Phytologia 58: 200. 1985.

A shrub; branches leafy, at first softly pubescent, later glabrescent; leaves decussate-oppposite; petioles to 2.5 cm. long, pubes-

cent, basally articulate; leaf-blades membranous, paler beneath, ovate or oblong-obovate, about 11 cm. long and 6 cm. wide, gradually diminishing in size upwards, the floral ones about 3 cm. long and 1.5 cm. wide, all apically cuspidate-acuminate with an obtuse acumen, marginally undulate, basally sometimes somewhat oblique and subrotund or obtuse, glabrous and shiny above, sparsely pubescent on the venation beneath; inflorescence terminal, in all 7.5--10 cm. long and 4 cm. wide, pubescent; cymes short, few-flowered, supra-axillary, forming a thyrsoid, often foliaceous panicle; bracts linear, about 3 mm. long; pedicels 2--4 mm. long; calyx cylindric-infundibular, in all 7--8 mm. long and 2--3 mm. wide, externally sparsely pubescent, the tube broadly cylindric, the lobes deltoid, scarcely 2 mm. long, shorter than the tube, apically acute; corolla-tube about 1.4--1.5 cm. long, surpassing the calyx, basally 1.5--2 mm. wide, apically attenuate, ampliate below the limb to 3 mm., glabrous, the lobes suborbicular to broadly ovate, subequal, 3--4 mm. long and wide, apically obtuse; stamens exserted about 5 mm. beyond the corolla-mouth.

In order to compare the characters of Moore's supposed two separate species (1919) his descriptions are given herewith: *C. lupakense* is described as "Ramis foliosis molliter pubescentibus deinde glabrescentibus; foliis oppositis ovatis vel oblongo-obovatis apice cuspidato-acuminatis ipso obtusis basi interdum aliquantulum obliquis subrotundatis vel obtusis margine undulatis petiolis pubescentibus basi articulatis insidentibus membranaceis supra glabris nitidisque subtus in nervis sparsim pubescentibus; cymis brevibus pauciforis supra axillas foliorum diminutorum affixis paniculam thyrsoideam foliaceam efficientibus; floribus submediocribus pedicellatis; calycis sparsim pubescentis tubo late cylindrico quam lobi deltoidei acuti plabe longiore; corollae tubo calycem facile siperante basi dilatato inde attenuato ipso sub limbo ampliato glabro lobis inter se subaequalibus suborbicularibus; staminibus usque circa 5 mm. exsertis. Belgian Congo, Lupaka river; *Kassner, 2458* in part. Foliorum limbus usque 11 x 6 cm., superiora vero gradatim dimminuta; folia floralis ± 3 x 1.5 cm.; folia omnia pag. inf. pallidiora; petioli summum 2.5 cm. long Inflorescentia tota circa 10 x 4 cm., pubescens. Bracteae lineares, ± 3 mm. long. Pedicelli 2--3 mm. long. Calyx in toto 8 mm. long., 3 mm. lat.; lobi soli vix 2 mm. long. Corollae tubus 14 mm. long., basi 2 mm. lat., mox usque 1 mm. subito constrictus, sub limbo 3 mm. lat.; lobi 4 x 4 mm."

C. consors is described as "Ramulis foliisque praecedentis [*C. lupakense*] ; floribus pedicellatis cymosis cymis in paniculam terminalem quam folia breviorem foliis floralibus carentem digestis; calyce cylindrico-infundibulari pubescente quam lobi deltoidei acuti longiore; corollae tubo calycem bene excedente attenuato sub limbo dilatato glabro lobis inter se subaequalibus late ovatis obtusissimis; staminibus usque 5 mm. exsertis. Belgian Congo, Lupaka river; *Kassner, 2458* in part. Inflorescentia 7.5 x 4 cm. Bracteae lineares, + 3 mm. long. Pedicelli summum 4 mm. long. Calyx 7 mm. long., 2 mm. lat.; lobi vix 2 mm. long. Corollae tubus 15 mm. long., ima basi 1.5 mm. fere usque ad limbum 1 mm.. ipso sub limbo 2 mm. lat.; lobi 3 x 3 mm."

He comments that "The affinity of both the above is with *C. Barteri* Baker, but probably still more close with *C. Bequaerti* de Wild. From this latter both are separated by the not denticulate-runcinate leaves, the larger calyx and corolla, glabrous outside, and with broader lobes. As between themselves the chief points of distinction are the inflorescence, the cymes mixed with floral leaves in the one case and without them in the other, and the longer and broader calyx of *C. lupakense*. To judge from the description in Fedde, Rep. xiii. 144, the inflorescence of *C. Bequaerti* is that of *C. lupakense*." Under *C. bingaense* S. Moore he notes that that this species "Differs from *C. lupakense* chiefly in foliage and corolla."

Thomas (1936), citing only *Kassner 2458*, comments: "Hier sind 2 Arten auf denselben Typus begründet worden; die angegebenen Unterschiede beziehen sich auf variable Verhältnisse, wie sie an ein und demselben Zweig auftreten, und sind sehr gering; es ist mir unverständlich, welche Gründe den Autor veranlässten, hier aus einer Art zwei neue Spezies aufzustellen."

Nothing is known to me of this controversial taxon beyond what is stated in the above bibliography.

CLERODENDRUM CORBISIERI DeWild., Feddes Repert. Spec. Nov. 13: 144 [as "*Clerodendron*"]. 1914; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 47, 84, & 92. 1936.

Synonymy: *Clerodendron corbisieri* DeWild., Feddes Repert. Spec. Nov. 13: 144. 1914.

Bibliography: DeWild., Feddes Repert. Spec. Nov. 13: 144 & 145. 1914; Fedde & Schust., Justs Bot. Jahresber. 42: 252. 1920; Prain, Ind. Kew. Suppl. 5, imp. 1. 61. 1921; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 47, 84, & 92. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 54. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 115 & 180. 1949; Mold., Résumé 141 & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Résumé Suppl. 12: 5 & 6. 1965; Mold., Fifth Summ. 1: 228 & 242 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218, 232, 384, & 535. 1980.

A many-stemmed, erect, perennial herb, 25--40 cm. tall, with a woody basal rhizome, the remainder annual; stems greenish-brown; branches erect, to 35 cm. long, not re-branched, shortly velutinous, slightly scabrous; leaves opposite or in whorls of 3 or 4, sessile; leaf-blades lanceolate-obovate, 5--10 cm. long, 0.8--1.5 cm. wide, apically long-cuneate, marginally subentire or irregularly undulate, basally more or less long-attenuate-narrowed, velutinous-scabrous on both surfaces; inflorescence loosely paniculate, very leafy; peduncles about 2.5 cm. long; cymes ramose, bracteolate, composed of 3-flowered glomerules; bractlets about 2.5 mm. long, velutinous; pedicels 2--3 mm. long, velutinous; calyx about 5.5 mm. long, externally sparsely velutinous, ciliate, the lobes cuneate, not rounded; corolla blue or violet; fruit at first green, later blue.

The species is based on *Corbisier 59?* (actually collected by Homblé) from Welgelegen in Upper Katanga, Zaire, deposited in the Brussels herbarium. The type collection is also sometimes cited as

Corbisiere & Florent 592, while Fedde & Schuster (1920) cite it as *Hombl 592*.

DeWildeman (1914) correctly notes that this species is related to *C. erectum* DeWild., *C. luembense* DeWild., *C. myricoides* (Hochst.) R. Br., and *C. ringoeti* DeWild. in the Subgenus *Cyclonema*.

Leistner reports finding the plant growing on gray sandy flats with open savanna. It has been collected at 665 m. altitude, in flower in February, March, September, and December, and in fruit in December. Thomas (1936) cites only *Corbisier 592* and *Pogge 1102a* from Zaire.

Citations: ZAIRE: *Callens 2282* (N), *3017* (N), *4063* (Ld); *Corbisier 592* [*Homble 592*] (Br--type, Br--isotype, Ld--photo of type, N--fragment of isotype, N--photo of type); *DeGiorgi s.n.* [Envir. Elisabethville 1923] (Br); *Leistner 1459* (Mu); *Ringoet 2* (Br), *489* (Br); *Vanderyst 16092* (Br, Br). ANGOLA: *E. J. Mendes 1897* (Ld, Ul); *Torre 8790* (Ul).

CLERODENDRUM CORDIFOLIUM (Hochst.) A. Rich., Tent. Fl. Abyss. 2: 170 [as "*Clerodendron*"]. 1851; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 34, 56, & 93. 1936.

Synonymy: *Volkameria cordifolia* Hochst., Flora 25: 227. 1842. *Clerodendron cordifolium* (Hochst.) A. Rich., Tent. Fl. Abyss. 2: 170. 1851. *Clerodendron cordifolium* A. Rich. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893. *Volkameria cordifolia* var. *microphylla* Schimp. ex Mold., Prelim. Alph. List Inv. Names 53 in syn. 1940. *Clerodendrum cordifolium* A. Rich., in herb.

Bibliography: Hochst., Flora 25: 227. 1842; Walp., Repert. Bot. Syst. 4: 100. 1845; Schau. in A. DC., Prodr. 11: 657. 1847; A. Rich., Tent. Fl. Abyss. 2 [Voy. Abyss. 3 (5)]: 170. 1851; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; Kotschy, Sitzungsber. Kais. Akad. Wiss. 51: 8. 1865; Aschers. in G. Schweinf., Beitr. Fl. Aethiop. 278. 1867; Oliv., Trans. Linn. Soc. Lond. 29: 132. 1875; Engl., Hochgebirgsfl. Trop. Afr. 357. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. C: 341. 1895; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 1219. 1895; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 294 & 304. 1900; Gürke, Engl. Bot. Jahrb. 28: 292. 1900; DeWild., Ann. Mus. Congo Bot., ser. 5, 3: 132. 1909; Wernham, Journ. Bot. Brit. 54: 231. 1916; Chipp, Kew Bull. Misc. Inf. 1929: 185 & 193. 1929; E. A. Bruce, Kew Bull. Misc. Inf. 1934: 306. 1934; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 14, 34, 56, & 93. 1936; Mold., Prelim. Alph. List Inv. Names 53. 1940; Mold., Alph. List Inv. Names 56. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 45, 49, 50, & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561 (1946) and imp. 2, 2: 1219. 1946; Mold., Alph. List Cit. 3: 835 & 901. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 109, 110, 116, 118, & 180. 1949; Snowden, Grass Comm. Mt. Veg. Uganda 20. 1953; Tarr, Fungi Pl. Diseases Sudan 64 & 118. 1955; J. K. Jacks., Journ. Ecol. 44: 350. 1956; Mold., Résumé 133, 134, 140, 141, 143, 146, 391, & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561 (1960) and imp. 3, 2: 1219. 1960; Dale & Greenway, Kenya Trees Shrubs 582. 1961; Cuf.,

Bull. Jard. Bot. Brux. 32: Suppl. 798. 1962; Lind & Tallantire, Some Comm. Flow. Pl. Uganda, ed. 1, 147 & 238. 1962; Mold., Résumé Suppl. 9: 3. 1964; Drar, Publ. Cairo Univ. Herb. 3: 110. 1970; Lind & Tallantire, Some Comm. Flow. Pl. Uganda, ed. 2, 147, 238, & 243. 1971; Mold., Fifth Summ. 1: 210, 212, 226--228, 233, 242, & 442 (1971) and 2: 733 & 864. 1971; Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: [230]. 1972; Mold., Phytologia 28: 441 (1974) and 31: 388. 1975; Mold., Phytol. Mem. 2: 201, 203, 211--218, 222, 223, 230, 232, & 535. 1980.

A small, often climbing subshrub or shrub, 0.4--1.5 m. tall, sparingly branched, growing in tufts, usually evergreen; stems softly pubescent; branchlets terete, unarmed, pubescent; leaves decussate-opposite, petiolate; leaf-blades subcoriaceous, obcordate-ovate, 7.5--10 cm. long, apically acuminate, marginally entire, basally cordate, glabrous above when mature, softly and finely pubescent beneath, especially on the venation; inflorescence terminal, amply paniculate, brachiate, its branches pubescent, the cymes lax; pedicels about 8 mm. long or as long as the calyx; calyx whitish or rose, turning claret or purple, about 8 mm. long, externally softly pubescent, not inflated, 5-fid to beyond the middle, the tube campanulate, the lobes ovate or ovate-lanceolate, apically acute, about as long as the tube; corolla white or cream-color, often tinged with rose in the throat, the tube slender, 1.6--2 cm. long, the lobes subequal, oblong, about 8 mm. long; stamens 4, about 2.5 cm. long, much exserted, ascending; fruiting-calyx accrescent, red-violet or purple; fruit small, drupaceous, at first green or greenish-bronze, turning black when ripe, ovoid, apically obtuse, externally smooth, often 1-seeded by abortion.

This species is based on *Schimper 1132* from the mountains near the Tacazze river, Ethiopia. Collectors have encountered it on savannas and wooded savannas, along roadsides, in *Cymbopogon afronardus* grasslands, in fire-swept grassy woodlands, forest edges, and patches of scrub, as well as in dry places in general, at altitudes of 750--2000 m., in anthesis in February, April, and July, and in fruit in January, February, and April.

The corollas are said to have been "white" on *Bergdyck 17* and by Lind & Tallantire (1962), "white, the center red" on *Van der Gucht 287*, "white with scarlet base" by Chipp (1929), "white, tinged rose in base of throat" on *Lebrun 3544*, "greenish-cream, the throat rose-red" on *Germain 511*, and "petals red, white at base" on *Liben 209*.

The species is said to be "well represented in the herbaceous layer on savannas" in Zaire. Chipp (1929) avers that it is "confined to East Africa, not reaching farther south than Tanganyika", citing his *nos. 48* & *49*. Kotschy (1865) cites *Binder 80* from about 7° N. lat. in Ethiopia; Lewalle (1972) cites *Lewalle 4868* from Burundi. Cufodontis (1962) cites only *Schimper 1132*; Drar (1970) cites his *nos. 1084, 1085, 1155, 1415, 1510, 2099,* & *2399* from the Sudan; Engler (1892) cites *Dillon s.n.* and *Schimper 19*, these apparently being the unnumbered Dillon and Schimper collections cited by Richard (1851) when he transferred the species from *Volkameria* to *Clerodendrum*. He notes that "J'avoue que je ne vois aucune différence de

quelque importance entre les deux genres *Volkameria* et *Clerodendron*. En conséquence, j'ai cru devoir rapporter l'arbuste abyssin désigne par M. Hochstetter sous le nom de *Volkameria cordifolia* au grand genre *Clerodendron*. Dans le §4 *Densiflora*, auquel elle me paraît appartenir, par son inflorescence et la figure de ses feuilles, je n'en vois aucune dont elle ne se distingue très-facilement."

Tarr (1955) reports that in the Sudan this species is attacked by the fungus *Cercosporella* sp., causing leaf spotting.

DeGraer affirms that the plant has medicinal properties [cfr. Rev. Congo Fev.-Mars 1929]. Bergdyck reports that the Azande tribesmen in Zaire use the leaves medicinally against snakebite and regard them as very efficacious.

Vernacular names reported for the plant are "mbisibaso", "nongowo", "nungao", "yat-kwong-ubim", and "yazakum".

Wernham (1916) claims that *C. subpeltatum* Wernham has similar leaves as those of *C. cordifolium* but much larger flowers; Gürke (1900) avers that *C. subreniforme* Gürke is probably related to *C. cordifolium*, Bruce (1934) asserts that her *C. grandicalyx*, now known as *C. fuscum* Gürke, is "very similar to *C. cordifolium* A. Rich., but may be distinguished by its conspicuous calyx".

Baker (1900) cites *Kotschy 497* from Senner (Sudan), *Schimper 1132* from Ethiopia, and *Petherdick s.n.*, *Schweinfurth 1369* and *Speke & Grant 567 & 676* from Kenya-Uganda-Tanzania. DeWildeman (1909) cites *Magis s.n.* from Zaire.

Thomas (1936) cites *Schweinfurth 1317 & 1530* from Sudan, *Neumann 155 & 156* and *Schimper 19* from Ethiopia, *Baker 198*, *Dümmer 3728*, and *Nägele 268* from Uganda, *Grant s.n.* and *Trotha 23* from Tanganyika, and *Jessen 411* from Angola. For some reason unknown to me he designates "Grant--9.62" as the type of the species -- this is clearly incorrect and inappropriate.

Material of *C. cordifolium* has been misidentified and distributed in some herbaria as *C. umbellatum* Poir. and as *C. umbellatum* var. *asperifolium* (Thomas) Mold.

Citations: SUDAN: Bahr El Ghazal: *Drar & Mahdi 1084* (Gz), *1085* (Gz), *1155* (Gz), *1415* (Gz). Dafur: *Drar & Mahdi 2099* (Gz), *2399* (Gz); *Ibrahim s.n.* [1958] (Gz); *Lynes 1* (W--1348910), *568* (W--1349042); *Schweinfurth 1369* (S). Nubia: *Prince Paul of Würtemberg s.n.* [1819] (Mu). ETHIOPIA: *Quartin-Dillon & Petit s.n.* (L); *Schimper 1132* (L--isotype, Ld--photo of isotype, N--photo of isotype, S--isotype, S--isotype), *1611* (L). CENTRAL AFRICAN REPUBLIC: *A. Chevalier 6742* (Br, N). ZAIRE: *Becquet 95* (Br, Br, Br, Br); *Belot 39* (Br, N); *Bergdyck 17* (Br); *Blommaert 82* (Br); *Bredo 1326* (Br), *1490* (Br); *Claessens 1495* (Br), *1931* (Br, N); *Collector undetermined 135* (Br); *DeGraer 18* (Br, Br, Br); *Delpierre s.n.* [Uele 1904] (Br); *Germain 511* (Br, Br), *708* (Br, N); *Gillet s.n.*[Region de Kisantu 1907] (Br, N); *Lathouwers III.6* (Br, Br); *Lebrun 3544* (Br, Br); *Liben 209* (Mu); *Magis s.n.* [Durumu 1907-8] (Br); *Mearns 2857* (W--632851), *2864* (W--632858); *Pittery 816* (Br, N), *818* (Br, Br, N); *Scops 96* (Br); *Van der Gucht 287* (Br, N); *Vanderyst 27563* (Br, N). BURUNDI: *Reekmans 3627* (Mu). UGANDA: *Brydolf s.n.* [17/10/1965] (Gz); *Mearns 2942* (W--632939), *3028* (Br, W--633032).

CLERODENDRUM COSTARICENSE Standl., Field Mus. Publ. Bot. 18: 1002--1003 [as "*Clerodendron*"]. 1938; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 22 & 89. 1942.

Synonymy: *Clerodendron costaricense* Standl., Field Mus. Publ. Bot. 18: 1002. 1928.

Bibliography: Standl., Field Mus. Publ. Bot. 18: 1002--1003. 1938; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 22 & 89. 1942; Mold., Alph. List Cit. 1: 58. 1946; Hill & Salisb., Ind. Kew. Suppl. 10: 55. 1947; Mold., Alph. List Cit. 2: 344 & 352 (1948) and 3: 945. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 39 & 180. 1949; Mold., Résumé 46 & 449. 1959; Mold., Fifth Summ. 1: 87 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 80 & 535. 1980.

A scandent shrub, 5 m. tall, glabrous throughout except for the inflorescence; branches slender, subterete, ochraceous; bark light-brown; internodes elongate; leaves decussate-opposite; petioles rather stout, about 1.5 cm. long; leaf-blades subpapyraceous or semi-rigid, oblong-elliptic or broadly elliptic, 11--14 cm. long, 6--9 cm. wide, apically abruptly and obtusely short-acuminate, marginally entire, basally obtuse, green and moderately shiny above, almost similarly green and shiny beneath, glabrous on both surfaces; midrib and larger venation only subprominulent above, decidedly prominent beneath; secondaries about 6 per side, broadly ascending, arcuate; veinlets prominulous, loosely reticulate; inflorescence axillary, 3-flowered; peduncles slender, 3--6 cm. long; bracts foliaceous, narrowly oblong-lanceolate, 1.5--2.5 cm. long, apically attenuate-acuminate; pedicels to 7 mm. long; flowers tetramerous; calyx (in closed bud) externally sparsely and minutely strigillose toward the base, otherwise glabrous, ellipsoid, 10--12 mm. long, obscurely costate, shortly lobed, the lobes broadly ovate, apically shortly caudate-apiculate; corolla hypocrateriform, very pale greenish-yellowish when opening, fading to brown, glabrous, the tube about 12 mm. long, cylindric, about 2 mm. wide, apically not dilated, the limb 4-lobed, the lobes spreading, oblong, equaling the tube in length, apically obtuse; stigma bilobed, the lobed curling.

This species is based on *Austin Smith H.588* collected in the Caribbean cloud-forest, where it was climbing over vegetation at the edge of woodland at La Pena de Zarcero, at 1650 m. altitude, Alajuela, Costa Rica, in April 1938, and is deposited in the Field Museum herbarium in Chicago. Standley (1938) cites also *Brenes 6147*. Smith notes: "fl. expanding to 35 mm."

There are some features about this plant that remind one strongly of *Aegiphila costaricensis* Mold. from the same general region.

Clerodendrum costaricense has been collected in anthesis in April and material has been misidentified and distributed in some herbaria as *Melastomaceae*.

Citations: COSTA RICA: Alajuela: *Brenes 6147* (F--1063097); *A. Smith H.588* (F--919527--type, Ld--photo of type, N--fragment of type, N--photo of type).

CLERODENDRUM COSTATUM R. Br., Prodr. Fl. Nov. Holl., imp. 1, 511. 1810.

Synonymy: *Clerodendron costatum* R. Br. apud Spreng. in L., Syst.

Veg., ed. 16, 2: 759. 1825.

Bibliography: R. Br., Prodr. Fl. Nov. Holl., imp. 1, 511 (1819) and imp. 2 [Isis 1819:] 153. 1819; Steud., Nom. Bot. Phan., ed. 1, 207. 1821; Link, Enum. Hort. Berol. 2: 127. 1822; Loud., Encycl. Pl. 522. 1829; Loud., Hort. Brit., ed. 1, 247. 1830; Sweet, Hort. Brit., ed. 2, 416. 1830; Loud., Hort. Brit., ed. 2, 247. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; G. Don in Sweet, Hort. Brit., ed. 3, 550. 1839; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; D. Dietr., Syn. Pl. 3: 617. 1843; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Benth. & F. Muell., Fl. Austral. 5: 61 & 64. 1870; F. Muell., Second Syst. Cens. Austral. Pl. 1: 173. 1889; F. M. Bailey, Cat. Indig. Nat. Pl. Queensl. 36. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; F. M. Bailey, Queensl. Fl. 1182 & 1184. 1901; F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 89, 108, & viii. 1921; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 152 & 180. 1949; Mold., Résumé 208 & 449. 1959; R. Br., Prodr. Fl. Nov. Holl., imp. 3, 511. 1960; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 345 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 334, 348, 384, & 535. 1980.

Brown's original (1810) description of this plant is merely "foliis ovatis obtusiusculis subtus tomentosis costatis rugosis, corymbis terminalibus axillaribusque trichotomis". The species is supposed to be endemic to Queensland and was introduced into cultivation in England, according to Loudon and Sweet (1830) in 1823 from New South Wales. The only common name recorded is the book-name "ribbed-leaved clerodendrum".

Bentham & Mueller (1870) describe and discuss the species as follows: "?*C. costatum*, R. Br. Prod. 511. A tall shrub. Leaves very broadly ovate, obtuse, 4 to 5 lines long, reticulate-rugose and velvety-tomentose underneath. Inflorescence a terminal corymbose panicle, not exceeding the leaves but longer than in *C. tomentosum*. Flowers not seen. Fruiting calyx enlarged and drupe of *C. floribundum*. -- Schau. in DC. Prodr. xi. 671. Queensland. Endeavour river, Banks and Solander. The foliage is that of *Gmelina Leichhardtii*, but the fruit undoubtedly that of *Clerodendron*, and not of *Gmelina*." Their statement that the leaves are only "4 to 5 lines" [8--10 mm.] long is amazing and doubtless is a misprint for "4 to 5 inches", especially since those of *Gmelina leichhardtii* (F. Muell.) F. Muell. are 7--14 cm. long.

Blake describes the plant as a shrub, 1.5--2.5 m. tall, with dull-green leaves which are paler beneath, and white flowers which are fragrant only at night. He encountered it on sand dunes, in anthesis in May. I have not seen the original Banks & Solander specimen, and await with keen interest the disposition of this taxon that will be made by my friend and colleague, Dr. Abid Ahmad Munir, who is now engaged in a thorough revision of the Australian *Verbenaceae*.

Citations: AUSTRALIA: Queensland: *S. T. Blake 23310* (N).

CLERODENDRUM CRUENTUM Lindl., Gard. Chron. 1860: 456 [as "*Clerodendron*"]. 1860; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 72 & 89. 1942.

Synonymy: *Clerodendron cruentum* Lindl., Gard. Chron. 1860: 456. 1860.

Bibliography: Lindl., Gard Chron. 1860: 339 & 456. 1860; Anon., Floral World 6: 215. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; H. J. Lam, Verbenac. Malay. Arch. 317 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94, 108, & viii. 1921; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 72 & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 158 & 180. 1949; Mold., Résumé 215 & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 358 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 348 & 535. 1980.

Lindley's original (1860) description of this species is: "foliis inflorescentiâ habitu *Clerodendri macrophylli* Blumii; pedicellis glanduloso-tomentosis, calyce angusto colorato nec foliaceo herbaceo punctato, staminibus inclusis, corollâ cruentâ. This is the plant which was exhibited a few weeks since by Messrs. Veitch (see ante, p. 339) and a noble species it is. The leaves are deep green, oblong, 10 inches in length by 4 in breadth, and there is a fine branching panicle of blood red flowers; so that it will stand in the front rank of stove shrubs. But it is in some respects so much like Blume's *Clerodendron macrophyllum* (now called *Cl. phyllomega*), that it may be a question whether it is botanically distinct. The flowers however are a very rich red, not a dirty white, the stamens do not project but are hidden in the corolla, the flower stalks are clothed with a short glandular fur, and the calyx instead of being green, dilated, and dotted, consists of five very narrow crimson lobes on which no dots are perceptible. It is therefore at any rate distinct enough in a gardening point of view. It was found by Mr. Thomas Lobb in some part of tropical Asia."

Lam (1919) comments: "Allied to *C. macrophylla* Bl., but different in the shape and colour of calyx and corolla". He lists it among his "Imperfectly known or doubtful species". Bakhuizen (1921) also includes it in his "Species unknown to me or doubtful".

Nothing is known to me of this plant beyond what is stated in its literature. If it truly has included stamens it would certainly be a most unusual taxon in this group of red-flowered species.

CLERODENDRUM CUBENSE Schau. in A. DC., Prodr. 11: 658 [as "*Clerodendron*"]. 1847; Mold., Alph. List Comm. Vern. Names 15 & 20. 1939.

Synonymy: *Clerodendron cubense* Schau. in A. DC., Prodr. 11: 658. 1847. *Clerodendron brachypus* Urb., Fedde Repert. Spec. Nov. 20: 347. 1924. *Clerodendron cubensis* A. Rich. ex Mold., Prelim. Alph. List Inv. Names 19 in syn. 1940. *Clerodendron pendulum* C. Wright ex Mold., Prelim. Alph. List Inv. Names 21 in syn. 1940. *Clerodendrom brachypus* Urb. apun Alain, Contrib. Acas. Mus. Hist. Nat. Coleg. La Salle 7: 78 sphalm. 1946. *Clerodendron cubense* Urb. ex Mold., Alph. List Inv. Names Suppl. 1: 6 in syn. 1947. *Clerodendron cubensis*

Schau. apud Roig, Dicc. Bot. Nom. Vulg, Cub. 496 sphalm. 1953.

Bibliography: Schau. in A. DC., Prodr. 11: 658. 1847; A. Rich. in Sagra, Hist. Fis. Polit. Nat. Cuba 11 (2): 146--147. 1850; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Sagra, Icon. Pl. Fl. Cub. 41. 1863; Griseb., Cat. Pl. Cuba 216. 1866; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1156. 1876; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; Urb., Feddes Repert. Spec. Nov. 20: 347. 1924; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1072. 1932; Mold., Alph. List Comm. Vern. Names 15 & 20. 1939; Mold., Prelim. Alph. List Inv. Names 18, 19, & 21. 1940; Mold., Alph. List Inv. Names 16, 17, & 19. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 24 & 89. 1942; Mold., Phytologia 2: 98. 1945; Alain, Contrib. Ocas. Mus. Hist. Nat. Coleg. La Salle 7: 29, 78, & 113. 1946; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Cit. 1: 4, 63, 64, 66, 130, 139, 187, 188, 221, & 316. 1946; Mold., Alph. List Inv. Names Suppl. 1: 5--7. 1947; Mold., Alph. List Cit. 2: 418, 486, & 652 (1948), 3: 695, 867, & 889 (1949), and 4: 1034, 1038, 1094, & 1144. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 43, 45, & 180. 1949; Roig, Dicc. Bot. Nom. Vulg. Cub. 2: 496, 607. 715--716, & 1005. 1953; Alain in León & Alain, Fl. Cuba, imp. 1, 4: 319 & 321. 1957; Mold., Résumé 51, 53, 259, 260, 262, 268, 271, & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 95, 98, 438, 440, 442, 443, 452, & 460 (1971) and 2: 864. 1971; Alemán Frías, Ezcurra Ferrer, Gutiérrez Vázquez, Horstmann, López Rendueles, Rodríguez Graquitena, Roquel Casabella, & Schreiber, Die Kulturpfl. 19: 422. 1972; Farnsworth, Pharmacog. Titles 8 (8): vi. 1973; Alain in León & Alain, Fl. Cuba, imp. 2, 2: 319 & 321. 1974; Mold., Phytol. Mem. 2: 88, 91, & 535. 1980; Mold., Phytologia 52: 20 (1982) and 57: 478. 1985.

A shrub, to 2 m. tall; branches very irregular and apparently gnarled; branchlets and twigs often irregular, gray or buff in color, very obtusely tetragonal, lenticellate, verrucose, minutely puberulent to strigillose or sometimes glabrous and shiny on shoots; nodes not annulate; principal internodes 1.3--4.4 cm. long; leaves decussate-opposite, mostly relatively few clustered only on the young twigs, or approximate; petioles slender and to 3 mm. long or obsolete, glabrous; leaf-blades very firmly membranous or subcoriaceous to coriaceous when mature, gray-green or rather dark-green above, pale beneath, oblanceolate or obovate to subpanduriform, the younger ones sometimes oblong- or obovate-elliptic, 3--16 cm. long, 1.5--4.8 cm. wide, apically abruptly acute or very shortly acuminate or cuspidate to obtuse or rounded, marginally entire or subdentate, basally rounded or cordate, sometimes slightly asymmetric, glabrous and more or less impressed-punctate on both surfaces, shiny beneath; midrib slender, flattened above, prominent beneath; secondaries very slender, 5--7 per side, short, arcuate, joined near the margins, flat or subimpressed above, prominulent beneath; vein and veinlet reticulation slender, usually obscure above, the larger parts slightly prominulent beneath on mature leaves; inflorescence axillary or terminal, cymose, 2--5-flowered, mostly much shorter than the subtending leaf, the peduncles practically obsolete or sometimes to 3.5

cm. long, the sympodia and cyme-branches obsolete or to only several mm. long and puberulent; pedicels very slender and elongate, 2--5 cm. long, basally puberulent, apically usually glabrous, often bearing a pair of minute subulate bractlets toward the middle, from which point another pedicel and flower may sometimes arise; bractlets linear, 1--3 mm. long, puberulent; flowers often pendulous; calyx campanulate, about 4 mm. long, the rim somewhat spreading and entire or very shortly denticulate; corolla white, 2.5--4 cm. long, the lobes oblong, about 1 cm. long; stamens long-exserted; fruit drupaceous, globose, 6--7 mm. long and wide, green (when immature?).

This species is based on several collections made by Ramon de la Sagra in Cuba in 1833 and deposited in the DeCandolle Herbarium in Geneva, there labeled as *nos. 208, 215,* & *595,* plus an unnumbered collection. Urban's *C. brachypus* was based on *Ekman 16673* from Ensenada de Vega Cuchilla, Pinar del Río, Cuba, deposited in the Berlin herbarium, now destroyed.

Collectors have encountered *C. cubense* in woods, coastal thickets, and ravines, on limestone cliffs, hillsides, and wooded limestone plains, as well as in wet depressions, from sealevel to 700 m. altitude, in flower in March and April and in fruit in April and May. Cremata reports that its wood is used by natives as firewood.

Vernacular names reported for the species are "hiel de gallina", "hiel de perro", "magüira cimarrona", "oviedo amarillo", and "oviedo de flor blanca".

Material of *C. cubense* has been misidentified and distributed in some herbaria as *C. grandiflorum* (Hook.) Schau. On the other hand, the *Alain & Killip 2008,* distributed as *C. cubense,* really is *C. grandiflorum* (Hook.) Schau. and *Herb. Hort. Bot. Bogor. 140* is not verbenaceous.

Citations: CUBA: Havana: *Acuña 17679* (Es); *Sagra 595* (B--fragment of cotype, Dc--cotype, Dc--cotype). Oriente: *Alain 3157* (Es); *Clément 4961* (Ha); *León, Victorin, & Alain 19814* (N). Pinar del Río: *Acuña & Roig 10873* (Es, Es); *Britton, Britton, & Gager 7403* (N); *Britton & Cowell 9996* (G, K, N, W--69b103); *Ekman 16673* (B, E--photo, Ld--photo, Ld--photo, N--photo, S), *18728* [Herb. Roig 3112] (B, Es, N, S); *Ganganelli s.n.* [Herb. Roig 2061] (Es). Province undetermined: *Sagra 208* (X--cotype), *215* in part (Bm--cotype, X--cotype), *s.n.* [Cuba; Macbride photos 33933] (F--photo of cotype, Kr--photo of cotype, Ld--photo of cotype, N--photo of cotype, P--cotype, V--cotype, W--1706395--cotype); *C. Wright 3175* in part [1860-1864; Herb. Sauvalle 1779 in part] (B, Bm, Cb, E--118926; G, Hv, Hv, K, L, Oa, P, X). ISLA DE PINOS: *Britton & Wilson 14859* (N), *15229* (Cm, F--459834, N, W--793538); *Cremata 28* (N), *s.n.* [Herb. Roig 2020] (Es); *Curtiss s. n.* [April 1904] (N, N); *Marie-Victorin & Alain 28* (Es--7517, Ha, Vi, Vi, W--1955333). MOUNTED CLIPPINGS: Urb., Feddes Repert. Spec. Nov. 20: 347. 1924 (W).

CLERODENDRUM CUMINGIANUM Schau. in A. DC., Prodr. 11: 666 [as "*Clerodendron*"]. 1847; H. Hallier, Meded. Rijks Herb. Leid. 37: 69. 1918.

Synonymy: *Clerodendron cumingianum* Schau. in A. DC., Prodr. 11: 666. 1847. *Clerodendron cumingii* Schau. ex Mold., Alph. List Inv.

Names Suppl. 1: 6 in syn. 1947.

Bibliography: Schau. in A. DC., Prodr. 11: 666. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Miq., Fl. Ned. Ind. 2: 875. 1858; Naves & Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: Nov. App. 160. 1880; Vidal y Soler, Phan. Cuming. Philip. 67, 87, & 135. 1885; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; E. D. Merr., Philip. Journ. Sci. Bot. 7: 98. 1912; H. Hallier, Meded. Rijks Herb. Leid. 37: 69. 1918; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 76, 90, 96, 108, & viii. 1921; E. D. Merr., Enum. Philip. Flow. Fl. 3: 401. 1923; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 11 & 20. 1936; Mold., Alph. List Comm. Vern. Names 27. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62 & 89. 1942; Mold., Phytologia 2: 98. 1945; Mold., Alph. List Cit. 1: 136. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; Mold., Alph. List Cit. 2: 462. 1948; H. N. & A. L. Mold., Pl. Life 2: 55. 1948; Mold., Alph. List Cit. 3: 848. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 141 & 180. 1949; Mold., Résumé 183, 262, & 449. 1959; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 694. 1961; Mold., Résumé Suppl. 3: 21. 1962; Mold., Fifth Summ. 1: 315, 349, & 443 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 306 & 535. 1980.

A shrub or treelet, 2--5 m. tall; stems 4--10 cm. in diameter; branchlets tetragonal, villous; leaves decussate-opposite; petioles 2.5--4 cm. long, villous; leaf-blades membranous, subobcordate-ovate, 10--15 cm. long, 7.5--10 cm. wide, apically acuminate, marginally entire or irregularly dentate, hirtellous above, softly villous (especially on the vein reticulation) beneath and here and there glandular-punctate beneath the pubescence; inflorescence terminal, paniculate, subfastigiate, compact, many-flowered, villous; bractlets minute; flowers fragrant; calyx oblong-tubular, about 1 cm. long, often reddish, externally long-pubescent, 5-fid, the lobes apically very acute and often purple; corolla white or rose, often with a lilac throat, infundibular, twice as long as the calyx or less, the tube externally pilose-subvillous, the limb 4 times as wide as the tube; stamens long-exserted; filaments white; anthers black; style white; stigmas green; fruiting-calyx reddish, somewhat shiny; fruit drupaceous, white or violet. Schauer (1847) refers to the pubescence as "strigose-villous".

This endemic Philippine species is based on *Cuming 1761* from Cebu, Philippine Islands, deposited in the Berlin herbarium with a duplicate in the Herb. Lucae. Schauer (1847) notes that the species is related to *C. infortunatum* L. It belongs in the Subgenus *Euclerodendron* Schau. and Section *Densiflora* Schau. -- in Thomas' classification (1936) in Section *Eurycalyx* Thomas, Subsection *Paniculata* Thomas.

Fernandez-Villar (1880) found this plant growing on Luzon and Panay islands. Other collectors report encountering it in damp places near cultivated areas, while Merrill (1921) affirms that it occurs chiefly in secondary forests along streams at low altitudes. Hallier (1918), however, found it growing "im Busch an Rande des Hochwaldes". It has been collected at altitudes to 665 m., in an-

thesis from January to November, and in fruit from January to June and August to October.

The corollas are described as having been "white" on *Ebalo 1140, Edan Phil. Bur. Sci. 46105, Ramos Phil. Bur. Sci. 42689,* and *Santos 4095,* "rose" on *Loher 4420,* and "limb white, mouth and base of lobes lilac" on *Hallier 4424.*

Vernacular names reported for the plant are "bulubatana", "flor de paridà", "maltasam", "pàridă", and "salumget".

Hansford (1961) reports the species as host to the fungus *Meliola clerodendricola* P. Henn. in the Philippines, based on *Philip. Bur. Sci. 32135.*

Hallier (1918) cites *Hallier 4424* & *4424a* and *Robinson 10000* from Basilan, *Elmer 13559* from Mindanao, and *Cuming 1761* from Cebu. Merrill (1923) cites *Celestino Phil. For. Bur. 7321, Cuming 1760, Ramos & Edano 38753, Reyes & Pascual 23078,* and *Phil. Bur. Sci. 31359, 31368, 35689,* & *36663* from Panay, Negros, Cebu, and Mindanao. *Loher 4420* is said to be identical with *Vidal 1650.*

Material of C. *cumingianum* has been misidentified and distributed in some herbaria as C. *macrocalyx* H. J. Lam. Some sheets of *Ramos 14477* [viz., Bz--19107] exhibit a very strong resemblance to C. *lanuginosum* Blume and may represent a natural hybrid between the two taxa. On the other hand, *Elmer 13559* is actually the type collection of C. *lanuginosum* var. *adpressipilum* Mold. and *Ramos Philip. Bur. Sci. 33102* is C. *vanoverberghii* Merr.

Citations: PHILIPPINE ISLANDS: Basilan: *DeVore & Hoover 25* (W--449567); *Reillo Philip. Bur. Sci. 15404* (Cm, Lu); *J. V. Santos 4095* (W--?246018). Bohol: *M. Ramos Philip. Bur. Sci. 42689* (Ca--242447). Cebu: *Cuming 1760* (L). Leyte: *Edano Philip. Bur. Sci. 41803* (Ca--239645). Luzon: *Loher 4420* (W--446869). Mindanao: *Ahern 549* (W--445823); *Ebalo 1140* (Ca--1189842, Mi); *Kanehira 2598* (N); *E. D. Merrill 8239* (W--901936), *11642* (Bz--19102, W--1361259); *M. Ramos 14477* (Bz--19107, Bz--19108); *Ramos & Edaño Philip. Bur. Sci. 36663* (W--1260124), *84994* (Bz); *C. M. Weber 1102* (W--712321). Negros: *Celestino Philip. Bur. Sci. 7321* (W--628874); *W. D. Pierce P.233* (W--1599589). Panay: *Edaño Philip. Bur. Sci. 46105* (Bz--19101, Ca--310000, N); *Martelino & Edaño Philip. Bur. Sci. 35689* (Bz--19104, W--1264081); *Ramos & Edaño Philip. Bur. Sci. 31359* (Bz--19105), *31368* (N). Tawitawi: *Ramos & Edaño Philip. Bur. Sci. 44009* (B, Ca--257643). LOCALITY OF COLLECTION UNDETERMINED: *Collector undetermined s.n.* (Pd).

CLERODENDRUM CUNEIFORME Mold., nom. nov.

Synonymy: *Clerodendron cuneatum* Gürke, Engl. Bot. Jahrb. 28: 303. 1900 [not Auct., 1967, nor Turcz. Bull. Soc. Nat. Mosc. 36 (2): 221, 1863). *Clerodendrum cuneatum* Gürke apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 81 & 93. 1936. *Clerodendrum schefflerі* var. *ellipticum* Mold., Phytologia 1: 417--418. 1940.

Bibliography: Gürke, Engl. Bot. Jahrb. 28: 303. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; Dinter, Feddes Repert. Spec. Nov. 16: 168. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 79, 108, & viii. 1921; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 30,

45, 81, & 93. 1936; Mold., Phytologia 1: 417--418. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 52, 89, & 91 (1942) and ed. 2, 121, 181, & 183. 1949; Mold., Résumé 153, 267, & 449. 1959; Mold., Resumé Suppl. 9: 3. 1964; Mold., Fifth Summ. 1: 255. 443, & 451 (1971) and 2: 864. 1971; Mold., Phytologia 34: 261 & 262. 1976; Mold., Phytol. Mem. 2: 236, 244, & 535. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 419. 1983.

A subshrub; younger branches sparingly downy; leaf-scars large, corky, elevated, with flaring margins; leaves decussate-opposite, congested on the twigs; petioles very slender, 5--15 mm. long, sparsely strigillose; leaf-blades membranous, rhomboid-obovate or broadly elliptic, 2.8--8 cm. long, 1.7--4.7 cm. wide, apically acute, marginally coarsely dentate (the teeth basally to 1 cm. wide), basally acuminate or gradually attenuate-cuneate into the petiole, softly strigose-downy or very sparsely puberulent to glabrous on both surfaces, more densely so beneath; inflorescence terminal, cymose, the cymes lax, to 5 cm. long and 10 cm. wide, 10--12-flowered, the axis and cyme-branches finely downy; bracts ovate, 8--12 mm. long, 4--6 mm. wide, short-stalked or sessile, apically obtuse, downy, the ultimate ones narrowly lanceolate, 4--5 mm. long and 1 mm. wide, apically acute; pedicels 5--10 mm. long; calyx widely campanulate, 5-fid to the middle or below, the lobes broadly ovate or almost rotund, 5--7 mm. long, apically rounded and obtuse, externally downy, internally somewhat glandulose; corolla zygomorphic, its tube about 1 cm. long, twice as long as the calyx, the lobes unequal; stamens and style long-exserted, curvate.

This species is based on *Wilms 160* from Lydenburg, Transvaal, South Africa, collected in October 1887, and on *Rehmann 6188* from Houtbosch, Transvaal. Gürke (1900) comments that "Die zur Section *Cyclonema* gehörende Art ist durch die rhomboidisch-verkehrt-eiförmigen, am Grunde keilförmigen und sehr grob gesägten Blätter und die sehr wenigblütigen Rispen ausgezeichnet und leicht kenntlich".

Clerodendrum schefflleri var. *ellipticum* was based on *M. S. Evans 544a* from Berea, at 5000--6000 feet altitude, Durban, Natal, South Africa, collected in October 1894 and deposited in the Natal Government Herbarium at Durban.

The Dehn collection, cited below, is accompanied by a hand-colored painting. The species has been collected in flower in October and December.

Thomas (1936) cites *Rehmann 6188* and *Wilms 160* from Transvaal, designating the latter collection as the type, and *Rudatis 1472* from Natal. Dinter (1919) cites *Dinter 65, 741,* & *2419* from Namibia, but Friedrich-Holzhammer and his associates (1967) suggest that this is a misidentification and that the Dinter collections actually represent C. *dekindtii* Gürke.

The *Dinter 5301, Rogers 30464, Schoenfelder 52,* and *Volk 2561,* distributed as C. *cuneatum,* actually are C. *dekindtii* var. *dinteri* Thomas.

The C. *cuneatum* of Turczaninow (1863), referred to in the synonymy (above) belongs in the synonymy of C. *serratum* (L.) Moon, while

C. cuneatum Auct. belongs in the synonymy of *C. dekindtii* Gürke.

Citations: ZIMBABWE: *Dehn 558* (Mu, Rh--8520); *Klingberg s.n.* [June 1895] (S). SOUTH AFRICA: Natal: *M. S. Evans 544a* (N, N--photo, Na); *Fries & Fries 3637* (S); *Rudatis 1472* (S). LOCALITY OF COLLECTION UNDETERMINED: *Volk 710a* [Asis] (Mu).

CLERODENDRUM CUNNINGHAMII Benth. in Benth. & F. Muell., Fl. Austral. 5: 64 [as "*Clerodendron*"]. 1870; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 67, 69, 72, & 89. 1942.

Synonymy: *Clerodendron cunninghamii* Benth. in Benth. & F. Muell., Fl. Austral. 5: 64. 1870.

Bibliography: Benth. in Benth. & F. Muell., Fl. Austral. 5: 61 & 64. 1870; Schomb., Fl. S. Austral. 52. 1875; F. Muell., Second Syst. Cens. Austral. Pl. 1: 173. 1889; K. Schum. & Hollr., Fl. Kais. Wilhelmsl. 122. 1889; F. M. Bailey, Cat. Indig. Nat. Pl. Queensl. 36. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; F. M. Bailey, Queensl. Fl. 4: 1182 & 1184. 1901; F. M. Bailey, Compreh. Cat. Queensl. Pl. 386, pl. 11. 1913; H. J. Lam, Verbenac. Malay. Arch. 262 & 263. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 76, 89, 108, & viii. 1921; Stapf, Ind. Lond. 2: 238. 1930; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 67, 69, 72, & 89. 1942; Mold., Alph. List Cit. 1: 60, 141, & 254 (1946) and 2: 572. 1948; H. N. & A. L. Mold., Pl. Life 2: 55. 1948; Mold., Alph. List Cit. 3: 905. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 149, 152, 158, & 181. 1949; Mold., Résumé 200, 207, 208, 215, & 449. 1959; Mold., Résumé Suppl. 3: 26. 1962; Backer & Bakh., Fl. Java 2: 607. 1965; Mold., Fifth Summ. 1: 335, 345, & 358 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 325, 334, 339, 348, & 535. 1980; Munir in Morley & Toelken, Flow. Pl. Austral. 286 & 287, fig. 174a. 1983; Mold., Phytologia 58: 448. 1985.

Illustrations: F. M. Bailey, Compreh. Cat. Queensl. Pl. 386, pl. 11 (in color). 1913; Munir in Morley & Toelken, Flow. Pl. Austral. 286, fig. 174a (in color). 1983.

An erect or scandent shrub or small rather crooked tree, 1.5--16 m. tall; stems to 15 cm. in diameter at breast height; bark brown or gray, furrowed and flaking off in small rectangular scales; middle and inner bark cream-color; wood cream-color, moderately soft and light; branchlets rather slender, obtusely tetragonal, minutely and obscurely puberulent to mealy-pubescent when young, finally subglabrate, lenticellate; nodes nor annulate; leaf-scars rather large and patelliform, flat, with protruding edges; principal internodes 2.5--3.5 cm. long; leaves decussate-opposite; petioles medium-stout or slender, 1--5.5 cm. long, very minutely and obscurely puberulent or glabrate, rather deeply canaliculate above, often collapsed at base and apex in drying; leaf-blades thin-chartaceous or submembranous, rather uniformly green on both surfaces or lighter beneath, elliptic or ovate to broadly ovate or rarely oblong, 9--25 cm. long, 5--15 cm. wide, apically acutely and rather shortly acuminate, marginally entire, basally acute or acuminate to broadly rounded or subcordate, glabrous (except for the venation) above, rather densely puberulent beneath; midrib basally rather stout beneath, rapidly diminishing in

size as the apex is approached, flat above, rounded-prominent beneath; secondaries slender, about 6 per side, arcuate-ascending, obscurely joined in many loops at the very margins or not joined; tertiaries sparse; veinlet reticulation fine, sometimes plainly visible (but not prominulent) above as well as beneath, where only the larger portions are prominulent; inflorescence terminal, broadly corymbose or cymose-paniculate, to 21 cm. long, 17--25 cm. wide, basally leafy, with 2--4 pairs of opposite cyme-branches, each few- to many-flowered, appressed short-pubescent; pedicels 2.5--4 cm. long, continuous with the branchlets and (along with the rachis) similarly puberulent or becoming glabrescent; bracts large and foliaceous, subtending the lowest or all pairs of inflorescence-branches, to 6 cm. long and 3 cm. wide, the upper ones much smaller, linear-lanceolate, 2--3 mm. long, 0.5--1 mm. wide, long-stipitate. similar to the leaves in all respects except size, caducous; pedicels 0.5--1 cm. long; flowers often insect-galled; calyx green, 1--1.2 cm. long, externally densely appressed-pubescent, without peltate glands, 5-fid to about the middle; corolla white or light-cream, hypocrateriform, externally glabrous, the tube slender, 4--6 cm. long, the lobes equal, oblong or obovate, 0.7--1.5 cm. long, 5--7 mm. wide, patent-recurved, apically subacute; stamens 3.5--4 cm. long, long-exserted; style 7--8 cm. long, glabrous; ovary globose, externally glabrous; fruit drupaceous, subglobose, 1--1.2 cm. long and wide, black, pulpy, 4-seeded.

This species is apparently based on unnumbered Cunningham and Hulls collections, the latter from Escape Cliffs, Queensland, Australia, and is endemic to tropical Australia and New Guinea.

Bentham & Mueller (1870) describe the species as "A tall shrub, either quite glabrous or the under side of the leaves and inflorescence more or less tomentose. Leaves ovate, scarcely acuminate, often narrowed to the base, sometimes above 6 inches long and membranous, sometimes much smaller and firmer, the petiole varying from under 1 in. to above 2 in. Flowers numerous in a broad terminal corymb sometimes dense sometimes loose, with the calyx and structure nearly of *C. floribundum*, but remarkable for the long slender corolla-tube, usually exceeding 2 in., the lobes broad, not above 3 lines long. Stamens rather long. Fruiting calyx more or less funnel-shaped, shortly contracted at the base, the margins very spreading or recurved; drupe 4 or 5 lines in diameter, ripening 2 to 4 distinct pyrenes." They cite a Hulls collection from Northern Australia, a Cunningham collection from Goulburn island, and Cunningham, Daemel, and Jardine unnumbered collections from Queensland. They comment that "Some of Brown's specimens, as well as others seen only in fruit and referred to *C. floribundum*, may perhaps belong to *C. Cunninghamii*. Some of F. Mueller's from Gilbert river, with more pubescent leaves, are very doubtful."

Collectors have encountered *Clerodendrum cunninghamii* in ridge forests, lower montane rainforests, grasslands, and monsoon forests on coastal dunes, from sealevel to 1000 m. altitude, in flower in April, May, and July, and in fruit in January, April, and July. White reports that it is "common in rainforests" on Long Island,

while Clemens describes it as "a scandent shrub" in Queensland. Bakhuizen (1921) suggests that *C. costatum* R. Br. may be conspecific and synonymous with this species. It is also known from cultivated material in Java, England, Guyana, and Mozambique. Material has been misidentified and distributed in some herbaria as the quite similar *C. floribundum* R. Br.

Citations: NEW GUINEA: Papua: *J. Chalmers s.n.* [1885] (Mb). Territory of New Guinea: *M. S. Clemens 10499* (Mi), *41319* (Mi); *Hoogland 5092* (W--2214236); *Schlechter 18903* (Br, Ca--226567, N); *Streimann & Kairo NGF.27578* (Mu). AUSTRALIA: Northern Territory: *M. R. Schomburgk 149* (K). Queensland: *M. S. Clemens s.n.* [Mount Glorious, January 1945] (Ca--81170, Mi); *Cunninhgam 80* (N--cotype); *Dall s.n.* [Rockingham Bay] (K); *Hulls s.n.* [Escape Cliffs] (K--cotype, Ld--photo of cotype, Mi--photo of cotype, N--fragment of cotype, N--photo of cotype). AUSTRALIAN ISLANDS: Groote: *Specht 269* (W--2094576). Long: *C. T. White 12163* (Ca--937846). South Goulburn: *Cunningham 183* (N--cotype). CULTIVATED: England: *Holtze 547/1890* (K). Guyana: *Herb. Br. Guian. Bot. Gard. s.n.* (K, U). Java:*Herb. Hort. Bot. Bogor. XV.J.A.XXXIII.7* (bz--26400, Bz--26401, Bz--26542, Bz, Bz, Bz, Bz, Bz, N), *XV.J.A.XXXIII.7a* (Bz--26402, Bz--26403, N), *XV.J.A.XXXIV.2* (Bz--26405, Bz--26534, Bz, Bz, N), *XV.J.A.XXXIV.2a* (Bz--26406, Bz--26407, Bz, N), *XV.J.A.XXXOV.2*(Bz--26404). Mozambique: *A. Gomes e Sousa "C"* (Ld). MOUNTED ILLUSTRATIONS: F. Bauer Icon. 956 (V), 956a (V), 956b (V); Munir in Morley & Toelken, Flow. Pl. Austral. 286, fig. 174a (Ld, Ld).

CLERODENDRUM CURRANII Elm., Leafl. Philip. Bot. 5: 1847 [as "*Clerodendron*"]. 1913; H. Hallier, Meded. Rijks Herb. Leid. 37: 66. 1918.

Synonymy: *Clerodendron curranii* Elm., Leafl. Philip. Bot. 5: 1847. 1913. *Clerodendron infortunatum* var. *curranii* (Elm.) Bakh., in herb.

Bibliography: Elm., Leafl. Philip. Bot. 5: 1847. 1913; Fedde & Schust., Justs Bot. Jahresber. 41: 387. 1918; H. Hallier, Meded. Rijks Herb. Leid. 37: 66--67. 1918; H. J. Lam, Verbenac. Malay. Arch. 288 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 89, 108, & viii. 1921; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62 & 89. 1942; Mold., Alph. List Cit. 1: 191. 1946; H. N. & A. L. Mold., Pl. Life 2: 55. 1948; Mold., Alph. List Cit. 2: 463. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 141 & 181. 1949; Mold., Résumé 183 & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Fifth Summ. 1: 315 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 306 & 535. 1980.

An erect, slender shrub, or tree-like, 2.5--8 m. tall; stems 5--8 cm. in diameter at breast height, only sparingly branched from below the middle; wood very soft, white, tasteless, "with a slight greenish or foetid odor" [acc. Elmer]; pith large, white; bark very smooth, mottled brown and grayish-white, green beneath the epidermis; branches crooked, sparingly rebranched, ascending, the slender ultimate ones greenish and angular, densely avellaneous-tomentose; leaves decussate-opposite, often scattered, plainly anisophyllous; petioles about

10 cm. long but shorter on smaller leaves, densely short-pubescent with tawny hairs; leaf-blades softly membranous, descending, slightly paler green beneath, to 22.5 cm. long and 16 cm. wide on the basal half, the upper ones more reduced, apically mostly attenuately acute or acuminate, marginally entire or remotely and obsoletely sinuate-dentate, basally broadly rounded and cordate, velutinous-pubescent above, densely and softly cinereous-pubescent or -tomentose beneath, drying yellowish-brown on both surfaces; midrib straight, stouter than the secondaries; secondaries 4--6 pairs laterally ascending, the basal or stronger ones with as many sublateral tertiaries arising from the lower outer side only, with cross-bars also evident; veinlet reticulation obscure; inflorescence paniculate, terminal, erect, corymbose; peduncles green, 5--8 cm. long, angular, tomentose, subtended by foliaceous bracts; inflorescence-branches opposite, the lower ones longer, subtended by caducous bractlets, light olivaceous-tomentose, rebranched above the middle, the ultimate divisions few and short, apically floriferous; terminal flower solitary, odorless, terminating a 1-cm.-long pedicel, the pedicels of the few clustered lateral flowers shorter, all subtended by linear, densely tomentose, caducous bractlets; calyx slender-tubular, about 1.5 cm. long and apically about 7 mm. wide, externally puberulent and glandulose, 5-fid to about the middle, the lobes suboblong, subequal, at least 7.5 mm. long and 3 mm. wide, slenderly tapering to the acuminate or subcaudate apex, reticulately veined, much paler green, externally puberulent toward the apex and with a few large glands in the middle; corolla white or creamy-white with a purplish center or purple throat, hypocrateriform, about 2.5 cm. long, the basal 2/3 tubular and externally puberulent (except at the base), the tube strongly striate externally, "the distal bud portion a trifle tipped and obovately oblong" [acc. Elmer], the lobes oblong, about 8 mm. long and 4.5 mm. wide, apically obtusely rounded to acute, basally narrowed, ultimately wide-spreading, occasionally glandular-punctate, dorsally faintly puberulent toward the apex and along the distal margin, the margins below the middle undulate or obscurely and irregularly dentate; stamens 4 "or more" [acc. Elmer], inserted in the corolla-throat, 2 cm. long, glabrous, usually curved toward the distal end, strongly looped in bud; anthers elliptic, 2.5 mm. long, 1.25 mm. wide, subdorsifixed, basally tapering and sagittately lobed, apically truncately rounded, compressed, drying blackish-brown; style "articulate to ovary" (acc. Elmer), very similar to the filaments, subcompressed and laterally grooved, cream-color except for the greenish distal end; stigmas very deep-green; ovary shortly thick-columnar, basally constricted, externally glabrous.

This species is based on *Elmer 12860* from Palawan, Philippine Islands, collected in March 1911. Hallier (1918) classifies it in the Section *Paniculata* of *Euclerodendron*, citing only *Elmer 12860* and *Merrill 7237* from Palawan. Elmer (1913) asserts that it is "Only critically distinguished from C. *infortunatum* (Roxb.) Linn." and forms "extensive copses in good well drained ground among light woods bordering cogon patches at 500 feet altitude along the trail to Napsan. Named after H. M. Curran, an exforester in the Philippine

government service and who has also collected it on Palawan."

Bakhuizen (1921) reduces *C. curranii* to synonymy under *C. villosum* Blume. A vernacular name, "tabingtabing", is recorded for it. The corollas are said to have been "white" on *Ebalo 576* and "white with a purplish center" on *Merrill 799*; Hallier (1918) describes it as "intus carnea".

Clerodendrum curranii has been collected in anthesis in February, March, May, and September. Material has been misidentified and distributed in some herbaria as *C. infortunatum* L., *C. villosum* Blume, and *C. viscosum* Vent., all of which are superficially very similar.

Citations: PHILIPPINE ISLANDS: Culión: *E. D. Merrill 671* (W--435641). Palawan: *Cenabre Philip. For. Bur. 29278* (W--1262453); *Ebalo 576* (Mi); *Elmer 12860* (Bi--isotype, Bz--20915--isotype, L--isotype, N--isotype, N--photo of isotype, Ut--28381--isotype, W--872792--isotype); *E. D. Merrill 1299* (N), *7237* (Bz--20914, W--901865). Paragua: *E. D. Merrill 799* (W--435769). Island undetermined: *Herb. Philip. Bur. Sci. s.n.* (Gg--32035).

CLERODENDRUM CUSPIDATUM Turcz., Bull. Soc. Nat. Mosc. 36 (2): 221 [as "*Clerodendron*"]. 1863; Mold., Prelim. Alph. List Inv. Names 19. 1940.

Synonymy: *Clerodendron cuspidatum* Turcz., Bull. Soc. Nat. Mosc. 36 (2): 221. 1863.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 221. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Mold., Prelim. Alph. List Inv. Names 19. 1940; Mold., Alph. List Inv. Names 17. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Cit. 3: 903. 1949; Mold., Résumé 262 & 449. 1959; Mold., Resumé Suppl. 1: 5. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 443 (1971) and 2: 864 & 968. 1971; Mold., Phytol. Mem. 2: 107 & 535. 1980.

Turczaninow's original (1863) description of this plant is: "(Euclerodendra racemiflora), Cl. ramis tetragonis pubescentibus; foliis oppositis petiolatis utrinque longe attenuatis, medio inaequaliter serratis, in utraque pagina pubescentibus; racemo terminali folia superante confertifloro, bracteis lanceolatis flores sessiles aequantibus interstincto; calycibus striatis bilabiatis, labio superiore integro obtuso, inferiore 4 dentato; filamentis longe exsertis flores triplo excedentibus. Flores albi e schedula, bracteae utrinque attenuatae rubrae. Forma calycis jam a congeneribus bene distinguitur, praeter alios characteres. In provincia Ocana, prope Convenecon, alt. 3000 ped. *Schlim No. 714.*"

Nothing is known to me about this species beyond what is given in the above bibliography. The type locality is in Norte de Santander, Colombia.

CLERODENDRUM CYRTOPHYLLUM Turcz., Bull. Soc. Nat. Mosc. 36 (3): 222 [as "*Clerodendron*"]. 1863; Mold., Prelim. Alph. List Inv. Names 18, 19, & 23. 1940.

Synonymy: *Clerodendron cyrtophyllum* Turcz., Bull. Soc. Nat. Mosc. 36 (3): 222. 1863. *Clerodendron amplius* Hance, Ann. Sci. Nat., ser.

5, 5: 233. 1866. *Clerodendron formosanum* Maxim., Bull. Imp. Sci. St.-Pétersb. 31: 85--86. 1886. *Cordia venosa* Hemsl. in Forbes, Journ. Linn. Soc. Lond. Bot. 26: 143. 1890. *Clerodendron glaberrima* Hayata ex Kawakami, List Pl. Formos. 84. 1910; Journ. Coll. Sci. Univ. Tokyo 30: 216. 1911. *Clerodendron cytophyllum* Turcz. apud Worsdell, Ind. Lond. Suppl. 1: 238 sphalm. 1941. *Clerodendron crytophyllum* Wiltshire, Commonw. Mycol. Inst. Ind. Fungi 1: 422 sphalm. 1954. *Clerendon cystophyllum* Turcz. ex Mold., Résumé 259 in syn. 1959. *Clerendendron cyrstophyllum* Turcz. ex Mold., Résumé 259 in syn. 1959. *Clerodendron crytophyllum* Turcz. ex Hsu, Taiwania 14: 14 sphalm. 1968. *Clerodendrum formosanum* Maxim. apud Hsiao, Fl. Taiwan 4: 421. 1978. *Clerodendrum glaberrimum* Hayata apud Hsiao, Fl. Taiwan 4: 421. 1978.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (3); 222. 1863; Hance, Ann. Sci. Nat., ser. 5, 5: 233. 1866; Franch., Nouv. Arch. Mus. Hist. Nat. Paris, ser. 2, 6: 111. 1883; Franch., Pl. David., imp. 1, 1: 231. 1884; Maxim., Bull. Acad. Imp. Sci. St.-Pétersb. 31: 83 & 85--86. 1886; Maxim., Mél. Biol. 12: 519. 1886; Hemsl. in Forbes, Journ. Linn. Soc. Lond. Bot. 26: 143. 1890; Forbes & Hemsl., Journ. Linn. Soc. Lond. Bot. 26 [Ind. Fl. Sin. 2]: 259. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560 & 561. 1893; Prain, Ind. Kew. Suppl. 4, imp. 1, 101. 1901; Kawakami, List Pl. Formos. 84. 1910; Hayata, Journ. Coll. Sci. Imp. Univ. Tokyo 30: [Mat. Fl. Formos.] 216. 1911; Dunn & Tutcher, Kew Bull. Misc. Inf. Addit. Ser. 10: 204 & 205. 1912' Hayata, Icon. Pl. Formos. 2: 216, fig. 39. 1912; J. Matsumura, Ind. Pl. Jap. 2 (2): 531. 1912; Fedde & Schust., Justs Bot. Jahresber. 39 (2): 319. 1913; Rehd. in Sarg., Pl. Wils. 3: 377. 1916; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; Itô, Taiwan Shokubutu [Illust. Formos. Pl.] pl. 596 (1927) and pl. 598. 1928; Sasaki, List Pl. Formos. 351. 1928; Stapf, Ind. Lond. 2: 230. 1930; Rehd., Journ. Arnold Arb. 12: 76--77. 1931; P'ei, Mem. Sci. Soc. China 1 (3): 124 & 147--150. 1932; P'ei, Sinensia 2: 75--76. 1932; L. H. Bailey, List Florists Handl. Verb. [mss.]. 1935; Dop in Lecomte. Fl. Gén. Indochine 4: 852 & 875. 1935; Kanehira, Formos. Trees, ed. 2, 649--650 & 718, fig. 605. 1936; Kafuku & Hata, Journ. Chem. Soc. Japan 57: 727--731. 1936; Fedde & Schust., Justs Bot. Jahresber. 59 (2): 416. 1939; Mold., Prelim. Alph. List Inv. Names 18, 19, & 23. 1940; Yamamoto, Trans. Nat. Hist. Soc. Formos. 30: 418. 1940; L. H. & E. Z. Bailey, Hortus Second, imp. 1, 188. 1941; Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; Hansford, Proc. Linn. Soc. Lond. Bot. 153: 9. 1941; Prain, Ind. Kew. Suppl. 4, imp. 2, 101. 1941; Wiltshire, Rev. Appliq. Mycol. Suppl. 3: 33. 1941; Worsdell, Ind. Lond. Suppl. 1: 238. 1941; Mold., Alph. List Inv. Names 16, 17, & 22. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 56, 58, 59, 72, 89, & 90. 1942; Mold., Phytologia 2: 98. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560 & 561. 1946; Mold., Alph. List Cit. 1: 15, 18, 26, 27, 79, 91, 101, 102, 108, & 236. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; Hansford & Deight., Mycol. Papers IMI.23: 70. 1948; Mold., Alph. List Cit. 2: 355, 429, 514, 577, 602, & 643 (1948), 3: 658, 666, 718, 719, 732, 776, 811, 895, & 971 (1949), and 4: 984, 985, 1010, 1011, 1018, 1104, 1146, 1149, 1201, 1206, 1224, 1238, 1242, & 1243. 1949.

[to be continued]

NOTAS SOBRE LA FLORA FANEROGAMICA DE NUEVA GALICIA, III*

Servando Carvajal
Herbario del Centro de Enseñanza
Técnica Industrial
Apartado 2-216
Guadalajara, Jalisco. 44280
MEXICO

Durante la preparación del tratamiento sistemático de la familia de los pinos (Pinaceae), para la **Flora Novo-galiciana** del Dr. Rogers McVaugh, han surgido varios problemas con respecto a la distribución, variaciones naturales y para la correcta identificación de algunos "taxa" en Abies y Pinus, géneros que la componen. Debido a la enorme cantidad de miembros que conforman al género Pinus, se decidió por concentrar las investigaciones primero en él y publicar posteriormente lo referente a Abies. Entre la extensa colección de especímenes de Pinus, depositados en el Herbario del Centro de Enseñanza Técnica Industrial (CREG) y en otros Herbarios Mexicanos (IBUG, ENCB, MEXU y en el de la Universidad Autónoma de Guadalajara), se han encontrado algunos muy interesantes, que representan quizás categorias infragenéricas no descritas aún para la ciencia, de acuerdo con la literatura consultada; su estudio ha conducido a realizar algunas modificaciones nomenclaturales y adiciones taxonómicas, que han llegado a ser necesarias a fín de entender en parte, a este género tan complejo en el área que nos ocupa.

PROPOSITUM

Esta investigación fue planteada de la siguiente manera:

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* Carvajal, S. 1981. Notas Sobre la Flora Fanerogámica de Nueva Galicia, II. **PHYTOLOGIA 49 (3): 185—196.**

1ra. Cuestión:
¿La población citada en la literatura como Pinus ayacahuite var. brachyptera, que se localiza en la Sierra del Cuale (Jalisco), es realmente diferente a la población que se distribuye en los estados del norte de la República Mexicana?

2da. Cuestión:
¿A qué subsección pertenece, de acuerdo a Little & Critchfield (1969), el taxón recientemente denominado Pinus rzedowskii?

3ra. Cuestión:
¿Son dos tipos diferentes de Pinus lumholtzii los que se encuentran en la Sierra de Quila, Jalisco?

4ta. Cuestión:
¿A qué especie corresponde un pino de (3-) 4 (-5) hojas por fascículo, muy cortas y anchas, con conos ocres, grandes, resinosos y las escamas con la apófisis cóncava, colectado por Maximino Martínez en 1941, en el Volcan Nevado, Jalisco?

5ta. Cuestión:
¿Cúal es la especie del Pinus colectado en El Salto del Rincón (municipio de Villa de Purificación, Jalisco), cuyo cono tiene apariencia de P. pringlei y /o P. patula?

6ta. Cuestión:
¿Se podría contar con una herramienta eficaz para identificar a los diferentes "taxa" del género Pinus, presentes en Nueva Galicia?

GRATITUDO

El presente trabajo es el resultado del estudio de ejemplares en el campo y de un análisis minucioso de laboratorio. Sin embargo, no debe considerarse ésta como una investigación exhaustiva, pues dentro del área citada como Nueva Galicia (McVaugh, 1961), existen numerosas regiones que no han sido exploradas botánicamente, las cuales en última instancia, podrían proporcionar datos importantes para un mejor conocimiento de nuestra flora. El autor manifiesta su agradecimiento a los Doctores Jerzy Rzedowski, Concepción Rodríguez Jiménez y Raquel Galván, del Herbario del Instituto Politécnico Nacional (ENCB); Dra. María Teresa Germán Pinzón y al Sr. Rafael Hernández, del Herbario Nacional (MEXU); Biól. Carlos Luis Díaz Luna del Herbario del Instituto de Ciencias Biológicas, de la Universidad Autónoma de Guadalajara y al Ing. José A. Vázquez García, del Herbario del Instituto de Botánica de la Universidad de Guadalajara (IBUG), las facilidades prestadas para la revisión de los ejemplares depositados en sus Instituciones, entre ellos, los tipos, isotipos u holotipos de muchos táxones. Asimismo, a Alfredo Meza Zambrano, Hector A. López Cabrera, Agustín Gallegos Rodríguez,

Gerardo Ruvalcaba Salazar, Jorge Méndez Montaño, José Carmen López M., Benito Martínez y Miguel Carvajal Mariscal, su decidido apoyo para conclusión de la investigación: LAS PINACEAE DE NUEVA GALICIA. Hic opus sororí Gloriae cui sum obstrictus memoria beneficii sempiterna, dicavit.

SUMMARUM FACTUM

Respuesta a la 1ra. cuestión:

Desde 1909 que fue descrito Pinus ayacahuite var. brachyptera por George R. Shaw, basandose en ejemplares colectados por Nelson (4555, de El Salto, Durango; 4915, del Monte Mohinora, Chihuahua; 6043), Sierra Madre, en Chihuahua), y depositados en el Museo Nacional de Washington; ha sido objeto de atención por parte de algunos investigadores (Bailey, 1913; Gentry, 1942, 1946; White 1948; Maysilles 1956 y G. C. de Rzedowski, 1960), debido a sus caracteres morfológicos, pero principalmente a su distribución y relaciones con otros pinos y en general con la vegetación de algunas áreas nuestro territorio. Shaw diferenciaba a esta variedad de las dos restantes, en el tamaño de la semilla, en la longitud del ala de la semilla o su eventual ausencia; tales detalles concuerdan con la población localizada en los estados de Sonora, Chihuahua, Sinaloa y Durango.

Martínez en 1948, en su revisión a "LOS PINOS MEXICANOS", estuvo de acuerdo con Shaw y mencionó por su parte, el haber estudiado ejemplares procedentes del estado de Jalisco, correspondientes a Pinus ayacahuite; pero al llevar a cabo su análisis concluyó que los especímenes de Jalisco "... parecen intermedios entre la variedad veitchii y la variedad brachyptera, pero se acerca más a ésta...", por lo que tal nombre es el que ha utilizado en la literatura para designar a la población de Jalisco.

No obstante, es curioso que no se halla encontrado a Pinus ayacahuite var. brachyptera en otros complejos montañosos con condiciones ecológicas similares dentro del mismo estado de Jalisco, así también, que se desconozca su presencia en los estados adyacentes (fig. 1). Los análisis morfológicos de especímenes de Durango y Jalisco, mostraron diferencias notables entre sí, por lo que se pensó entonces, en la posibilidad de que la población de Jalisco bien pudiera representar un eslabón que uniera geográficamente a las tres variedades o mejor aún, que fuera una nueva identidad con escasas relaciones a nivel varietal.

Con el acopio de un mayor número de muestras de Jalisco (de la Sierra del Cuale), y de Durango (de El Salto, Pueblo Nuevo, en donde parecen encontrarse los ejemplares más típicos de la variedad), se planeó hacer una investigación para evaluar los aspectos más sobresalientes de la variación natural de los pinos de ambas localidades. Para llevarla a cabo, se tomó como base, la metodología propuesta por Caballero (1967), en la que se incluyen diferentes áreas geográficas, diferentes sitios por área y diferentes árboles por sitio.

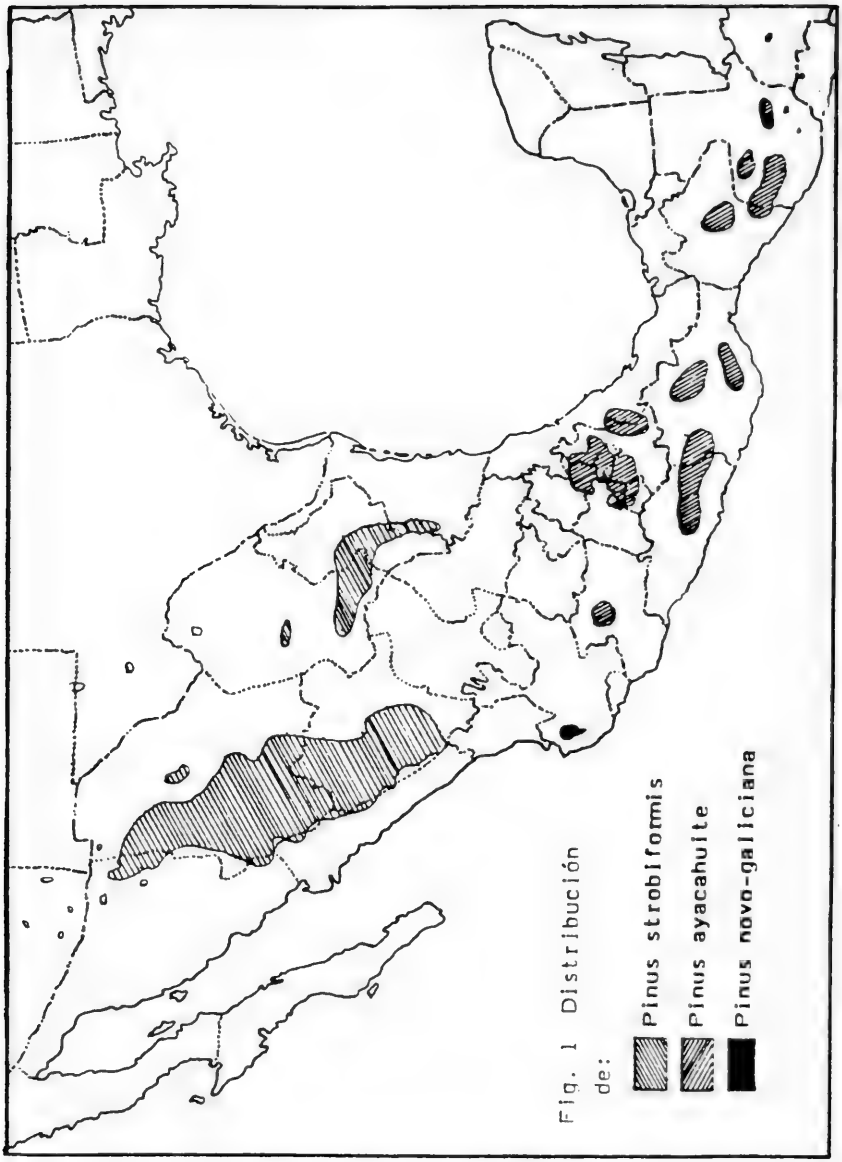

Fig. 1 Distribución de:

El análisis biométrico (que será publicado por separado), consideró los siguientes caractéres:

a. TAXONOMICOS: Longitud de las hojas, número de hojas por fascículo, longitud del cono, anchura del cono, relación anchura-longitud del cono, anchura y longitud de la escama del cono, tamaño de la semilla y longitud del ala de la semilla.

b. SILVICOLAS: Altura del árbol, diámetro de árbol sin corteza, espesor de la corteza, edad.

c. FISIOLOGICOS: Número de hileras de estomas, posición de las hileras de estomas en las caras de la hoja, posición y número de canales resiníferos, número de células epiteliales por canal.

d. TECNOLOGICOS: Gravedad específica de las virutas de incremento, longitud de las traqueidas e incremento medio por anillo.

El análisis estadístico de las 20 variables propuestas lleva a concluir que la población de Jalisco posee:

a) Corteza más delgada; b) Mayor diámetro normal; c) Agujas y fascículos foliares más largos; d) Menor número de canales resiníferos; e) Menor número de células epiteliales por canal; f) Menor número de hileras de estomas; g) Conos de mayores dimensiones; h) muy grande la relación longitud-anchura del cono; i) Las escamas son más largas y encorvadas, casi enroscadas; j) Las semilla carecen de ala; k) incremento medio anual en diámetro mayor que a la población de Durango.

En lo que respecta a las variables restantes, no se obtuvieron diferencias significativas, por lo que se pueden considerar como similares.

Por lo anteriormente señalado, las variables altamente significativas, se pueden considerar como suficientemente aceptables para llevar a cabo una diferenciación entre ambas localidades, por lo que se cree pertinente proponer un nuevo nombre para el taxon de Jalisco:

Pinus novo-galiciana S. Carvajal, nom. et stat. nov.

Pinus ayacahuite var. brachyptera G.R. Shaw, The Pines of Mexico. Publ. Jour. Arnold Arb. 1: 11. 1909. En parte.

Arbol de 25 m o más de alto, con el tronco recto y corteza de 0.8--1.3 cm de grosor, copa cónica o aguda, ramas un poco ascendentes, casi verticiladas; hojas en grupos de 5, de 18--23 cm, delgadas, los fascículos espaciados, de color verde claro, con tintes azulosos, triangulares, bordes aserrados, con los dientecillos separados; un haz fibrovascular; canales resiníferos 2 (-3), uno medio o dos, algo separados de la hipodermis; hipodermis delgada, uniforme; células de la endodermis con las paredes exteriores delgadas; vainas

pajizas, pronto caedizas; conillos subcilíndricos, con el ápice atenuado, poco resinosos, de 2.8--3.3 cm de largo, sobre un pedúnculo de 18--33 mm de largo, colocados por pares o en grupos de tres; conos subcilíndricos, con el ápice atenuado, poco resinosos, un poco encorvados, con tinte naranjado o amarillento, de 36--59 cm de largo, de 4.8--5.6 veces tan largos como anchos, sobre pedúnculos robustos de 18--33 mm o menos, a veces cubiertos por las escamas basales; escamas gruesas, duras, cóncavas y ralas, de 67--118 (media igual a 89) por cono, apófisis larga y reflejada, que termina en una prolongación ancha, enroscada, de 2.5--3.6 (-4.1) cm de ancho, pro 5.3--8.7 cm de largo, la prolongación sobresale hasta 3.7 cm; semilla de 12--15 mm, sin ala, pero con una cicatriz remanente de ella; con frecuencia sólo una semilla en la escama ovulífera, la otra nula al ser abortada; hojas cotiledonares de 15--17. (Fig. 2).

TIPO: MEXICO: JALISCO: Sierra del Cuale, en La Mina, Municipio de El Tuito; 2350 m; 13 Ago 1984; S. Carvajal 4703; Bosques húmedos con Pinus lumholtzii, Quercus laeta, Q. magnoliifolia, Abies guatemalensis var. jaliscana, y Arbutus xalapensis, en laderas con poca pendiente, valles o en barrancos pequeños, en suelos profundos y bien drenados. (Isotipos para ser distribuídos).

SPECIMINIS TESTIMONIALIS LECTUS

Sierra del Cuale, R. Lamas R. 49 (CREG, MEXU); L.M.V. de Puga 8762 (IBUG); J. de la Torre V. s.n. (IBUG); La Ciénega, J. Venegas T. s.n. (IBUG); S. Carvajal 3007 (CREG). La Mina, R. Lamas R. 181 (CREG, MEXU); N. Cervantes y R. Gómez 11 (CREG), S. Carvajal 3841 (CREG). Cumbre Blanca, G. Barba s.n. (MEXU); R. González T. 610 (IBUG, ENCB); S. Carvajal 4096 (CREG). Cerro San Juan, S. Carvajal 4651 (CREG); Gentry & Gilly 10790 (MEXU), colectado en 1951.

Recientemente se ha estado utilizando en nombre de **Pinus strobiformis** Engelm., relegando como sinónimos a P. ayacahuite var. brachyptera, P. reflexa y P. flexilis var. reflexa (Critchfield & Little, 1966). **P. novo-galiciana** Carvajal, parece representar entonces, un eslabón que une geográficamente a P. ayacahuite del Mediodía de la República y P. strobiformis de los Estados del Norte (fig. 1).

Respuesta a la 2da. cuestión:

Pinus rzedowskii fue descrito por Madrigal et Caballero (1969), en base a ejemplares colectados en la región de Coalcomán, Michoacán (México). Dichos autores mencionaron en la discusión de la especie que: "según la clasificación propuesta por Shaw (1914), P. rzedowskii, correspondería a la Subsección Paracembra y al Grupo Balfourianae, por tener las escamas (ovulíferas) con umbo dorsal y el ala de la semilla bien desarrollada, si se considera la clasificación de Gaussen (1960), esta especie presenta caracteres intermedios entre

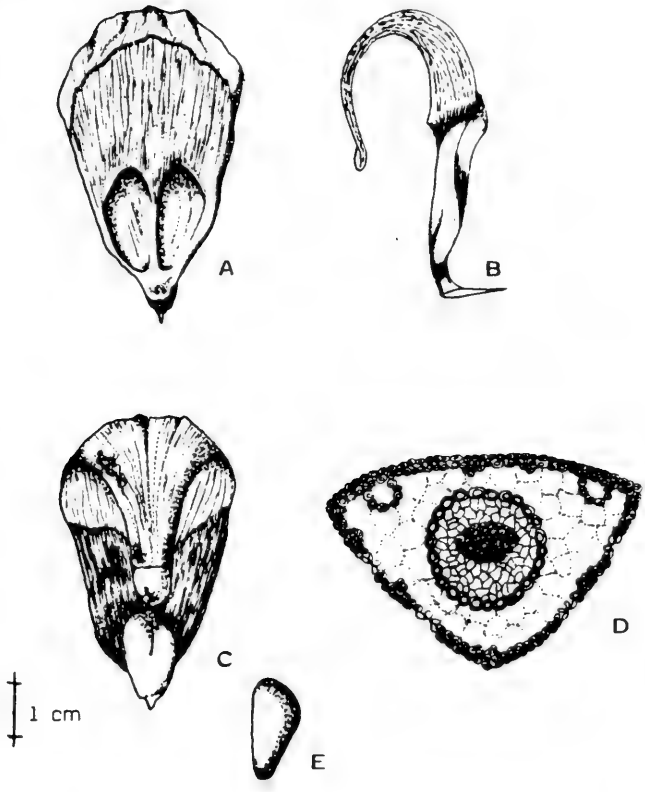

Fig. 2. **Pinus novo-galiciana** Carvajal. Escamas del cono: A. vista ventral (1X); B. vista lateral (1X); C. vista dorsal (1X); D. corte transversal (40X), y E. semilla (1X) (Dibujo por el autor).

los subgéneros Cembrapinus y Eupinus".

Desafortunadamente la publicación de la especie fue con unos meses de diferencia al trabajo titulado "Subdivisions of the genus **Pinus** (Pines)", dado a la luz por Little & Critchfield en 1969. En él se proporciona una clave, de la cual se transcribe un fragmento:

B. Brácteas no decurrentes bajo los fascículos de hojas; hojas con un haz fibrovascular, comunmente 5 (5--1) en un fascículo, con la vaina decídua; semilla sin ala o si la tienen y es larga, entonces no se desprende facilmente . . . . . .Subgénero 2. **Strobus**

C. Umbo de la escama del cono terminal; hojas 5 en un fascículo. . . . . Sección 2. **Strobus**

D. Conos indehiscentes, deciduos a la madurez; semilla sin ala. . . . . .Subsección 2. **Cembrae**

DD. Conos dehiscentes a la madurez; semillas en su mayoría con una ala larga o con una ala rudimentaria. . . . . Subsección 3. **Strobi**

CC. Umbo de la escama del cono dorsal; hojas 5--1 en un fascículo . . . . . Sección 3. **Parrya**

E. Semillas grandes, sin ala o con una ala corta; hojas 4--1 (rara vez 5), en un fascículo, dispersas

F. Semillas sin ala; hojas 4--1 (rara vez 5), en un fascículo. . . . . Subsección 4. **Cembroides**

FF. Semilla con una ala corta, desprendible; hojas 3 en un fascículo. . . . . Subsección 5. **Gerardianae**

EE. Semillas pequeñas, con una ala larga; hojas 5 en un fascículo, ligeramente comprimidas, persistentes por muchos años. . . . . Subsección 6. **Balfourianae**

BB. Brácteas decurrentes bajos los fascículos de hojas. . . . . extralímite

Al tratar de ubicar a Pinus rzedowskii mediante la clave se observó que no concordaba con los datos proporcionados por lo que describe como nueva una subsección:

Subgén. 2. Strobus, Secc. 3. Parrya, Subsecc. 5a. **Rzedowskianae** S. Carvajal, Subsect. nov.

Folia (3-) 4, brevia (6--10 cm longa), hipodermide homomorpha; ductis resiniferis externalibus, interdum internalibus; ramuli vernales ramulorum 1 (uninodales); strobili plerumque obliqui, maturitate dehiscente, decidui; semina magna, ala grandia, separabili.

Hojas (3-) 4, cortas (de 6--10 cm de largo), con la hipodermis homomorfa;

con canales resiniferos externos, rara vez alguno interno, ramillas uninodales; conos femeninos, la mayoría de las veces oblícuo, dehiscente a la madurez, pronto caedizo; semilla grande, con una ala larga, desprendible.

Una especie de Michoacán (en México): Pinus rzedowskii.

Pinus rzedowskii Madrigal et Caballero, Boletín Técnico Nº 26. Instituto Nacional de Investigaciones Forestales, Agosto de 1969. 11 pp. I tabl. Ilustr. "pino de rzedowski". Región de Coalcomán, Dos Aguas, Michoacán. México.

Esta subsección propuesta difiere de la Subsección Cembroides, porque las semillas tiene una ala larga; de la Subsección Gerardianae, en que el ala es larga y los fascículos son en su mayoría compuestos de 4 hojas y por último, de la Subsección Balfourianae, en tener semillas grandes y los fascículos con 4, rara vez tres agujas.

Respuesta a la 3ra. cuestión:

En 1977, se colectaron unas muestras botánicas del género Pinus, en la Región Central de Nueva Galicia (en Tecolotlán, Jalisco, J. Castellanos 177), y las que tentativamente fueron identificadas como P. chihuahuana, lo que las hacía interesantes, pues esta especie parece restringir su área de distribución a la porción muy norte de Jalisco y los estados situados arriba de él. Posteriormente se hizo un análisis más detallado de esas muestras, así como de otras colectadas en zonas adyacentes y se observó que existían variaciones muy notables con respecto al cono, la estructura interna de las hojas, al igual que la posición de éstas con respecto a la ramilla. Tales características hacían a las muestras ser más semejantes a P. lumholtzii. Sin embargo, existen también diferencias muy marcadas con referencia a éste último, por lo que se ve la conveniencia de proporner el siguiente nombre para poder diferenciarlos:

Pinus lumholtzii var. **microphylla** S. Carvajal, var. nov.

Ad pinum lumholtzianum Robinson et Fernald accedit distinguitur notis infra descriptis:

Foliis 4, raro 3, brevis, 8--13 (-15) cm longis, pendentis; strobilis symmetricis, 3--5 cm longis, ramulis longis persistentes.

Arbol de 8--12 m de altura, con la copa rala, ramillas delgadas, flexibles, de color castaño; hojas en fascículos de 4, rara vez 3, verticalmente colgantes, flexibles, de 8--13 (-15) cm de largo, de color amarillento, triangulares, con los bordes aserrados, los dientecillos muy próximos entre sí, hileras de estopresentes en las tres caras, tres en las dorsales y de 4--5 en la ventral; canales resiníferos (4-) 7--9, medios, ocasionalmente uno o dos internos; células de la endodermis con las paredes externas delgadas; hipodermis biforme, con ligeras ondulaciones irregulares; vainas de color castaño claro, brillantes,

persistentes por mucho tiempo, de 15--25 mm de largo; conos ovoides de 3--5 cm de largo, solitarios, simétricos, colgantes, de color rojizo oscuro, opacos, persistentes por mucho tiempo en la ramilla, pedúnculos de 5--8 mm, delgados, adheridos al cono cuando éste cae, escamas de 10--12 mm de largo, por 2--4 mm de ancho, regulares y uniformes, con el ápice redondeado, apófisis aplanada, a veces un poco abultada (esto se observa en las escamas basales), cúspide achatada con una espina pequeña, pronto caediza; semilla oblonga de color castaño, de 2--3 mm, con el ala de 6--8 mm de largo.

TIPO: MEXICO: JALISCO: Rancho El Cobre, municipio de San Martín de Hidalgo; 2100 m de altitud; 16 Sept 1983; S. Carvajal 4031, en el Herbario del Centro de Enseñanza Técnica Industrial (CREG), en Guadalajara. (Isotipos para ser distribuídos).

SPECIMINIS TESTIMONIALIS LECTUS

CHIHUAHUA: Barranca Guerachic (Río San Miguel), municipio de Batopiles; 19 Ago 1961; I.W. Knobloch 1843 (ENCB).

NAYARIT: 23 millas de Jesús María, sobre el camino a Fresnillo; 1850 m de altitud; 24 Ene 1976; M. Kimnack & Sánchez-Mejorada 1890 (MEXU). Meseta de Juanácata, municipio de Jala; 1900 m de altitud; 14 Feb 1980; J.M. Stead & B.T. Styles 474 (ENCB).

AGUASCALIENTES: Cerro del Laurel, municipio de Calvillo; 2500 m de altitud; 25 de Marz 1982; M. de la Cerda 1354 (ENCB). 27 Ago 1960; J. Rzedowski 14084 (MEXU).

JALISCO: Sierra de Quila, municipio de Tecolotlán (cerca de la localidad tipo); 2110 m de altitud; J. Castellanos 177 (CREG); Valle de Cocula; 1550 m de altitud; 11 Oct 1981; H.H. Iltis & R. Guzmán M. 3255 (ENCB). Rancho lagunillas. muncipio de San Martín de Hidalgo (cerca de la localidad tipo), J.O. Bravo 7 (CREG). Cerro Huehuentón; G. González & S. Carvajal 27 (CREG).

Martínez (1948: 249), había hecho algunas observaciones con respecto a los ejemplares de Pinus lumholtzii con hojas cortas y agregaba "... es necesario hacer estudios más detallados de ellos para definir su posición taxonómica...". A la fecha, se desconoce referencia bibliográfica algunas, con respecto a este nuevo taxon.

Pinus lumholtzii var. microphylla Carvajal, tiene mucha relación con la variedad típica: P. lumholtzii Rob. et Fern. var. lumholtzii. Sin embargo, difieren en las siguientes características: las hojas de la primera se presentan en número de 4, rara vez 3, muy cortas (de 8--13 cm de largo), más finas, triangulares, no carinadas, los canales resiníferos se encuentran de (-4) 7--9 y los conos son de 3--5 cm de longitud; mientras que en la segunda, las hojas son 3, a veces 4, más largas (20--32 cm), anchamente triangulares o carinadas; canales resiníferos de 4--9 y los conos de 4--6 cm de largo.

Con los demás miembros de la Subsección Leiophyllae (Little & Critchfield, 1969), parece relacionarse por la longitud de las hojas y en la persistencia del cono por mucho tiempo en la ramilla; es muy probable que esta variedad pudiera servir de enlace entre ellos, tal y como se muestra en la figura 3. Al momento no se tienen evidencias de hibridaciones interespecíficas y, por otro lado, es notable la disyunción geográfica de los táxones, en lo que respecta a Jalisco.

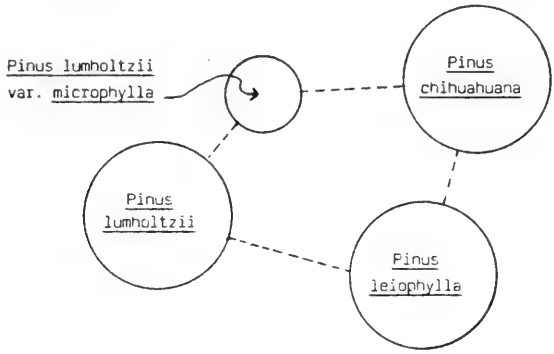

Fig. 3. Relación entre los miembros de la Subsección Leiophyllae

Pinus lumholtzii var. microphylla, se desarrolla en bosques de P. lumholtzii var. lumholtzii, P. douglasiana, P. pseudostrobus, P. michoacana var. cornuta, Quercus obtusata, Q. castanea y ejemplares dispersos de Dodonaea viscosa, sobre suelos rojos, arcillosos, con buen drenaje o bien, sobre laderas riolíticas; de 1850--2500 m de altitud; localmente se le conoce con el nombre de "pino lacio" o "pino triste".

Respuesta a la 4ta. Cuestión:

La sección que Martínez (1948) denominó como Montezumae (Subsección Ponderosae, sensu Little & Critchfield, op. cit.), es un grupo extremadamente complejo, por la alta variabilidad que presenta sus miembros. Tales variaciones dieron al citado autor, la oportunidad para separar en tres grupos a dicha sección y son, a saber:

Grupo Montezumae
Grupo Rudis y,
Grupo Michoacana

Los miembros del Grupo Montezumae, se caracterizan por tener el cono larga-

mente ovoide, opaco y persistente, cayendo más o menos un año después de la dehiscencia, de menos de 16 cm de longitud; hojas largas y más o menos gruesas, excepto en la variedad lindleyi, en la que siempre son delgadas.

Los del Grupo Rudis, tienen las hojas tiesas y por lo general encorvadas, en fascículos de 3, 4 y 5 hojas en el mismo árbol o a veces 5 hojas como número constante; los conos manifiestamente oscuros, hasta parecer casi negros; habitan en el límite altitudinal de la vegetación arbórea.

El Grupo Michoacana, comprende pinos de 5 (-6) hojas por fascículo, largas, gruesas y fuertes, el cono es de más de 20 cm de longitud, a veces encorvado como en Pinus michoacana var. cornuta.

En 1981, se colectaron en las inmediaciones del Volcán Nevado, en Jalisco, unas muestras de pino que tentativamente se colocaron dentro del Grupo Michoacana, pero la forma del cono y las hojas gruesas y fuertes, pero el número de hojas: (3-) 4 (-5) y el tamaño del cono las acercaba al Grupo Montezumae. El tamaño de las hojas y el color de los conos, las alejaba definitivamente del Grupo Rudis.

Un análisis detallado de las muestras, mostraron variantes muy marcadas, las que las hacía ser diferentes a Pinus montezumae var. lindleyi, con quien exhibe bastante afinidad. Posteriormente, en 1984, se tuvo la oportunidad de revisar algunos ejemplares depositados en el Herbario Nacional (MEXU) y en el Herbario de la Escuela Nacional de Ciencias Biológicas (ENCB), y constatar con certeza algunos caracteres dudosos. Con la información recabada y no sin algún temor, se propone el siguiente nombre para dicho taxon:

Pinus montezumae var. **mezambranus** S. Carvajal, var. nov.

Similis P. montezumae, sed distinguenda: folia 4 (raro 3 vel 5) per fasciculum, 22--25 cm longa, 1--1.7 mm lata, flexilia; ductis resiniferis 4--8, medialibus, strobili breviter pedunculati, obliqui, 13--15 cm longi, squamae apophisi dorsali concava.

Varietas in honorem Alfredo Meza Zambrano, amicus fidus et discipulus, interdum intelligentia capax, tamen semper juxta in res arduae, grate nominavi.

Arbol de 12--20 m de alto, ramillas ásperas, con las bases de las brácteas fuertes, de color castaño oscuro; hojas más gruesas que en Pinus montezumae var. lindleyi (de 1--1.7 mm), de (3-) 4 (-5) por fascículo de (20-) 22--25 (-32) cm de largo, triangulares, flexibles, algo erectas, en su mayoría colgantes, de color verde oscuro, brillantes; paredes exteriores de las células de la endodermis engrosadas; canales resiníferos de 4--8; hipodermis casi regular; vainas de 20--30 mm de color castaño-ceniciento; conos solitarios, largamente ovoides, oblícuos, de 13--15 cm de largo, colgantes, de color castaño claro, brillantes; pedúnculo de 10--12 mm de largo, adherido al cono cuando este cae; escamas de 1.5--1.8 cm de ancho, con apófisis muy aplanada, las más

de las veces cóncavas, cúspide nula, con una espina pronto caediza.

TIPO: MEXICO: JALISCO: La Media Luna, Ladera N del Volcán Nevado, municipio de Venustiano Carranza; 25 Sept 1981; S. Carvajal & M.C. Luce G. 3411. Bosque de Pinus montezumæ var. mezambranus, P. douglasiana, P. pseudostrobus, P. leiophylla, Abies religiosa, Quercus rugosa y Q. laurina, sobre suelos de grava volcánica. (Isotipos para ser distribuídos).

SPECIMINIS TESTIMONIALIS LECTUS

JALISCO: Volcán de Fuego; 2850 m de altitud; Oct 1978; M. Cházaro 705. Volcán de Colima (en Jalisco); Jul 1941; M. Martínez 3438. Puerto Las Platas, municipio de Tuxpan; 2500 m de altitud; 13 Feb 1984; S. Carvajal & A. Meza Z. 4607.

DISTRITO FEDERAL: Cerro del Guarda; 2600 m de altitud; 13 Jul 1951; E. Matuda 26213.

MICHOACAN: Ladera del Cerro Angahuan; 2350 m de altitud; 20 Oct 1979; X. Madrigal S. 3449.

Es muy probable que Martínez y otros colectores hayan observado a Pinus montezumae var. mezambranus en el campo, durante su estancia en la inmediaciones del Volcán Nevado, en Jalisco; pero creyeron que representaba variantes mínimas con respecto a la variedad típica, o en otro caso, que lo hayan colectado considerandolo como una forma de P. montezumæ var. lindleyi, como lo indican las muestras que fueron distribuídas con este nombre en los herbarios citados, descontando cualquier eventual diferencia en base al tipo conocido. No se conocen otras referencias con respecto a este taxón.

Respuesta a la 5ta. Cuestión:

En 1983 se colectaron en el Salto del Rincón, municipio de Villa de Purificación, unas muestras de Pinus, las que junto con otras colectadas en zonas adyacentes, se identificaron como Pinus lawsonii, pero el tamaño de las hojas y la forma peculiar del cono, hicieron desistir de tal nombre. Al analizar en forma más detallada, se encontró que la anatomía de las hojas presentaba muchas semejanzas con P. oocarpa (canales resiníferos septales, por ejemplo), pero mostraba notables diferencias en lo que respecta a la forma y tamaño del cono. Con el acopio de nuevas colecciones y su posterior estudio, se pudo concluir, que quizá representara un taxon no descrito aún para la ciencia, al cual se designa con el siguiente nombre:

Pinus macvaughii S. Carvajal, sp. nov.

Arbor 12--15 m altus, cortice rimari; foliis 5, 15--20 cm longis, triangularibus, gracilibus et flexilibus, marginibus serrulatis, stomatibus dorsalibus et

ventralibus; hipodermide biforme, raro in parenchyma penetrabili, atque ductis resiniferis (2-) 3 numero, septalibus, endodermide parietibus externis crassis, fascibus fibrovascularibus 2, bene distinctis; vaiginis persistentibus, 15--25 mm longis, castaneis; gemmis ovoide-turbinatis, castaneis, lutescentibus; strobilis longis, ovoideis vel ovoide-turbinatis, prope oblongis, prope symmetricalibus, pendentis, 8--9 cm longis et 3 cm latis vel fere, plerumque 2--2.5-plo longioribus quam latioribus, persistentibus, brunneo-lutescentibus, splendens demun cineracens; pedunculis 6--8 mm. longis; squamis plerumque in intermedialibus atque deorsibus parte, relicti clausibus dum strobili adherer ramulorum, apice angulosis, umbone irregulariter; apophisi depressa vel leviter elevata in intermedia atque sursum parte; cuspide mucrone brevi, decidua; semi nibus brevis, oscura , maculatis, 3--5 mm longis; ala grandia, 10--12 mm longa.

Species in honorem Rogers McVaugh (1909-), qui de plantis novogalicianis provenere ibi scriptor maximus ingenium, grate nominavi.

Arbol de 12--15 m de altura y hasta 40--50 cm de diámetro, con la copa redondeada y rala; ramas horizontales, fuertes, corteza agrietada, oscuro-grisacea, con placas irregulares, más o menos delgadas, casi rectangulares, con el interior rojizo; ramillas castaño claro, ásperas en un principio, después escamosas, pero la bráctea desapareciendo al final; hojas en fascículos de 5, de 15--20 cm de largo, aglomeradas en la extremidad de la ramillas, triangulares, de color verde claro, brillantes, suaves y flexibles, bordes finamente aserrados, con dos haces fibrovasculares bien diferenciados, canales resiníferos (2-) 3, septales, células de la endodermis con las paredes exteriores engrosadas, hipodermis biforme, con leves entrantes en el clorénquima; vainas persistentes, de color castaño claro, brillantes; conillos subterminales, subglobosos, cilíndrico-oblongo, sobre pedúnculos de 15--20 mm, en pares, con escamas anchas, casi triangulares, con picos pequeños, gruesos y dirigidos hacia el ápice; conos regularmente ovoides u ovoide-cónicos, casi oblongos, de color castaño rojizo, lustrosos en el principio, al final cenicientos, algo ligeros, algo reflejados y casi simétricos, colgantes, de 8--9 cm de largo por 3 cm de ancho o un poco más (de 2--2.5 veces tan largos como anchos, regularmentes las escamas se abren hasta la parte media del cono, permaneciendo de la mitad hacia abajo cerradas o casi, lo que le confiere al cono una apariencia casi simétrica, solitarios o en grupos de 2, sobre pedúnculos de 6--8 mm, persistentes; escamas algo gruesas, con el interior oscuro, apiastadas, algo ensanchadas en la parte media, ápice angulose, rara vez redondeado, umbo de contorno irregular, pero uniforme, con la quilla transversal un poco levantada; apófisis aplastada en las escamas basales, poco prominente en la región media y superior, cúspide con una espina pequeña, pronto caediza; semilla pequeña, alargada y oscura, con manchas pequeñas, de 3--5 mm y con una ala grande, de 10--12 mm, con estrias pronunciadas, la base engrosada.

TIPO: MEXICO: JALISCO: El Salto del Rincón, municipio de Villa de Purificación; 800--1200 m de altitud; 24 Oct 1983; S. Carvajal 4588. Bosque de Pinus maximinoi, P. oocarpa, P. pseudostrobus y Quercus aristata, sobre suelos de origen granítico, profundos y con buen drenaje. En el Herbario del

Centro de Enseñanza Técnica Industrial (CREG). Isotipos para ser distribuídos.

SPECIMINIS TESTIMONIALIS LECTUS

JALISCO: Sierra de El Tuito, en el Refugio; 12 de Octubre de 1982; 980 m de altitud; S. Carvajal 3444, 3456, 3478, 3481, 3482, 3490. Km 6, terracería El Tuito-La Mina, R. Lamas R. & R. Torres 178 (todos ellos en CREG).

Indudablemente Pinus macvaughii, cabe en la sección que Martínez (1948), denomina Serotinos y que Little & Critchfield (1969), tratan como Subsección Oocarpæ, por las características del cono, tamaño y estructura interna de las hojas. Presenta mucha afinidad con P. oocarpa, en lo que respecta al número de hojas por fascículo y en la posición de los canales resiníferos que son septales, pero el último taxón varía en el número de ellos, en que las hojas son más anchas, en que los conos son redondeados u ovoides y casi tan largos como anchos, además los conos permanecen cerrados por muchos más tiempo abriendo tarde y completamente; de P. pringlei difiere en el número de hojas por fascículo, anchura de las hojas, en la posición y número de los canales resiníferos, sin embargo existe una notable similitud con respecto a los conos, por otro lado, no se han estudiado colecciones de P. pringlei dentro de los límites del estado de Jalisco. De P. patula difiere también en el número y posición de las hojas, en la posición de los canales resiníferos, en la simetría y figura del cono, además la tendencia de este con respecto al habitat parecer ser de bosques templado-fríos (de 1800--3000 m), mientras que P. macvaughii, es más de tendencias subtropicales (800--1200 m).

Respuesta a la 6ta. cuestión:

La identificación de los táxones de Pinus presentes en Nueva Galicia, se puede llevar a cabo mediante la siguiente clave, en donde se incluyen los nombres nuevos que se proponen en este trabajo:

CLAVE A LOS PINOS DE NUEVA GALICIA

1. Brácteas no decurrentes bajo los fascículos de hojas; hojas de 3--5, con la vaina caediza; semillas con o sin ala, si presente, entonces corta e inefectiva y no se desprende con facilidad de la semilla

2. Umbo terminal; hojas en fascículos de 5; vaina caediza pronto; ápice de las escamas del cono con prolongación laminar más o menos encorvada

3. Escamas duras y anchas; ala de la semilla mediana y ancha, de 15--20 mm de largo, por 6--10 mm de ancho; conos resinosos . . . . . .**P. ayacahuite** var. **veitchii**

3. Escamas frágiles y angostadas hacia la base, con el ápice más o menos enroscado; semillas sin ala; cono poco o no resinoso. . . . . **P. novo-galiciana**

2. Umbo dorsal; hojas en fascículos de 3--5, comunmente con la vaina caediza tarde y no completamente

4. Semilla con ala; hojas (3-) 4 en un fascículo. . . . . **P. rzedowskii**

4. Semilla sin ala; hojas (2-) 3--5 en un fascículo

5. Hojas (-2) 3, de 3--7 cm de largo; conos redondeados de 3--5 5 cm de largo; semillas menores de 15 mm. . . . **P. cembroides**

5. Hojas 5, de 7--11 cm de largo; conos de orbicular-ovados a angostamente ovados, de 15--23 cm de largo, semillas de 22--26 mm. . . . . **P. maximartinezii**

1. Brácteas decurrentes bajo los fascículos de hojas; hojas (3-) 5 (-8); vaina caediza o persistente; semillas con una ala efectiva que se desprende facilmente de la semilla

6. Hojas con la vaina caediza, de 3--5 en un fascículo

7. Hojas largas, de 17--30 cm de largo, colgantes, tiensas; cono caedizo dentro del primer año; semilla de 5--6 mm. . . . **P. lumholtzii**

7. Hojas cortas, de 8--15 cm de largo

8. Hojas verticalmente caídas, gruesas (de 1 mm o más de ancho) amarillentas y tiesas; conos más o menos persistentes; semillas de 5--6 mm. . . . . **P. lumholtzii** var. **microphylla**

8. Hojas erectas y dispersas, delgadas y finas o gruesas y tiesas; conos tenasmente persistentes ya abiertos; semillas de 4 mm de largo

9. Hojas 5, delgadas y finas (de 0.5 mm de ancho o un poco más), de 8--15 cm de largo, vainas en las hojas jóvenes de 16--20 mm de largo; semillas con ala de 12 mm de largo y 4 mm de ancho. . . . . **P. leiophylla**

9. Hojas 3 (-5), anchas tiesas y fuertes, de 6--14 cm de largo; vainas en las hojas jóvenes de 14 mm o menos; semilla con ala de 15 mm de longitud y de 4--5 mm de ancho. . . . . **P. chihuahuana**

6. Hojas con la vaina persistente, de 3--5 (-8) en un fascículo

10. Conos persistentes durante varios años, simétricos o casi; pedúnculo de 6--35 mm de longitud

11. Hojas 3 (-4) por fascículo

12. Conos ligeramente oblícuos, oblongos, 2 o más veces tan largos como anchos, pedúnculo 6--8 mm, a veces nulo. . . . . **P. pringlei**

12. Conos simétricos, globulosos, de 1 o menos veces tan largos como anchos, pedúnculo de 22--43 mm. . . . . .**P. oocarpa** var. **trifoliata**

11. Hojas (4-) 5 pof fascículo; conos simétricos; semilla de 6--7.5 mm de longitud

13. Conos largamente cónicos, con ápice atenuado, de 2--2.5 veces tan largos como anchos; cono abriendo tarde y no completamente; pedúnculo de 6--8 mm. . . . . **P. macvaughii**

13. Conos ovoides o redondeados, de 1.2 o menos veces tan largos como anchos; conos abriendo tarde y completamente; pedúnculo de 15--41 mm de largo

14. Hojas delgadas, no mayores de 15 cm de largo. . . . . **P. oocarpa** var. **microphylla**

14. Hojas gruesas, mayores de 15 cm, generalmente de 18--35 cm de longitud. . . . . **P. oocarpa**

10. Conos caedizos o persistentes pero menos de un año, asimétricos o casi; pedúnculo a veces nulo, en algunos táxones no mayor de 15 mm

15. Escamas del cono con una espina aguda, fuerte y persistente; cono sin pedúnculo o con éste no mayor de 10 mm, con frecuencia cuando los conos caen dejan varias escamas basales adheridas a la ramilla

16. Hojas de 3--5, muy largas, de 21--38 cm de largo, dispersas y colgantes, gruesas; conos encorvados, de 11--16 cm de largo. . . . . **P. engelmannii** var. **blancoi**

16. Hojas de (5-) 6 (-7), cortas, de 10--28 cm de largo, encorvadas y tiesas; conos menores de 11 cm de largo ligeramente encorvados. . . . . .**P. durangensis**

15. Escamas del cono sin espina o con una espina débil, generalmente caediza; cono sin pedúnculo o con un pedúnculo corto de 5--15 mm

17. Conos pequeños, de 8 cm o menos, comunmente de 3--7 cm de largo

18. Escamas del cono iguales y entonces los conos casi simétricos; pedúnculo de 5--8 mm; semillas de 4 mm; hojas de 2--4

19. Hojas (2-) 3 (-4), tiesas y rígidas, anchas; canales resiníferos medios, de 2--7; vainas de 5--8 mm, castaño oscuro; conos mayores de 5 cm. . . . . .**P. teocote**

19. Hojas 3, delgadas, suaves y flexibles; canales resiníferos internos, de (1-) 2 (-4), a veces uno-septal; vainas de 10--12 mm, castaño-grisáceas; conos menores de 5 cm, generalmente de 3--4 cm . . . . . **P. herrerai**

18. Escamas del cono desiguales y entonces los conos un poco oblícuos; pedúnculo de 12--15 mm de largo; hojas 3--5

20. Hojas 3--5 por fascículo; apófisis convexa y protuberante, aquillada. . . . . .**P. lawsonii**

20. Hojas 5 por fascículo; apófisis aplanada, debilmente aquillada

21. Pedúnculo persistente en la ramilla; apófisis irregular; cono con frecuencia resinoso. . . . . .**P. pseudostrobus**

21. Pedúnculo caedizo, adherido al cono; apófisis regularmente cuadrangular; cono resinoso. . . . . **P. maximinoi**

17. Conos mayores de 8 cm de largo, comunmente de 9--30 cm

22. Hojas colgantes, en fascículos de 5, de 14--36 cm de longitud

23. Corteza de las ramillas y del tronco superior con escamas rojizas; hojas ligeramente anchas (de más de 1 mm), de 25--36 cm de largo, ligeramente colgantes . . . . . **P. douglasiana**

23. Corteza de las ramillas y del tronco superior lisa gris; hojas delgadas (menos de 1 mm), flexibles, de 14--28 cm de largo, colgantes

24. Apófisis irregular; cono con frecuencia resinoso, de (7-) 9--10 cm de largo. . . . . **P. pseudostrobus**

24. Apófisis regularmente cuagrangular, cono no resinoso, de 7 (-9) cm de largo. . . . . **P. maximinoi**

22. Hojas erectas y dispersas, en fascículos de (3-) 5 (-6) y de 10--45 cm de longitud

25. Conos de (20-) 23--30 cm de largo, cilíndricos u oblongos; hojas 5 (-6), de (20-) 25--45 cm; áreas subtropicales, de 1500--2400 m

26. Conos oblongo-cónicos, rectos o casi, con la

mayor anchura cerca de la base, 2 veces o menos tan largos como anchos, umbo transversalmente alargadado; cono castaño-rojizo

27. Umbos casi uniformes, con el ápice regular . . . . . .P **michoacana**

27. Umbos más bien irregulares, abultados o anlosos, con la apófisis saliente, cúspide y ápices salientes. . . **P. michoacana** f. **procera**

26. Conos cilíndrico-cónicos, angostados y gradualmente atenuados, casi siempre encorvados, de 3 (-4) veces tan largos como anchos; umbos regularmente cuadrangulares; conos castaño oscuro o amarillento-verdoso

28. Apófisis no reflejada, con la espina muy peña; cono amarillento-verdoso. . . . . **P. michoacana** var. **comuta**

28. Apófisis reflejada, saliente, con una espina patente; cono agudo, castaño-oscuro. . . . **P. michoacana** var. **comuta** f. **nayaritana**

25. Conos menores de 20 cm de largo, cónicos u ovoides; hojas de 3--6 (-8) por fascículo, de menos de 28 cm de largo

29. Conos de color muy oscuro, casi negro, de 6--12 cm de largo; hojas de 3--5 por fascículo y de 7--15 cm de largo; altas montañas, desde la zona templada hasta el límite de los árboles . . . . . **P. hartwegii**

29. Conos castaño claro, de 5--20 cm de largo; hojas (3-) 4--6 (-8) por fascículo

30. Hojas (5-) 6 (-8) por fascículo. . . . . .P. **martinezii**

30. Hojas 3--5 por fascículo

31. Hojas (3-) 4 (-5) por fascículo. . . . . **P. montezumae** var. **mezambranus**

31. Hojas 5

32. Conos de 5--10 cm de largo; hojas de 10--15 (-20) cm de longitud; altas montañas, zonas templadas, de 2500--3400 m de altitud. . . . . **P. rudis**

32. Conos de 10--20 cm; hojas de 14--

36 cm de longitud; zonas subtropicales y templadas

33. Conos de 16--20 cm de largo. . . . . **P. montezumae f. macrocarpa**

33. Conos de 10--15 cm de largo

34. Hojas gruesas, de 14--25 cm de largo; apófisis salientes; cono recto o casi. . . . . **P. montezumae**

34. Hojas delgadas, de 27--35 cm de largo; apófisis algo achatadas; cono encorvado. . . . . **P. montezumae** var. **lindleyi**

REFERENCIAS BIBLIOGRAFICAS

BAILEY, VERNON. 1913. Life Zones and Crops of New México. U.S. Dept. Agric. Bur. Biol. Survey, No. Amer. Fauna 35. 100 pp. Illustr.

CABALLERO D., M. 1967. ¿Son **Pinus rudis** y **P. hartwegii**, dos especies diferentes?. Tesis Profesional, Escuela Nacional de Agricultura. 139 pp.

CARVAJAL H., S. 1981. Notas Preliminares al Estudio del Género **Pinus** en Jalisco. VIII Congreso Mexicano de Botánica. Morelia. Michoacán, Mexico. 13 pp.

GAUSSEN, H. 1960. Les Gymnospermes Actualles et fossiles. Fasc. iv. Faculté des Sciences, Toulouse, France. 272 pp.

GENTRY, HOWARD S. 1942. Rio Mayo Plants. A Study of the Flora and Vegetation of the Valley of the Rio Mayo, Sonora. Carnegie Inst. Wash. Publ. 527, 328 pp., Illuustr.

_____. 1946. Notes in the Vegetation of Sierra Surorato in Northern Sinaloa. Torrey Bot. Club Bull. 73: 451--462., Illustr.

LITTLE, E.L. & W.B. CRITCHFIELD. 1969. Subdivisions of the Genus **Pinus** (Pines). USDA., FOREST. Ser . Misc. Publ. 1144. 51 pp.

MADRIGAL S., X. Y M. CABALLERO D. 1969. Una Nueva Especie Mexicana de **Pinus**. Bol. Tecn. No. 26. Inst. Nac. Invest. Forest. (INIF).

MARTINEZ, M. 1948. Los Pinos Mexicanos. Edic. Botas, 2da. Edic. Mexico. 361 pp.

MAYSILLES, JAMES H. 1956. Floral Relationships of the Pine Forest of Western Durango. Ph.D. Thesis, Univ. Mich. usa., 165 pp. ill.

McVAUGH, R. 1961. **Euphorbiaceae Novæ Novo-Galicianæ.** Brittonia 13: 145--205.

RZEDOWSKI, G. CALDERON DE. 1960. Notas sobre la Flora y la Vegetación del Estado de San Luis Potosí. VII. Vegetación en el Valle de San Luis Potosí. Acta Cient. Potosina 4(1): 188. pp. Illustr.

SHAW, G.R. 1909. The Pines of Mexico. Publ. Journ. Arnold Arb. 1: 1--29, pl. 1—22.

_____. 1914. The Genus **Pinus**. Publ. Journ. Arnold Arb. 5: 1--96.

WHITE, STEPHEN S. 1948. The Vegetacion and Flora of the Region of the Ric Bavispe in Northeasthern Sonora, Mexico. Lloydia 11(4): 229--302., Illustr.

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BOOK REVIEWS

Alma L Moldenke

"APPLES -- A Guide to the Identification of International Varieties" by John Bultitude, 324 pp., 252 color photo.& 504 b/w photo., 10 tab. & 2 fig. University of Washington Press, Seattle, Washington 98145. 1983 (Engl.), 1984 (USA). $50.00.

"Apple trees have been taken to all parts of the world by European colonizers, with the result that today the fruit plays an important role in many economies." This book describes 252 different varieties grown commercially and in private gardens in northern Europe and America, South Africa, Australia and New Zealand. For each there is identification possible by a detailed key-chart, beautifully clear natural color photograph of a fruited twig, careful black/white photographs of the longitudinal and transverse cut fruit sections along with outlined descriptive text, synonyms and references. The author is world-renowned in his field as well as is the National Fruit Trials-Brogate Farm in Faversham, Kent, England, where he devoted most of his professional life. This book is well organized, highly useful, attractive, and destined to become a classic in its world-wide scope.

"ANNUAL REVIEW OF ECOLOGY AND SYSTEMATICS Volume 16, 1985" edited by Richard F. Johnston and associates, vi & 504 pp., 40 b/w fig. incl. 29 maps & 27 tab. Annual Reviews, Inc., Palo Alto, California 94306. 1985. $27.00 in U.S.A., $30.00 foreign.

The preface makes emphases worth noting: "essential unity in ecology and systematics" and "consistently treating humans as natural parts of the ecological whole" -- "positions by no means held by all members of our community 16 years ago". This issue has articles on community ecology: ecology of kelp communities, species diversity of coral reefs: field evidence on predation vs. competition in structuring prey communities, and reconstruction of late-Quaternary landscapes. Other excellent papers deal with longevity in individual flowers, resource limitation in plants presented in an economic analogy, biological aspects of endemism in higher plants, and gene flow in natural populations. All papers in this volume and in this series are well worth the reading and/or study.

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AN ANNOTATED CATALOGUE OF TYPE SPECIMENS IN THE UNIVERSITY OF ILLINOIS HERBARIUM (ILL)-- 2. PIPERACEAE CONTINUED: ARCTOTTONIA, MANEKIA AND PEPEROMIA, PLUS SOME ADDITIONS TO PART 1 (PIPER)

Almut G. Jones

Plant Biology, University of Illinois, 289 Morrill Hall, 505 S. Goodwin, Urbana, IL 61801.

INTRODUCTION

In the introduction to part 1 of this catalogue (Jones 1985), I gave an overview of the history of our collections in the Piperaceae and included references to some of the works by William Trelease and Truman G. Yuncker. That portion, though applicable, will not be repeated here. With part 2, I have essentially completed the recording of names in this family, for which type material (including paratypes) is located at ILL. Some of our specimens of Piper are out on loan, and a few additional types may turn up upon return of that material.

The following, second part of the annotated catalogue lists 607 basionyms, including two in Arctottonia, one in Manekia, 596 in Peperomia, and eight in Piper.

The format is basically the same as in part 1 (Jones, 1985). I have retained the original spelling and endings, and cited the place of original publication for each name. If the holotype or lectotype is not located at ILL I have also, whenever available, included the conventional abbreviation of the herbarium in which the type is to be found. Depositories for isotypes and paratypes other than ILL are not given. For paratypes, I have cited only the names of collectors and collection numbers; locality data are omitted. For reasons explained in part 1, I have not made any taxonomic decisions, but I have included information on the disposition of synonyms by other authors (see References).

When necessary and feasable, I have designated lectotypes. The respective entries are marked with an asterisk. It should be noted that several of the specimens may actually be the holotypes. There are 58 such entries, and 46 of these types are at ILL. In addition, I have recorded in our herbarium 128 holotypes, 303 isotypes (including isolectotypes), 74 specimen packets with fragments of the type, four syntypes, and 285 paratypes. In a few instances, where no type was cited with the original description or indicated by the author on a specimen, I have recorded authentic specimens located at ILL that potentially could be used for lectotypification.

ANNOTATED CATALOGUE OF TYPE SPECIMENS

Arctottonia

sempervirens Trel. ex Lundell, Publ. Carnegie Inst. Wash. 436: 302. 1934 (nomen nudum), ex Standley in Standley & Record, Field Mus. Publ. Bot. 12: 405. 1936. TYPE: Guatemala, Petén, Uaxactún. 16 APR 1931. Bartlett 12563 [holotype: MICH; isotype: ILL (2 sheets)].-- [= Piper sempervirens (Trel. ex Standley) Lundell (fide Standley & Steyerm., 1952; = P. neesianum C.DC. in DC. (fide Bornstein, 1985 annotation)]

tuxpenyana Trel. ex Lundell, Publ. Carnegie Inst. Wash. 436: 311. 1934 (nomen nudum), ex Standley in Standley & Record, Field Mus. Publ. Bot. 12: 406. 1936. TYPE: Mexico, Campeche, Tuxpeña. 7 FEB 1932. Lundell 1300 (holotype: MICH; isotype: ILL).-- [= Piper yucatanense C.DC. (fide Bornstein, 1985 annotation)]

Manekia

urbani Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 313. 1927. TYPE: Haiti, La Hotte, Morne Vandervelde. El. 700 m. 1925. Ekman 5242 (holotype: ?; isotype: ILL).-- [This is the type of the generic name Manekia]

Peperomia

abbreviatipes Trel. & Yuncker, Piperaceae no. S. Amer. 2: 655, fig. 573. 1950. TYPE: Colombia. Mutis 542 (holotype: US 1560146; fragments of the type at ILL).

abnormis Trel., Ciencia (Mexico) 2: 206. 1941. TYPE: Ecuador, Archidona. 1865. Isern 1053 (holotype: MA; isotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950]

abrupte-acutata Trel. & Yuncker var. membranacea Trel. & Yuncker, Piperaceae no. S. Amer. 2: 683. 1950. TYPE: Colombia, Santander, vicinity of California. El. 2300 m. 11-27 JAN 1927. Killip & Smith 17078, in part [holotype: US 1352727; isotype: ILL (one piece on this sheet belongs in and is a paratype of P. pennellii Trel. & Yuncker)].

aceramarcana Trel., Bull. Torrey Bot. Club 55: 169. 1928. TYPE: Bolivia, Río Aceramarca. El. 10800 ft. 1926. Tate 713 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Yuncker, 1955]

aceramarcana var. variifolia Yuncker, Lilloa 27: 199, pl. 76. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3727 (holotype: US 1177045; isotype: ILL).

adsurgens Yuncker, Bol. Inst. Bot. (São Paulo) 3: 179, fig. 157. 1966. TYPE: Brazil, Rio de Janeiro, Maria Madalena. 24 MAR 1955. Pereira 1314 (holotype: RB; paratype at ILL: L.B. Smith 1885).-- [This species upheld by Yuncker, 1974]

aerea Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 19. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1800 m. Schunke 494 (holotype: F 571552; isotype: ILL).

aggravescens Trel. in Yuncker, Field Mus. Publ. Bot. 17: 330. 1938. TYPE: Honduras, Comayagua, Siguatepeque. El. 1800 m. 21 JUL 1936. Yuncker, Dawson & Youse 5990 (holotype: ILL; paratype at ILL: Yuncker, Dawson & Youse 6188).-- [This species recognized by Standley & Steyerm., 1952]

aguaditana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 576, fig. 500. 1950. TYPE: Colombia, Tolima, Aguadita. 15 JAN 1943. Silvano Jorge & Carlos 161 (holotype: ILL).

aguilae Trel. & Yuncker, Piperaceae no. S. Amer. 2: 723, fig. 646. 1950. TYPE: Colombia, Tolima, El Fresno. El. 1800 m. 3 DEC 1939. García Barriga 8232 (holotype: US 1774151; paratype at ILL: Antonio Miguel 38).

ainana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 20. 1936. TYPE: Peru, Ayacucho, Aina, near Río Apurímac. El. 750-1000 m. 7, 17 MAY 1929. Killip & Smith 22766 (holotype: US; isotype: ILL).

* ajoupana Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited); publ. as P. stehleana var. ajoupana Trel. & Stehlé ex Stehlé & Quentin, op. cit. 2(2): 49, 50(fig. 3). 1948 (nomen nudum, but with illustration of a leaf). TYPE: Guadeloupe. Stehlé & Stehlé 1722 (holotype, or LECTOTYPE designated herein: ILL).-- [= P. nigropunctata Miq. (fide Howard, 1973)]

alata Ruiz & Pavón, Fl. Peruv. & Chile 1: 31, pl. 48, fig. b. 1798. TYPE: Peru, Huánuco, Pozuzo. Ruiz & Pavón s.n. [holotype: MA?; fragments of the type (obtained from MA) at ILL].-- [This species of wide distribution and generally recognized]

alatiscapa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 20. 1936. TYPE: Peru, Junín, Pichis Trail, Eneñas. El. 1600-1900 m. JUN-JUL 1929. Killip & Smith 25623 (holotype: US; isotype: ILL).

albert-smithii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 495, fig. 439. 1950. TYPE: Colombia, Santander, between Piedecuesta and Las Vegas. El. 2000-2500 m. 19-24 DEC 1926. Killip & Smith 15552 [holotype: US 1351416; isotype: ILL; paratype at ILL: Killip & Smith 20442 (cited as 20422)].

albert-smithii var. alipetiolata Trel. & Yuncker, Piperaceae no. S. Amer. 2: 496. 1950. TYPE: Colombia, Cundinamarca, Caparrapí. El. ca 1275 m. 8-13 JUN 1939. García Barriga 7732 (holotype: US 1775890; isotype: ILL; paratype at ILL: Killip 34714).

albert-smithii var. epunctata Trel. & Yuncker, Piperaceae no. S. Amer. 2: 496, fig. 440. 1950. TYPE: Colombia, Caldas, Río Santa Rita, Salento. El. 1600-1800 m. 26 AUG 1922. Killip & Hazen 10131 (holotype: US 1142980; isotype: ILL; paratype at ILL: Ecuador: Haught 2872).

albescens Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 299. 1940. TYPE: Panama, Coclé, vicinity of El Valle. El. 600-1000 m. 8 DEC 1938. Allen 1259 (holotype: ILL).-- [This species recognized by Yuncker, 1950]

alleni Trel. in Woodson & Seibert, Ann. Missouri Bot. Gard. 25: 825. 1938. TYPE: Panama, Darién, Pinogana-Yavisa Trail. El. 15 m. 17 MAR 1937. Allen 262 (holotype: MO; fragments of the type at ILL).-- [= P. quadrangularis (Thompson) A. Dietr. (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1957, and 1974)]

allorgeana Stehlé, Candollea 8: 76. 1940. TYPE: Martinique, chemin du Gros Morne. El. 700 m. 12 AUG 1939. Stehlé & Stehlé 3386 (holotype: ?; isotype: ILL).-- [= P. hirtella Miq. in Hooker (fide Howard, 1973)]

allorgeana forma lata Trel. ex Stehlé, Fl. Descript. Antill. Fr. 2(1): 141. 1940; Bull. Agric. Martinique 9(3): 220. 1940. TYPE: Martinique, Gros-Morne lane. El. 620-700 m. 12 AUG 1939. Stehlé & Stehlé 3389 (holotype: ILL; paratype at ILL: Stehlé & Stehlé 3388).-- [= P. hirtella (fide Howard, 1973)]

allorgeana forma major Trel. ex Stehlé, Fl. Descript. Antill. Fr. 2(1): 140. 1940; Bull. Agric. Martinique 9(3): 217. 1940. TYPE: Martinique, Deux-Choux. El. 700 m. 26 APR 1939. Stehlé & Stehlé 3211 (holotype: ILL; paratype at ILL: Stehlé & Stehlé 3254).-- [= P. hirtella (fide Howard, 1973)]

allorgeana forma minor Trel. ex Stehlé, Fl. Descript. Antill. Fr. 2(1): 140. 1940; Bull. Agric. Martinique 9(3): 217. 1940. TYPE: Martinique, Deux-Choux. El. 580-680 m. 12 AUG 1939. Stehlé & Stehlé 3390 (holotype: ILL; paratype at ILL: Stehlé & Stehlé 3391).-- [= P. hirtella (fide Howard, 1973)]

alternifolia Yuncker, Bernice P. Bishop Mus. Bull. 112: 24. 1933. TYPE: Hawaii, Molokai, Mapulehu Valley. Forbes 302-MO [holotype: BISH; paratypes at ILL: Degener 3065 and 3069 (leg. Wiebke), 3185 and 3186 (leg. Wiebke & Nitta)].-- [This species recognized by Kartesz & Kartesz, 1980]

alveolata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 324, 331. 1927. TYPE: Santo Domingo [Dominican Republ.]. JAN-MAR 1871. Wright, Parry & Brummel 514 [holotype: US 209801; paratypes at ILL (from Haiti): Ekman 1797, 4607; Leonard 8328].

ambiguifolia Trel. & Yuncker, Piperaceae no. S. Amer. 2: 571, fig. 495. 1950. TYPE: Colombia, Santander, Río Servitá, between Málaga and Concepción. El. 2100-2300 m. 19 JUL 1940. Cuatrecasas & García Barriga 9867 (holotype: US 1799090; isotype: ILL).

amnicola Trel. in Yuncker, Field Mus. Publ. Bot. 17: 330. 1938. TYPE: Honduras, Comayagua, on a tree, river bank near Siguatepeque. El. 1050 m. JUN-AUG 1936. Yuncker, Dawson & Youse 5799 (holotype: ILL).

* amphioxys Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 24. 1931. TYPE: Santo Domingo [Dominican Republ.], Rió Ozoma, Santo Domingo City. 13 JAN 1929. Ekman 11133 (holotype, or LECTOTYPE designated herein: ILL).

amphitricha Trel., Contr. U.S. Nat. Herb. 26(4): 192. 1929. TYPE: Costa Rica, San José, Quebradillas, N of Santa María de Dota. El. 1800 m. 24 DEC 1925. Standley 43089a (holotype: US 1251160; isotype: ILL).-- [This species recognized by Burger, 1971]

amphitricha var. santa-rosana Trel., Contr. U.S. Nat. Herb. 26(4): 192. 1929. TYPE: Costa Rica, San José, Santa Rosa de Copey. Tonduz 12225 (holotype: G-DC; paratype at ILL: Standley 42620).-- [Cited with the species by Burger, 1971]

amphoterophylla Trel., Contr. U.S. Nat. Herb. 26(4): 225. 1929. TYPE: Costa Rica, San José, La Palma. JUL 1888. Biolley 939 (holotype: US 796599; paratype at ILL: Standley 41609).-- [= P. galioides Kunth (fide Burger, 1971)]

amphoterophylla var. glutineofructa Trel., Contr. U.S. Nat. Herb. 26(4): 226. 1929. TYPE: Costa Rica, San José, Cerro de las Vueltas. El. 2700-3000 m. 29 DEC 1925-1 JAN 1926. Standley & Valerio 44007 (holotype: US 1251182; isotype: ILL; paratypes at ILL: Standley 42166, 42234, 43059, 43090; Standley & Valerio 43527).-- [= P. galioides (fide Burger, 1971)]

aneura Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 601, fig. 525. 1950. TYPE: Colombia, Goajira, 15 km SW of Carraipia. El. 750 m. 26 AUG 1944. Haught 4320 (holotype: US 1709288; isotype: ILL).

antoni Trel. in Woodson & Seibert, Ann. Missouri Bot. Gard. 24: 185. 1937. TYPE: Panama, Coclé, El Valle de Antón and vicinity. El. 500-700 m. 23-27 JUL 1935. Seibert 437 (holotype: MO; isotype: ILL).-- [= P. magnoliifolia (Jacquin) A. Dietr. (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1957, 1966 and 1974)]

antoni forma fertilior Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 299. 1940. TYPE: Panama, Coclé, vicinity of El Valle. El. 800-1000 m. 5 SEP 1938. Allen 760 (holotype: ILL).-- [= P. magnoliifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950 and 1974)]

antoni forma lutea Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 300. 1940. TYPE: Panama, Coclé, vicinity of El Valle. El. 600-1000 m. 8 DEC 1938. Allen 1160 (holotype: ILL).-- [= P. magnoliifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1957, 1966 and 1974)]

antoni var. reducta Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 299. 1940. TYPE: Panama, Coclé, vicinity of El Valle. El. 600-1000 m. 8 DEC 1938. Allen 1222 (holotype: ILL).-- [= P. obtusifolia (L.) A. Dietr. (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1955, 1957 and 1974)]

antoniana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 21. 1936. TYPE: Peru, Loreto, Río Itaya, San Antonio. El. 110 m. 18 SEP 1929. Killip & Smith 29496 (holotype: US; isotype: ILL).

apodophylla Trel. & Yuncker var. hirtella Trel. & Yuncker, Piperaceae no. S. Amer. 2: 581. 1950. TYPE: Colombia, Santander, Río Suratá valley, between Bucaramanga and El Jaboncillo. El. 800-1500 m. 2 JAN 1927. Killip & Smith 16352 (holotype: GH; isotype: ILL).

apodostachya Yuncker, Lilloa 27: 251, pl. 128. [1953] 1955. TYPE: Bolivia, La Paz, San Carlos, near Mapiri. El. 850 m. 17 DEC 1926. Buchtien 627 (holotype: US 1399490; isotype: ILL).

appellator Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 300. 1940. TYPE: Panama, Chiriquí, vicinity of Casita Alta, Volcán de Chiriquí. El. 1500-2000 m. JUN-JUL 1938. Woodson, Allen & Seibert 816 (holotype: ILL).--
[= P. leucosticta Trel. (fide Yuncker, 1950)]

* apurimacana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 22. 1936. TYPE: Peru, Ayacucho, Carrapa, between Huanta and Río Apurímac. El. ca 1500 m. MAY 1929. Killip & Smith 22355 (LECTOTYPE, designated herein: ILL).

arctebaccata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 23. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1000 m. Schunke 471 (holotype: F 571529; fragment of the type at ILL).

arcuatispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 23. 1936. TYPE: Peru, Junín, Pichis Trail, San Nicholás. El. 1100 m. Killip & Smith 25992 (holotype: US; isotype: ILL).

areolata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 23. 1936. TYPE: Peru, Loreto, Balsapuerto. El. 150-350 m. Killip & Smith 28660 [holotype: US; fragment of the type (a single leaf) at ILL].

argumentosa Trel. in Yuncker, Field Mus. Publ. Bot. 17: 331. 1938. TYPE: Honduras, Comayagua, on a log in ravine near El Achote, above Siguatepeque. El. 1350 m. 19 JUL 1936. Yuncker, Dawson & Youse 5966 (holotype: ILL).

artatiflora Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 23. 1936. TYPE: Peru, Junín, Palca. 6 DEC 1924. Stevens 47 (holotype: ILL).

* aspergillus Trel., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 33: 45. 1936 (without a Latin diagnosis). TYPE: Colombia, Caldas, New Quindío Trail. 14 AUG 1922. Killip 9787 (LECTOTYPE, designated herein: US 1142908; isolectotype: ILL).--
[= P. saligna Kunth (fide Trel. & Yuncker, 1950)]

asterophylla Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 24. 1936. TYPE: Peru, Loreto, Santa Rosa. El. 135 m. 1-5 SEP 1929. Killip & Smith 28909 (holotype: US; isotype: ILL).

* auberyana Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 [nomen nudum, but type cited: = Stehlé & Stehlé 1723 (not at ILL)]; validly published in op. cit. 2(2): 57. 1948, with a different type citation!. TYPE: Guadeloupe, Santa Rosa. 13 JAN 1937. Aubery 1622 (LECTOTYPE, designated herein: NY; isolectotype: ILL).-- [= P. myrtifolia (Vahl) A. Dietr. (fide Howard, 1973)]

baileyae Trel. ex Standley, Contr. Arnold Arbor. 5: 53. 1933. TYPE: Panama, Canal Zone, Barro Colorado Island. Bailey & Bailey 84 (holotype: ?; isotype: ILL).-- [= P. obscurifolia C.DC. (fide Yuncker, 1950 and Croat, 1978)]

bajana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 581. 1950. TYPE: Colombia, Santander, vicinity of La Baja. El. 3500 m. 14-31 JAN 1927. Killip & Smith 18091 (holotype: US 1353562; isotype: ILL).

balineorum Trel. ex Stehlé, Bull. Soc. Bot. France 84: 408. 1937 (without a Latin diagnosis); Candollea 8: 80. 1940. TYPE: Guadeloupe, Forêt des Bains-Jaunes. El. 650 m. Stehlé & Stehlé 230 [holotype: ?; paratype at ILL: Quentin 1336 (cited in 1937)].-- [= P. nigropunctata (fide Howard, 1973)]

balneolorum Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited). TYPE: Guadeloupe, Bains-Jaunes. 1 JAN 1937. Stehlé 1348 (leg. Quentin) (holotype: ?; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

barbensis Trel. var. alajuelana Trel., Contr. U.S. Nat. Herb. 26(4): 191. 1929. TYPE: Costa Rica, Alajuela, Fraijanes. El. 1500-1700 m. 12-13 FEB 1926. Standley & Torres 47695 (holotype: US 1251258; isotype: ILL; paratype at ILL: Standley & Valerio 43769).-- [= P. hispidula (Sw.) A. Dietr. (fide Burger, 1971)]

bayajana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 24. 1926. TYPE: Cuba, Oriente, Sierra Maestra near Bayajá. El. ca 900 m. 8 AUG 1922. Ekman 14779 [holotype: ?; isotype: ILL (2 sheets)].-- [= P. grisebachii C.DC. (fide Yuncker, 1950-51)]

bayatana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 22, 30. 1926. TYPE: Cuba, Oriente, Bayate. 20 NOV 1915. Ekman 6639 (holotype: ?; fragments of the type at ILL).-- [= P. obtusifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957 and 1974)]

bella Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 690, fig. 606. 1950. TYPE: Colombia, Antioquia, on Río Guapá, 8 km E of Guapá, etc. El. ca 150 m. 10 MAY 1945. Haught 4656 (holotype: US 1709197; isotype: ILL).

bella var. subcordata Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 691, fig. 607. 1950. TYPE: Colombia, Chocó, Cupica. El. ca 100 m. 10 FEB 1947. Haught 5557 (holotype: US 1709502; isotype: ILL).

bellatula Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 478, fig. 420. 1950. TYPE: Colombia, Antioquia, near Río Guapá, about 9 km E of Guapá, etc. El. ca 150 m. 10 MAY 1945. Haught 4657 (holotype: US 1709198; isotype: ILL).

bermudezana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 25. 1936. TYPE: Peru, Junín, Puerto Bermúdez. El. 375 m. 14-17 JUL 1929. Killip & Smith 26451 (holotype: US; isotype: ILL).

bethaniana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 612, fig. 536. 1950. TYPE: Colombia, Cundinamarca, Finca Bethania, below Peña Negra, Mun. Anolaima. El. 2700 m. 29 MAY 1941. García Barriga & Jaramillo 10420 (holotype: US 1851536; isotype: ILL).

blanda (Jacquin) Kunth var. sericea Yuncker in Espinosa, Univ. Loja Estud. Bot. Ecuador 2: 31. 1949 (nomen nudum), in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 559. 1950. TYPE: Ecuador, Loja, El Valle, 2 km NE of Loja. El. 2100 m. 6 MAR 1947. Espinosa 1361 (holotype: ILL; paratype at ILL: Espinosa 90).

blepharilepida Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 319, 326. 1927. TYPE: Haiti, Chapelle Faure. 18 AUG 1924. Ekman 1529 (holotype: ?; isotype: ILL).

blephariphylla Trel. & Yuncker, Piperaceae no. S. Amer. 2: 665, fig. 580. 1950. TYPE: Colombia, Chocó, Río San Juán, near Palestina. El. 5-50 m. 12-14 MAR 1944. Cuatrecasas 16930 (holotype: US 1852543; isotype: ILL; paratypes at ILL: Haught 5379; Killip & Cuatrecasas 38762, 38876; Killip & García 33231, 33384).

blepharipus Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 25. 1936. TYPE: Peru, Loreto, Yurimaguas. El. 135 m. AUG-SEP 1929. Killip & Smith 28030 (holotype: US; isotype: ILL).

blepharipus var. binispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 25. 1936. TYPE: Peru, Loreto, San Antonio, Alto Río Itaya. El. 145 m. SEP-OCT 1929. Williams 3435 (holotype: F 618141; isotype: ILL).

* blepharipus var. iquitosensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 26. 1936. TYPE: Peru, Loreto, Iquitos. El. 100 m. 3-11 AUG 1929. Killip & Smith 27462 (LECTOTYPE, designated herein: ILL).

bocasensis Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 300. 1940. TYPE: Panama, Bocas del Toro, vicinity of Nievecita. El. 0-50 m. 8-19 AUG 1938. Woodson, Allen & Seibert 1859 (holotype: ILL).-- [This species recognized by Yuncker, 1950; = P. emiliana C.DC. (fide Burger, 1971)]

* bopiana Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 227. 1927. TYPE LOCALITY: Bolivia, La Paz, Bopi River, at 3000 ft. AUG 1921. Rusby 387, 570 = SYNTYPES (both at ILL).-- [Yuncker (1955) recognized this species and cited Rusby 387 as the "type"; Trelease, however, wrote "Type" on the other specimen: Rusby 570. The latter number therefore should be regarded as the HOLOTYPE (or LECTOTYPE). According to Yuncker, that collection belongs in P. rhombea Ruiz & Pavón, as do several other specimens annotated by Trelease as "P. bopiana". Comparison of Rusby 387 with the other authentic specimens shows that the material is conspecific, i.e., P. bopiana Trel. in Rusby, as well as P. bopiana sensu Yuncker (1955) belong in synonymy under P. rhombea]

brachyiula Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 26. 1936. TYPE: Peru, Matucana. El. 2400 m. APR-MAY 1922. Macbride & Featherstone 129 (holotype: F 516662; isotype: ILL).

bracteispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 26. 1936. TYPE: Peru, Huánuco, Huacachi, near Muña. El. 1950 m. MAY-JUN 1923. Macbride 4171a (holotype: F 551173; fragments of the type at ILL).

brevihirtella Yuncker, Bol. Inst. Bot. (São Paulo) 3: 155, fig. 140. 1966. TYPE: Brazil, Minas Gerais, Faz. do Diamante, Olhos de Agua. 1 APR 1931. Mexia 5508 (holotype: US 1618128; isotype: ILL).-- [This species upheld by Yuncker, 1974]

brevipeduncula (C.DC.) Trel. var. major Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 301. 1940. TYPE: Panama, Prov. Panamá, Río Las Lajas. El. ca 20 m. 19 NOV 1939. Allen 2037 (holotype: ILL).-- [= P. pseudo-dependens C.DC. (fide Trel. & Yuncker, 1950 and Yuncker, 1950)]

brouetiana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 321, 328. 1927. TYPE: Haiti, Morne Brouet. 30 JUL 1924. Ekman 1197 (holotype: ?; isotype: ILL).

* buchii C.DC. in Urban var. macrostachya Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 321, 329. 1927. TYPE: Haiti, La Selle, Rivière Momence, Nouvelle Touraine. El. 1000 m. 17 AUG 1924. Ekman 1516 (holotype, or LECTOTYPE designated herein: ILL).

buchtienii Yuncker, Lilloa 27: 241, pl. 118. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3747 [holotype: US 1176607; paratypes at ILL: Buchtien 3745, 3746, 5380, 7249; Cárdenas 1335a (fragments)].

cabaiana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 321, 328. 1927. TYPE: Haiti, La Selle, Morne Cabaio. El. 1900 m. 24 AUG 1924. Ekman 1590 (holotype: ?; isotype: ILL).

cacaophila Trel. & Yuncker, Piperaceae no. S. Amer. 2: 610, fig. 534. 1950. TYPE: Ecuador, Los Rios, roadside at Quevedo. El. ca 350 m. 22 NOV 1939. Haught 2966 (holotype: US 1707621; isotype: ILL).

caducipilosa Trel. in Yuncker, Field Mus. Publ. Bot. 17: 331. 1938. TYPE: Honduras, Lancetilla Valley, epiphytic on tree near Lancetilla. El. 30 m. 12 JUL 1934. Yuncker 4544 (holotype: ILL).

caespitiformans Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited), ex Stehlé, Candollea 8: 77. 1940. TYPE: Guadeloupe, Malanga. El. 680 m. Stehlé & Stehlé 1753 (holotype: NY; fragments of type at ILL).-- [= P. trifolia (L.) A. Dietr. (fide Howard, 1973)]

caliginigaudens Trel. & Yuncker, Piperaceae no. S. Amer. 2: 695, fig. 614. 1950. TYPE: Ecuador, Napo-Pastaza ... trail from Mera to Baños. El. ca 470 m. 23 FEB 1935. Mexia 6969 (holotype: US 1619094; isotype: ILL).

calimana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 617, fig. 541. 1950. TYPE: Colombia, El Valle, "Calima" on Río Calima. 14-15 SEP 1922. Killip 11225 (holotype: GH; isotype: ILL; paratype at ILL: Haught 2542).-- [This species recognized by Yuncker, 1955a]

calophylla Yuncker, Bol. Inst. Bot. (São Paulo) 3: 140, fig. 124. 1966 [as callophylla]. TYPE: Brazil, Paraná, Serra do Mar, Cadeado. 4 NOV 1915. Dusén 17295 (holotype: US 1481730; isotype: ILL).-- [This species upheld by Yuncker, 1974]

calvescens Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 27. 1936. TYPE: Peru, Huánuco, Cueva Grande, near Pozuzo. El. 1050 m. 23 JUN 1923. Macbride 4800 (holotype: F 535834; isotype: ILL).

canaminana Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 288. 1927. TYPE: Bolivia, Canamina. El. 4000 ft. 21 JUL 1921. White 515 [holotype: ILL (this specimen marked "Type" by Trelease); paratypes at ILL: White 282 (this number cited as the type by Yuncker, 1955), 513 (a different species)].-- [This species recognized by Yuncker, 1955.-- White 513 belongs in P. aceroana C.DC. (fide Yuncker)]

cangrejalana Trel. in Yuncker, Field Mus. Publ. Bot. 9(4): 274. 1940. TYPE: Honduras, Atlántida, lower slopes of Mt. Cangrejal near La Ceiba. 2 AUG 1938. Yuncker, Koepper & Wagner 8765 (holotype: ILL).

caniana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 27. 1936. TYPE: Peru, Huánuco, Cani, near Mito. El. 2550 m. 16-26 APR 1923. Macbride 3415 (holotype: F 534486; isotype: ILL).

capitis-bovis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 323, 330. 1927. TYPE: Haiti, Aux Cayes, Mt. Tête de Boeuf. El. 1100 m. Ekman 781 [holotype: ?; fragment of the type (1 leaf) at ILL].

cardenasii Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 227. 1927. TYPE: Bolivia, Beni, Rurrenabaque. El. 300 m. 25 NOV 1921. Cárdenas 1174 (holotype: ILL).-- [This species recognized by Yuncker, 1955]

carlo-wrightii Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 16, 23. 1926. TYPE: eastern Cuba. "Oct. 8" and "Febr. 7". Wright (holotype: W; paratypes at ILL: Ekman 2026, 6900).-- [= P. quadrangularis (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1953, 1957 and 1974)]

carpapatana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 27. 1936. TYPE: Peru, Junín, Carpapata. El. 2700-3200 m. 7 JUN 1929. Killip & Smith 24438 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 24393).

carrapana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 28. 1936. TYPE: Peru, Ayacucho, Carrapa. El. 1500 m. MAY 1929. Killip & Smith 23207 (holotype: US; isotype: ILL).

cartagoana Trel., Contr. U.S. Nat. Herb. 26(4): 222. 1929. TYPE: Costa Rica, San José. Pittier 3198 (holotype: ?; paratypes at ILL: Standley 41456, 42785; Standley & Valerio 49514, 49624).-- [= P. tetraphylla (G. Forster) Hooker & Arnott (cf. Burger, 1971)]

casitana Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 301. 1940. TYPE: Panama, Chiriquí, vicinity of Casita Alta, Volcán de Chiriquí. El. 1500-2000 m. JUN-JUL 1938. Woodson, Allen & Seibert 952 (holotype: ILL).-- [= P. adscendens C.DC. (fide Trel. & Yuncker, 1950 and Yuncker 1950; = P. acuminata Ruiz & Pavón (fide Burger, 1971)]

castelosensis Yuncker, Bol. Inst. Bot. (São Paulo) 3: 156, fig. 141. 1966. TYPE: Brazil, Rio de Janeiro, Serra dos Órgãos, Castelos. El. 2000 m. 19-20 MAR 1932. Brade 11538 [holotype: R; paratypes at ILL: Hoehne s.n. (= SP 8664); Zickan s.n. (= SP 5385)].-- [This species upheld by Yuncker, 1974]

cataractaegaudens Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinque 2(1): 3. 1937 (nomen nudum, but type cited); Trel. ex Stehlé, Fl. Descript. Antill. Fr. 2(1): 144. 1940; Bull. Agric. Martinique 9(3): 221. 1940. TYPE: Guadeloupe, Bord de la chute du Grand Carbet. El. 1000 m. 17 JAN 1937. Stehlé & Stehlé 1625 (holotype: NY; fragments of the type at ILL).-- [= P. hirtella (fide Howard, 1973)]

cattii Trel. in Standley, Field Mus. Publ. Bot. 18(1): 310. 1937. TYPE: Costa Rica, Limón, margin of Bonilla Lakes above Tunnel Camp. El. 300-430 m. 13 DEC 1929. Dodge, Catt & Thomas 6141 (holotype: GH; isotype: ILL).-- [= P. glabella (Sw.) A. Dietr. (fide Burger, 1971)]

cerea Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 28. 1936. TYPE: Peru, Huánuco, Mito. El. 2700 m. Macbride 3330 (holotype: F 534400; isotype: ILL).

cerro-puntana Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 301. 1940. TYPE: Panama, Chiriquí, trail from Cerro Punta to headwaters of Río Caldera. El. 2250-2500 m. 14 JAN 1939. Allen 1451 (holotype: ILL).-- [This species recognized by Yuncker, 1950; = P. amphitricha (fide Burger, 1971)]

chachopoana Trel. ex Badillo, Cat. Fl. Venezolana 1: 244. 1945 (nomen nudum). TYPE: Venezuela, Mérida, above Chachopo. 16 JAN 1929. Pittier 13165 (holotype: ?; fragments of the type at ILL).-- [= P. microphylla Kunth (fide Trel. & Yuncker, 1950)]

chalhuapuquiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 29. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 215 (holotype: ILL).

chartacea Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 30. 1936. TYPE: Peru, Junín, Puerto Bermúdez. El. 375 m. 14-17 JUL 1929. Killip & Smith 26636 (holotype: US; isotype: ILL).

chicamochana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 470, fig. 411. 1950. TYPE: Colombia, Boyacá, Río Chicamocha Valley, between Soata and Tipacoque. El. 1700-2000 m. 18 JUL 1940. Cuatrecasas & García Barriga 9822 [holotype: US 1798144; paratype at ILL: Cuatrecasas 1122 (small piece)].

chicbulana Trel. in Standley, Field Mus. Publ. Bot. 17: 230. 1937. TYPE: Guatemala, Petén, on a tree trunk in high, mesophytic forest of Monte Chicbul, near La Libertad. 29 APR 1933. Lundell 3099 (holotype: MICH; isotype: ILL).-- [= P. granulosa Trel. (fide Standley & Steyerm., 1952)]

chillonensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 30. 1936. TYPE: Peru, Lima, along Río Chillon, above Obrajillo. El. 2800-3200 m. Pennell 14413 (holotype: F 558460; fragments of the type at ILL).

chiqueroana Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 301. 1940. TYPE: Panama, Chiriquí, Bajo Mona, mouth of Quebrada Chiquero, Río Caldera. El. 1500-2000 m. 3 JUL 1938. Woodson, Allen & Seibert 1025 (holotype: ILL).-- [= P. barbinodis Trel. (fide Burger, 1971 and Yuncker, 1950)]

chiriquiensis Yuncker, Ann. Missouri Bot. Gard. 37: 93. 1950. TYPE: Panama, Chiriquí, above Camp I, Holcomb's Trail, above El Boquete. El. 1800-2100 m. 18 FEB 1918. Killip 3564 (holotype: US; isotype: ILL).

chlorostachya Trel., Contr. U.S. Nat. Herb. 26(4): 203. 1929. TYPE: Costa Rica, San José, Cerro de las Vueltas. El. 2700-3000 m. 29 DEC 1925-1 JAN 1926. Standley & Valerio 43513 (holotype: US 1251176; isotype: ILL; paratype at ILL: Standley 42766).-- [= P. hylophila C.DC. (fide Burger, 1971)]

chromatogena Yuncker, Lilloa 27: 278, pl. 159. [1953] 1955. TYPE: Bolivia, La Paz, Hacienda Simaco, along the road to Tipuani. El. 1400 m. MAR 1920. Buchtien 5382 (holotype: US 1176984; paratypes at ILL: Buchtien 3718, 7251, 7252, 7253).

chrysleri Yuncker, Ann. Missouri Bot. Gard. 37: 94. 1950. TYPE: Panama, Canal Zone, Barro Colorado Island. 29 JUN 1940. Chrysler & Roever 4797 (holotype: ILL).-- [= P. obscurifolia (fide Croat, 1978)]

chrysolepida Trel. ex I.M. Johnston, Proc. Calif. Acad. Sci. 20: 57. 1931. TYPE: Mexico, Socorro Island. 1903. Barkeley 228 (holotype: US 3999023; fragments of the type at ILL; paratype at ILL: Mason 1629).

chucanebana Trel. in Standley, Field Mus. Publ. Bot. 10: 156. 1931. TYPE: not cited, presumably from Honduras, perhaps to be lectotypified (authentic specimen from Honduras at ILL: Standley 55244).-- [This species recognized by Yuncker, 1938; = P. deppeana Schlecht. & Cham. (cf. Standley & Steyerm., 1952)]

ciliatifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 30. 1936. TYPE: Peru, Loreto, Balsapuerto. El. 150-350 m. 28-30 AUG 1929. Killip & Smith 28684 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 27982).

ciliatifolia var. eciliatifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 31. 1936. TYPE: Peru, Loreto, Santa Rosa. El. 135 m. Killip & Smith 28723 [holotype: US; fragment of the type (a single leaf) at ILL].

ciliatifolia var. iquitosana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 31. 1936. TYPE: Peru, Loreto, Iquitos. El. ca 100 m. 3-11 AUG 1929. Killip & Smith 27167 (holotype: US; isotype: ILL).

ciliatifolia var. santarosana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 31. 1936. TYPE: Peru, Loreto, Santa Rosa. El. 135 m. 1-5 SEP 1929. Killip & Smith 28988 (holotype: US; isotype: ILL).

circinnata Link, Bot. Jahrb. 1(3): 64. 1820. TYPE: Brazil. Pohl 1217 (holotype: W; fragments of the type at ILL).-- [This species recognized by Yuncker, 1957 and 1974]

circulifolia Trel. in Yuncker [var. circulifolia], Field Mus. Publ. Bot. 17: 331. 1938. TYPE: Honduras, Comayagua, ... near El Achote, above the plains of Siguatepeque. El. 1350 m. 7 AUG 1936. Yuncker, Dawson & Youse 6361 (holotype: ILL).-- [= P. quadrifolia (L.) Kunth (fide Standley & Steyerm., 1952)]

circulifolia var. eciliata Trel. in Yuncker, Field Mus. Publ. Bot. 17: 332. 1938. TYPE: Honduras, Comayagua, ... near El Achote, hills above the plains of Siguatepeque. El. 1350 m. 7 AUG 1936. Yuncker, Dawson & Youse 6360 (holotype: ILL).-- ["the leaves are not ciliated and the plants are larger." (quote from the label)]

circulifolia var. flava Trel. in Yuncker, Field Mus. Publ. Bot. 17: 331. 1938. TYPE: Honduras, Comayagua, ... near El Achote, hills above the plains of Siguatepeque. El. 1350 m. 15 JUL 1936. Yuncker, Dawson & Youse 5869 (holotype: ILL).-- ["Leaves thick and turgid, emarginate." (quote from the label)]

clavatispica Trel. & Yuncker, Piperaceae no. S. Amer. 2: 477, fig. 419. 1950. TYPE: Colombia, Caldas, Quebrada Pontoná, ca 18 km W of La Dorada. El. ca 400 m. 30 DEC 1936. Haught 2133 (holotype: US 1742378; isotype: ILL).

clivicola Yuncker, Bol. Inst. Bot. (São Paulo) 3: 158, fig. 142. 1966. TYPE: Brazil, Rio de Janeiro, Itatiaia. 18 JUL 1902. Dusén 763 (holotype: R; isotype: ILL).-- [This species upheld by Yuncker, 1974]

cocleana Trel. in Woodson & Seibert, Ann. Missouri Bot. Gard. 25: 826. 1938. TYPE: Panama, Coclé, upper Río Mata Ahogado Valley. El. 350 m. 31 DEC 1936. Allen 133 (holotype: ILL).-- [This species recognized by Yuncker, 1950]

coliblancoana Trel. in Standley, Field Mus. Publ. Bot. 18(4): 311. 1937. TYPE: Costa Rica, Cartago, Finca Coliblanco, S slope of Volcán de Turrialba. El. 1980 m. 11 OCT 1929. Dodge 4516 (holotype: GH; isotype: ILL).-- [= P. tenella (Sw.) A. Dietr. (fide Burger, 1971)]

* collicola Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 24. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, dry hill W of S. José de Ocoa. El. 700 m. 25 FEB 1929. Ekman 11665 (holotype, or LECTOTYPE designated herein: ILL).

collocata Trel. in Yuncker, Field Mus. Publ. Bot. 17: 332. 1938. TYPE: Honduras, Comayagua, ... near El Achote, hills above Siguatepeque. El. 1350 m. 26 JUL 1936. Yuncker, Dawson & Youse 6106 (holotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

coloniae Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 31. 1936. TYPE: Peru, Junín, Colonia Perené. El. 680 m. Killip & Smith 25053 (holotype: US; isotype: ILL).

condormiens Trel. in Yuncker, Field Mus. Publ. Bot. 17: 332. 1938. TYPE: Honduras, Comayagua, ... El Achote, above Siguatepeque. El. 1800 m. 1 AUG 1936. Yuncker, Dawson & Youse 6237 (holotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

confertispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 32. 1936. TYPE: Peru, Huánuco, Mito. El. 2700 m. 8-22 JUL 1922. Macbride & Featherstone 1646 (wrongly publ. as Macbride 1466) (holotype: F 518142; isotype: ILL).

confertispica var. erecta Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 32. 1936. TYPE: Peru, Huánuco, Mito. El. 2700 m. JUL-AUG 1922. Macbride & Featherstone 1915 (holotype: F 518410; isotype: ILL).

congestispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 32. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 62 (holotype: ILL).

connixa Trel. & Yuncker, Piperaceae no. S. Amer. 2: 717, fig. 639. 1950. TYPE: Colombia, Santander, Río Suratá Valley, between Bucaramanga and El Jaboncillo. El. 800-1500 m. 2 JAN 1927. Killip & Smith 16353 (holotype: GH; isotype: ILL).

conocarpa Trel. in Yuncker, Field Mus. Publ. Bot. 17: 332. 1938. TYPE: Honduras, Comayagua, above El Achote, near Siguatepeque. El. 1800 m. 28 JUL 1936. Yuncker, Dawson & Youse 6189 (holotype: ILL; paratype at ILL: Yuncker, Dawson & Youse 6010).-- [= P. quadrifolia (fide Standley & Steyerm., 1952)]

* contraria Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 24. 1931. TYPE: Santo Domingo [Dominican Republ.], La Cumbre. El. 250 m. 1929. Ekman 12399 (holotype, or LECTOTYPE designated herein: ILL).

conturbans Trel. & Yuncker, Piperaceae no. S. Amer. 2: 750, fig. 674. 1950. TYPE: Colombia, Cundinamarca, Sasaima. 21 JAN 1941. Antonio Camilo 112 (holotype: ILL; paratype at ILL: Laureano Javier 2).

conulifera Trel. ex Stehlé & Quentin var. acutifolia Trel. ex Stehlé, Bull. Soc. Bot. France 85: 578. 1939 (without a Latin diagnosis). TYPE: Guadeloupe, bosquets littoraux de Campeche à l'Anse-Bertrand. El. 10 m. Stehlé & Stehlé 1620 (holotype: NY; isotype: ILL; paratypes at ILL: Stehlé & Stehlé 1621, 1649, 2122, 2184, 2195, 2198).-- [= P. magnoliifolia (fide Howard, 1973)]

* conulifera var. matoubana [probably a spelling error of "matombana"] Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 45(fig. 1), 46. 1948 (nomen nudum). TYPE: Guadeloupe. Stehlé & Stehlé 2558 (holotype, or LECTOTYPE designated herein: NY; isotype or isolectotype: ILL).-- [= P. magnoliifolia (fide Howard, 1973)]

conulifera var. stehleae Trel. ex Stehlé, Bull. Soc. Bot. France 83: 628. 1936 (nomen subnudum); op. cit. 85: 579. 1938 (without a Latin diagnosis). TYPE: Marie-Galante. Mme. Stehlé 299 (holotype: NY; fragments of the type at ILL).-- [= P. magnoliifolia (fide Howard, 1973)]

conulifera var. stehlei Trel. ex Stehlé, Bull. Soc. Bot. France 83: 628. 1936 (nomen subnudum); validly publ. by Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 45(fig. 2), 46. 1948. TYPE: Guadeloupe. Stehlé 24 (holotype: NY; fragment of the type at ILL).-- [= P. magnoliifolia (fide Howard, 1973)]

* conulifera var. tenuispica Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 45(fig. 5), 46. 1948 (nomen nudum). TYPE: Guadeloupe. Stehlé 2547 (LECTOTYPE, designated herein: NY; isolectotype: ILL).-- [= P. magnoliifolia (fide Howard, 1973)]

* conulifera var. tivoliana Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 46. 1948 (nomen nudum). TYPE: Martinique, Tivoli Bot. Gard. Stehlé & Stehlé 2328 [LECTOTYPE, designated herein: NY; isolectotype: ILL (2 sheets)].-- [= P. magnoliifolia (fide Howard, 1973)]

corcovadensis Gardn. forma latifolia Yuncker, Bol. Inst. Bot. (São Paulo) 3: 159. 1966. TYPE: Brazil, São Paulo, Estacão Biológia, Alto da Serra. 17 SEP 1943. Kuhlman s.n. [holotype: S; paratype at ILL: Usteri s.n. (= SP 12621)].-- [This taxon recognized by Yuncker, 1974]

corozosana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 25. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, Los Corozos, S. José de Ocoa. El. 750 m. 19 MAR 1929. Ekman 11969 (holotype: ?; isotype: ILL).

cotoneasterifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 33. 1936. TYPE: Peru, Junín, Carpapata. El. 2700-3200 m. 7 JUN 1929. Killip & Smith 24390 (holotype: US; isotype: ILL).

crassispica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 321, 328. 1927. TYPE: Haiti, Morne Darracq, Le Borgne. El. 800 m. Ekman 4762 (holotype: ?; isotype: ILL).

crassulaecaulis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 33. 1936. TYPE: Peru, Junín, Carpapata. El. 2400 m. 7 JUN 1929. Killip & Smith 24355 (holotype: US; isotype: ILL).

crinigera Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 33. 1936. TYPE: Peru, Junín, Palca. 6 DEC 1924. Stevens 45 (holotype: ILL).

crispipila Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 322, 330. 1927. TYPE: Haiti, Port de Paix, Haut-Piton. El. 1000 m. Ekman 4612 (holotype: ?; isotype: ILL).

crotalophora Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 34. 1936. TYPE: Peru, Junín, La Merced, Hacienda Schunke. El. 1200 m. AUG-SEP 1923. Macbride 5644 (holotype: F 536682; isotype: ILL).-- [This collection is also the type of P. semielongata Trel. in J.F. Macbr., op. cit. 95, but the name P. crotalophora was adopted for the species by Trel. & Yuncker, 1950]

cruciata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 34. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 800 m. Schunke 343 (holotype: F 571399; fragments of the type at ILL).

cruentata Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 302. 1940. TYPE: Panama, Bocas del Toro, Isla de Colón. El. 25-75 m. 17-18 AUG 1938. Woodson, Allen & Seibert 1941 (holotype: MO; isotype: ILL).-- [This species recognized by Yuncker, 1950; = P. rotundifolia (L.) Kunth (fide Burger, 1971)]

crusculibacca Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 34. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 90 (holotype: ILL).

cryptolepida Trel., Contr. U.S. Nat. Herb. 26(4): 206. 1929. TYPE: Costa Rica, Limón, Hamburg Finca, Río Reventazón below Cairo. El. 55 m. 19 FEB 1926. Standley & Valerio 48932 (holotype: US 1251287; isotype: ILL; paratype at ILL: Standley & Valerio 49016).-- [= P. panamensis C.DC. ex Schroeder (fide Burger, 1971)]

cryptotricha Trel. ex Badillo, Cat. Fl. Venezolana 1: 244. 1945 (nomen nudum). TYPE: Venezuela, Miranda, Galipán. El. 1800-2400 m. 20 MAY 1913. Pittier 6213 (holotype: US; fragments of the type at ILL).-- [= P. reflexa (L.f.) A. Dietr. (fide Trel. & Yuncker, 1950; Yuncker, 1950-51 and 1955); = P. tetraphylla (cf. Yuncker, 1974)]

cuatrecasasana Trel., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 33: 46. 1936 (without a Latin diagnosis). TYPE: Colombia, Tolima, El Salto, Mt. Tolima. El. 3000 m. 15 MAY 1932. Cuatrecasas 2413 (holotype: MA; fragments of the type at ILL).-- [This species recognized by Trel. & Yuncker, 1950 (2: 560), but not validated]

* cubana C.DC. in DC. forma platana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 19. 1926 (nomen nudum). Type citation: "Eastern Cuba ... Rio Yara to Rio Plata (Ekman 14213, 14780 - f. platana)" = SYNTYPES: ILL (Ekman 14780 the LECTOTYPE, designated herein).-- [= P. glabella) (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957, 1966 and 1974)]

cubensis C.DC. var. haitensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 323, 331. 1927. TYPE: Haiti, Port de Paix, Haut-Piton. El. 800 m. Ekman 3684 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 3683).-- [The species recognized by Adams et al., 1972 and Yuncker, 1950-51]

* cufodontii Trel. in Cuf., Archivio Bot. Sist. Fitogeogr. & Genet. 10: 26. 1934. TYPE: Costa Rica, Vulcanus Irazu, ... Guayabillos. El. 2500 m. 23 MAY 1930. Cufodontis 509 (LECTOTYPE, designated herein: ILL).-- [= P. hylophila (fide Burger, 1971)]

cumbreana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 692, fig. 610. 1950. TYPE: Colombia, El Valle, La Cumbre. El. 1500-1700 m. 11-16 JUL 1922. Hazen 11837 (holotype: PH 601614; isotype: ILL).

currucaeformis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 35. 1936. TYPE: Peru, Junín, La Merced, Schunke Hacienda. El. 1400-1700 m. 8-12 JUN 1929. Killip & Smith 24542 (holotype: US; isotype: ILL).

cushiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 36. 1936. TYPE: Peru, Huánuco, Cushi. El. 1500 m. 19-23 JUN 1923. Macbride 4816 (holotype: F 535850; isotype: ILL).

daguana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 696, fig. 615. 1950. TYPE: Colombia, El Valle, Dagua Valley, Cisneros. El. 300-500 m. 21 SEP 1922. Killip 11482 (holotype: GH; isotype: ILL).

daiquiriana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 22, 30. 1926. TYPE: Cuba, Oriente, Daiquirí. 29 OCT 1916. Ekman 8140 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 8285).-- [= P. obtusifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957 and 1974)]

dantoana Trel. in Yuncker, Field Mus. Publ. Bot. 9(4): 274. 1940. TYPE: Honduras, Atlántida, Río Danto, Mt. Cangrejal, near La Ceiba. 16 JUL 1938. Yuncker, Koepper & Wagner 8499 (holotype: ILL).-- [= P. granulosa (fide Standley & Steyerm., 1952)]

dawsoni Trel. in Yuncker, Field Mus. Publ. Bot. 17: 333. 1938. TYPE: Honduras, Comayagua, above El Achote, near Siguatepeque. El. 1800 m. 21 JUL 1936. Yuncker, Dawson & Youse 6009 (holotype: ILL).

debilipes Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 37. 1936. TYPE: Peru, Junín, Pichis Trail, Yapas. El. 1350-1600 m. 28, 29 JUN 1929. Killip & Smith 25545 (holotype: US; isotype: ILL).

debilipes var. dimorpha Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 38. 1936. TYPE: Peru, Junín, Pichis Trail, Yapas. El. 1350-1600 m. Killip & Smith 25591 (holotype: US; fragments of the type at ILL).

deceptrix Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 38. 1936. TYPE: Peru, Loreto, San Antonio, on Río Itaya. El. 110 m. 18 SEP 1929. Killip & Smith 29325 (holotype: US; isotype: ILL).

decora Dahlst. var. pilosa Yuncker, Bol. Inst. Bot. (São Paulo) 3: 161. 1966. TYPE: Brazil, Minas Gerais, Belo Horizonte, Serra do Curral. 1 MAR 1934. Sampaio 7374 [holotype: R; isotype: ILL; paratype at ILL: Hoehne & Gehrt s.n. (= SP 17555)].-- [This variety recognized by Yuncker, 1974]

defluens Trel. in Yuncker, Field Mus. Publ. Bot. 17: 333. 1938. TYPE: Honduras, Lancetilla Valley, near Lancetilla. El. 27 m. 5 AUG 1934. Yuncker 4916 (holotype: ILL).

degeneri Yuncker, Bernice P. Bishop Mus. Bull. 112: 25. 1933. TYPE: Hawaii, Molokai, east arm of Kaluaaha Valley, on shaded cliffs. 12 JUL 1928. Degener & Wiebke 3061 (holotype: ?; isotype: ILL).-- [This species recognized by Kartesz & Kartesz, 1980]

dendroides Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 38. 1936. TYPE: Peru, Junín, Chahua(?). El. 2700 m. 12 MAY 1923. Macbride 3640 (holotype: F 534704; isotype: ILL; paratype at ILL: Macbride & Featherstone 1784).

dendromorphis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 39. 1936. TYPE: Peru, Cuzco, Marcapata. El. 3000 m. 15-16 FEB 1929. Weberbauer 7800 (holotype: F 605350; isotype: ILL).

diaphanoides Dahlst. Kongl. Svenska Vetenskapsakad. Handl. 33(2): 112, tab. 10, fig. 3. 1900. TYPE: Brazil, Rio Grande do Sul, Santo Ângelo, near Cachoeira. 31 JAN 1893. Malme 522 (holotype: S; isotype: ILL).-- [This species recognized by Yuncker, 1974]

diehliana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 39. 1936. TYPE: Peru, probably in Cuzco. Diehl 2526 (holotype: F 630026; fragments of the type at ILL).

diruptorum Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 302. 1940. TYPE: Panama, Chiriquí, Bajo Mona, mouth of Quebrada Chiquero, along Río Caldera. El. 1500-2000 m. 3 JUL 1938. Woodson, Allen & Seibert 1023 (holotype: MO; isotype: ILL).-- [This species recognized by Yuncker, 1950; = P. reptabunda Trel. (fide Burger, 1971)]

discilimba Trel. & Yuncker, Piperaceae no. S. Amer. 2: 489, fig. 433. 1950. TYPE: Colombia, Santander, between Piedecuesta and Las Vegas. El. 2000-2500 m. 19-24 DEC 1926. Killip & Smith 15502 (holotype: US 1351374; isotype: ILL; paratype at ILL: Killip & Smith 16568).

distractiflora Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 40. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 214 (holotype: ILL).

divaricata Yuncker, Lilloa 27: 203, pl. 81. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3724 (holotype: US 1177042; isotype: ILL).-- [This species recognized by Yuncker, 1974]

dodgei Trel. in Standley, Field Mus. Publ. Bot. 18(4): 312. 1937. TYPE: Costa Rica, Cartago, NW slope of Cerro de la Carpintera above La Union des Tres Cruces. El. 1460-1700 m. Dodge & Thomas 4782 (holotype: GH; isotype: ILL).-- [= P. carpinterana C.DC. (fide Burger, 1971)]

doleana Trel. ex Stehlé, Candollea 10: 288. 1946. TYPE: Guadeloupe, Dolé. JAN 1929. Trelease 66 (holotype: ILL; paratypes at ILL: Trelease 67, 68).-- [= P. myrtifolia (fide Howard, 1973)]

dolosa Trel. ex Stehlé, Bull. Soc. Bot. France 83: 628. 1937 (nomen subnudum); Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 52. 1948. TYPE cited: "Îlot des Saintes, Terre-de-Haut." Stehlé & Stehlé 155 [holotype: ?; a specimen (fragments) at ILL marked "Type" is No. 755 from Guadeloupe. Authentic specimen from "Îlot des Saintes" at ILL: Stehlé & Stehlé 1724].-- [= P. myrtifolia (fide Howard, 1973)]

* dominicana C.DC. var. myriantha Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 25. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, ... Bejucal, S. José de Ocoa. El. 1300 m. 13 MAR 1929. Ekman 11903 (holotype, or LECTOTYPE designated herein: ILL).

dominicana var. roberjotana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 318, 325. 1927. TYPE: Haiti, La Selle, Roberjot. El. 1700 m. 19 AUG 1924. Ekman 1542 (holotype: ?; isotype: ILL).

donaguiana C.DC. [var.] β longifilamentosa C.DC., Candollea 1: 308. 1923. No collection cited, but PROBABLE TYPE: Mexico, Hidalgo, barranca below Trinidad Iron Works. El. 5000 feet. 16 JUL 1904. Pringle 8992 (holotype: ?; probable isotype: ILL).-- [Pringle's specimen has a printed label with the above name, followed by the designation "n. var." Trelease marked the sheet as "P. longifilamentosa (C.DC.) Cotype," but the latter combination was never published]

dondonensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 26: 341. 1929. TYPE: Haiti, Massif du Nord, Dondon, near Citadelle Laferrière. El. 700 m. Ekman 9643 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 8260).

* dondonensis var. caimitensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 26: 341. 1929. TYPE: Haiti, Anse-à-Maçon, Gde. Caímite, at sea level. 22 AUG 1927. Ekman 8945 (holotype, or LECTOTYPE designated herein: ILL).

drapeta Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 40. 1936. TYPE: Peru, Huánuco, Huacachi near Muña. El. 1950 m. MAY-JUN 1923. Macbride 4122 (holotype: F 535193; isotype: ILL).

* duartensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 25. 1931. TYPE: Santo Domingo [Dominican Republ.], Duarte, Loma Quita-Espuela. El. 800 m. 25 APR 1929. Ekman 12281 (holotype, or LECTOTYPE designated herein: ILL).

duidana Trel. in Gleason, Bull. Torrey Bot. Club 58: 354. 1931. TYPE: Venezuela, Amazonas, slopes of Ridge 25, summit of Mt. Duida. El. 1650-1800 m. NOV-DEC 1928. Tate 438 (holotype: NY; isotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950 and Yuncker, 1955]

duricaulis Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 302. 1940. TYPE: Panama, Chiriquí, trail from Cerro Punto to headwaters of Río Caldera. El. 2250-2500 m. 14 JAN 1939. Allen 1441 (holotype: ILL).-- [This species recognized by Yuncker, 1950]

earlei Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 22, 31. 1926. TYPE: Cuba, Oriente, Cooper's Ranch, Baracoa. Underwood & Earle 872 (holotype: NY; paratypes at ILL: Ekman 14701, 14880).-- [= P. obtusifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957 and 1974)]

ecuadorensis C.DC., Bull. Herb. Boissier 6: 507. 1898. TYPE: Ecuador, Andes of Quito. Jameson 543 [holotype: B; fragment of isotype (from LE) at ILL].-- [This species recognized by Trel. & Yuncker, 1950]

effusa Yuncker, Lilloa 27: 240, pl. 117. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3732 (holotype: US 1177039; isotype: ILL; paratype at ILL: Steinbach 9353).

efimbriata Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 226. 1927. TYPE: Bolivia, Pongo de Quime. El. 11500 ft. 12 JUL 1921. White 164 (holotype: ILL).-- [This species recognized by Yuncker, 1955]

ekmanii Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 22, 31. 1926. TYPE: Cuba, Oriente, Sierra Maestra, summit of Pico Turquino. El. 2040 m. 22-24 JUL 1922. Ekman 14531 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 5524).-- [= P. acuminata (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51 and 1974)]

ellsworthii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 486, fig. 430. 1950. TYPE: Colombia, Cauca, "La Gallera", Micay Valley. Killip 7675 (holotype: US 1142394; isotype: ILL).

emarginella (Sw.) C.DC. in DC. var. ovalis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 711, fig. 634. 1950. TYPE: Ecuador, Guayas, Teresita, 3 km W of Bucay. El. 270 m. 5-7 JUL 1923. Hitchcock 20458 (holotype: US 1195405; fragments of the type at ILL).

enenyasensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 42. 1936. TYPE: Peru, Junín, Pichis Trail, Eneñas. El. 1600-1900 m. JUN-JUL 1929. Killip & Smith 25654 (holotype: US; isotype: ILL).

ephemera Ekman, Ark. Bot. 22A(9): 20. 1929 (nomen nudum). TYPE: Haiti, La Vallée. 21 MAR 1928. Ekman 9755 (holotype: ?; isotype: ILL).-- [= P. pellucida (L.) Kunth (fide Trelease's labelling)]

epilobioides Trel. & Yuncker, Piperaceae no. S. Amer. 2: 551, fig. 483. 1950. TYPE: Colombia, Cauca, "Canaan," Mt. Puracé. El. 3100-3300 m. 11-13 JUN 1922. Pennell & Killip 6618 (holotype: US 1142144; isotype: ILL; paratype at ILL: Mutis 547).-- [This species recognized by Yuncker, 1955a]

epilobioides var. glabrilimba Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 552. 1950. TYPE: Colombia, Cauca, headwaters of Río Palo, Quebrada de Santo Domingo. El. 2665 m. 14 DEC 1944. Cuatrecasas 19298 (holotype: ILL).

eripipunctulata Trel. in Yuncker, Field Mus. Publ. Bot. 17: 333. 1938. TYPE: Honduras, Comayagua, on a rotten log in ravine near El Rincón, about 10 miles W of Siguatepeque. El. 1400-1500 m. 25 JUL 1936. Yuncker, Dawson & Youse 6079 (holotype: ILL; paratype at ILL: Yuncker, Dawson & Youse 6104).

erythrophlebia Trel., Contr. U.S. Nat. Herb. 26(4): 200. 1929. TYPE: Costa Rica, Cartago, El Muñeco, Río Navarro. El. 1400 m. 8, 9 FEB 1924. Standley 33418 (holotype: US 1229226; fragments of the type at ILL).-- [= P. hylophila (fide Burger, 1971)]

erythropremna Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 27. 1926. TYPE: Cuba, Pinar del Río, Loma Harenales. Shafer 13784 (holotype: NY; paratype at ILL: Ekman 16604).-- [This species recognized by Yuncker, 1950-51]

erythrostachya Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 43. 1936. TYPE: Peru, Huánuco, Pozuzo. El. 600 m. 20-22 JUN 1923. Macbride 4667 (holotype: F 535741; isotype: ILL).

estrellana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 43. 1936. TYPE: Peru, Ayacucho, Estrella, between Huanta and Río Apurímac. El. 500 m. 8, 14 May 1929. Killip & Smith 23064 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 25281).

euosma Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 22, 29. 1926. TYPE: Cuba, Pinar del Río, Sierra de S. Vicente. 1924. Ekman 18691 (holotype: ?; isotype: ILL).-- [= P. magnoliifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1957, 1966 and 1974)]

evadens Trel. ex Stehlé, Fl. Descr. Antill. Fr. 2(1): 134. 1940; Bull. Agric. Martinique 9(3): 211, tab. 12. 1940. TYPE: Guadeloupe, Soufrière lane. El. 950 m. Stehlé 330 (holotype: NY; fragments of the type at ILL).-- [= P. hirtella (fide Howard, 1973)]

ewanii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 573, fig. 497. 1950. TYPE: Colombia, Nariño, 6 km above San José, vicinity of Cerro Tablón, region of Volcán de Doña Ana. 14 DEC 1944. Ewan 16574 (holotype: ILL; paratype at ILL: Ecuador: Penland & Summers 2).

exiguispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 44. 1936. TYPE: Peru, Loreto, Puerto Arturo. El. 155-210 m. OCT-NOV 1929. Williams 5331 (holotype: F 622538; isotype: ILL).

exilamenta Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 44. 1936. TYPE: Peru, San Martín, Tarapoto. El. 360-900 m. DEC 1929. Williams 5722 (holotype: F 622513; isotype: ILL; paratype at ILL: Williams 6258).

exiliramea Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 44. 1936. TYPE: Peru, Loreto, Santa Rosa. El. 135 m. 1-5 SEP 1929. Killip & Smith 28768 (holotype: US; isotype: ILL).

exuberantifolia Trel. in Standley, Field Mus. Publ. Bot. 18(4): 313. 1937. TYPE: Costa Rica, Heredia, Cerro Central de Zurquí. El. 1600-1700 m. 27 DEC 1929. Dodge, Thomas, Valerio & Valerio 6140 "[a]", i.e., pro parte (holotype: GH; isotype: ILL).-- [= P. hylophila (fide Burger, 1971)]

famelica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 45. 1936. TYPE: Peru, Junín, E of Quimirí Bridge, near La Merced. El. 800-1300 m. 1-3 JUN 1929. Killip & Smith 23961 (holotype: US; isotype: ILL).

fieldiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 45. 1936. TYPE: Peru, Huánuco, Pozuzo. El. 600 m. 20-22 JUN 1923. Macbride 4684 (holotype: F 535758; isotype: ILL; paratype at ILL: Killip & Smith 25167).

filici-decorans Trel. in Yuncker, Field Mus. Publ. Bot. 17: 333. 1938. TYPE: Honduras, Comayagua, near El Achote, above Siguatepeque. El. 1350 m. 26 JUL 1936. Yuncker, Dawson & Youse 6105 (holotype: ILL).

fimbribractea Trel., Contr. U.S. Nat. Herb. 26(4): 196. 1929. TYPE: Costa Rica, Cartago, Dulce Nombre. El. 1400 m. 27 FEB 1924. Standley 35897 (holotype: US 1229256; paratypes at ILL: Standley 41447; Standley & Torres 51704; Standley & Valerio 45481).-- [= P. costaricensis C.DC. (fide Burger, 1971)]

fissicola Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 46. 1936. TYPE: Peru, Huánuco, Huánuco. El. 2100 m. 5-8 APR 1923. Macbride 3255 (holotype: F 534325; isotype: ILL).

flagitans Trel. in Yuncker, Field Mus. Publ. Bot. 17: 334. 1938. TYPE: Honduras, Comayagua, river bank 6 km W of Siguatepeque. El. 1200 m. 8 AUG 1936. Yuncker, Dawson & Youse 6383 (holotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

floresensis Trel. in Yuncker, Field Mus. Publ. Bot. 9: 275. 1940. TYPE: Honduras, Yoro, Las Flores. El. 270 m. 30 JUN 1938. Yuncker, Koepper & Wagner 8149 (holotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

floridensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 25. 1926. TYPE: Cuba, Oriente, Sierra Maestra, Florida above Daiquirí. El. 750 m. 28-29 JUN 1914. Ekman 1560 (holotype: ?; isotype: ILL).-- [= P. grisebachii (fide Yuncker, 1950-51)]

foliata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 47. 1936. TYPE: Peru, Junín, Huacapistana. 8 DEC 1924. Stevens 65 (holotype: ILL; paratype at ILL: Stevens 178).

* formonensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 24: 360. 1928. TYPE: Haiti, La Hotte, Mont Formon. El. 2150 m. Ekman 7517 (holotype, or LECTOTYPE designated herein: ILL).

fortunati Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 48. 1936. TYPE: Peru, Cuzco, valley of Río Apurímac. FEB 1929. Herrera s.n. [holotype: F 589470; fragments of the type at ILL; paratype at ILL (fragments): Weberbauer 5684].-- [= P. mandonii C.DC. in DC. (fide Trel. & Yuncker, 1950; Yuncker, 1955 and 1974)]

fortipes Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 48. 1936. TYPE: Peru, Ayacucho, Aina. El. 750-1000 m. 7, 17 MAY 1929. Killip & Smith 22589 (holotype: US; isotype: ILL).

fragilis Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 551, fig. 482. 1950. TYPE: Colombia, Nariño, Cordillera Oriental, vicinity of Funes along Río Tellez. El. 2600 m. 1 DEC 1944. Ewan 16509 (holotype: ILL).

fragrantissima Trel. & Yuncker, Piperaceae no. S. Amer. 2: 449, fig. 395. 1950. TYPE: Colombia, Putumayo, Cordillera Oriental, Quebrada Blanca, Río Afiladores drainage, along road to Cerro Precipicio. El. 2131 m. Ewan 16281 (holotype: ILL).

fraseri C.DC. var. peltata Yuncker ex Espinosa, Univ. Loja, Estud. Bot. Ecuador 2: 31. 1949 (nomen nudum), in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 740. 1950. TYPE: Ecuador, Loja, Horta-Naque. 5 NOV 1946. Espinosa 859 (holotype: ILL).

fulvescens Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 674, fig. 590. 1950. TYPE: Colombia, El Valle, Km. 8, along hwy. from Buenaventura to Cali, near sea level. 10 JUN 1944. Killip & Cuatrecasas 39011 (holotype: US 1856883; isotype: ILL).

fumeana Stehlé & Trel. in Stehlé, Bull. Soc. Bot. France 84: 408. 1937. TYPE: Guadeloupe. Stehlé & Stehlé 340 (holotype: ?; fragment of the type at ILL).-- [= P. urocarpa Fisch. & Mey. (fide Howard, 1973)]

fumeana var. stehlei Trel. ex Stehlé, Bull. Soc. Bot. France 84: 408. 1937. TYPE: Guadeloupe, ... ad rives fluminis St.-Louis. 22 FEB 1936. Stehlé & Stehlé 370 (holotype: NY; isotype: ILL).-- [= P. urocarpa (fide Howard, 1973)]

* galiifolia Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 227. 1927. TYPE: Bolivia, Pongo de Quime. El. 11500 feet. 12 JUL 1921. White 166 (LECTOTYPE, designated herein: ILL; isolectotype: NY).-- [= P. galioides (fide Yuncker, 1955)]

gehrigeri Trel. ex Badillo, Cat. Fl. Venezolana 1: 244. 1945 (nomen nudum); Trel. & Yuncker, Piperaceae no. S. Amer. 2: 527, fig. 465. 1950. TYPE: Venezuela, Mérida, Tabay, en selva de la Isla y El Rincón. El. 2500-2700 m. 8 SEP 1930. Gehriger 421 (holotype: US 1498577; isotype: ILL).

gentianaefolia Sodiro, Contrib. al Conoc. Fl. Ecuator Monogr. 1, Ed. 2, Nuevas Adic. p. 3 [1902]; Anales Univ. Centr. Ecuador 15: 98. 1902. TYPE: Ecuador, Tungurahua. El. 2600 m. 1901. Sodiro s.n. (holotype: ?; isotype: ILL).-- [= P. saligna (fide Trel. & Yuncker, 1950)]

gilberti Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 50. 1936. TYPE: Peru, Cuzco, Ollantaitambo. El. 3000 m. 15 MAY 1915. Cook & Gilbert 740 (holotype: US; fragments of the type at ILL).

glabrirhachis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 50. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 211 (holotype: ILL; paratypes at ILL: Stevens 64, 179).

glareosa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 50. 1936. TYPE: Peru, Loreto, Río Santiago, above Pongo de Manseriche. El. 200 m. 6 DEC 1931. Mexia 6236 (holotype: UC; isotype: ILL).

gloriosaefolia Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 319, 325. 1927. TYPE: Haiti, Morne de la Hotte, Ma Blanche. Ekman 526 (holotype: ?; fragments of the type at ILL).

gorgonillana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 632, fig. 554. 1950. TYPE: Colombia, Nariño, Gorgonilla Island, near sea level. 8 FEB 1939. Killip & García 33053 (holotype: US 1770053; isotype: ILL; paratypes at ILL: Killip & García 33079, 33138).

gorgonillana var. hirsutula Trel. & Yuncker, Piperaceae no. S. Amer. 2: 632. 1950. TYPE: Colombia, Cauca, highlands of Popayán. El. 1500-1800 m. FEB 1902. Lehmann B.T. 1009 (holotype: GH; paratype at ILL: Killip 11620).

granata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 24. 1926. TYPE: Cuba, Oriente, Sierra Maestra, cliffs, northern spur of Pico Turquino. El. 1850-1900 m. 24 JUL 1922. Ekman 14590 [holotype: ?; isotype: ILL; paratypes at ILL: Ekman 14580 (2 sheets)].-- [= P. galioides (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51 and 1955)]

granulata Trel. & Yuncker, Piperaceae no. S. Amer. 2: 654, fig. 572. 1950. TYPE: Colombia, Santander, vicinity of Barranca Bermeja, Magdalena Valley, etc. El. 100-500 m. 17 NOV 1934. Haught 1420 (holotype: US 1661694; isotype: ILL).

granulatifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 50. 1936. TYPE: Peru, Junín, Puerto Yessup. El. 400 m. 10-12 JUL 1929. Killip & Smith 26390 (holotype: US; isotype: ILL).

granulatilimba Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 51. 1936. TYPE: Peru, Loreto, Yurimaguas, lower Río Huallaga. El. 155-210 m. OCT-NOV 1929. Williams 4617 (holotype: F 629584; isotype: ILL; paratypes at ILL: Killip & Smith 26215; Williams 2802, 2945).

granulosa Trel., J. Wash. Acad. Sci. 19: 328. 1929. TYPE: Honduras, Atlántida, Lancetilla Valley near Tela. El. ca 100 m. 11 JAN 1928. Standley 54360 (holotype: F 583593; isotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

guaiquinimana Trel. ex Badillo, Cat. Fl. Venezolana 1: 245. 1945 (as guaiquinimiana, nomen nudum); Trel. & Yuncker, Piperaceae no. S. Amer. 2: 596, fig. 518. 1950. TYPE: Venezuela, Bolívar, Río Paragua, Guaiquinima. El. 285 m. 14, 15 APR 1943. Killip 37504 (holotype: US 1855529; isotype: ILL).

guanensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 24. 1926. TYPE: Cuba, Pinar del Río, base of Sierra Guane. NOV 1911. Shafer 10541 (holotype: US 1047841; fragments of the type at ILL).-- [This species recognized by Yuncker, 1950-51]

* guayabillosana Trel. in Cuf., Archivio Bot. Sist. Fitogeogr. & Genet. 10: 26. 1934. TYPE: Costa Rica, Vulcanus Irazú ... Guayabillos. El. 2300 m. 28 MAY 1930. Cufodontis, 317 (LECTOTYPE designated herein: ILL).-- [= P. galioides (fide Burger, 1971)]

gucayana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 51. 1936. TYPE: Peru, Cuzco, Urubamba Valley, near Gucay. El. 3000 m. Herrera 1464 (holotype: US; fragments of the type at ILL).

guttulatissima Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 25. 1926. TYPE: Cuba, Pinar del Río, Sierra Caliente, Sumidero. 24 NOV 1923. Ekman 18191 (holotype: ?; isotype: ILL).-- [= P. hirta C.DC. (fide Yuncker, 1950-51)]

haematolepis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 52. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 212 (holotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950]

haughtii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 523, fig. 463. 1950. TYPE: Colombia, Santander, vicinity of Barranca Bermeja, Magdalena Valley, between Sogamosa and Colorado rivers. El. 100-500 m. 25 AUG 1934. Haught 1341 (holotype: US 1661659; isotype: ILL; paratype at ILL: Haught 2059).

hebetata Trel. & Yuncker, Piperaceae no. S. Amer. 2: 529, fig. 468. 1950. TYPE: Colombia, Putumayo, Umbría. El. 325 m. OCT-NOV 1930. Klug 1805 (holotype: US 1518027; fragments of the type at ILL).

herediana Trel., Contr. U.S. Nat. Herb. 26(4): 197. 1929. TYPE: Costa Rica, Heredia, Yerba Buena. El. 2000 m. FEB 1926. Standley & Valerio 49260 (holotype: US 1251293; paratypes at ILL: Standley & Valerio 50200, 52337).-- [= P. elata C.DC. ex Schroeder (cf. Burger, 1971)]

herteri Trel., Revista Sudamer. Bot. 6: 66. 1941. TYPE: Uruguay. Herter 98388 (holotype: ?; fragments of the type at ILL).-- [= P. catharinae Miq. (fide Yuncker, 1955 and 1974)]

heterophylla Miq. in Hooker var. grandis Yuncker, Lilloa 27: 244, pl. 121. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3735 (holotype: US 1176597; isotype: ILL).

hispidorhachis Yuncker, Ann. Missouri Bot. Gard. 37: 112, fig. 21. 1950. TYPE: Panama, Prov. Panamá, Río La Maestra. El. 0-25 m. 4 DEC 1936. Allen 31 (holotype: MO; isotype: ILL).

hispidula (Sw.) A. Dietr. var. ellipticifolia Trel. & Yuncker, Piperaceae no. S. Amer. 2: 705, fig. 626. 1950. TYPE: Colombia, Santander, Río Suratá Valley above Suratá. El. 2000-2300 m. 5-6 JAN 1927. Killip & Smith 16580 (holotype: GH; isotype: ILL).

hispiduliformis Trel. in Moldenke, Lilloa 6: 295. 1941. TYPE: Argentina, Tucumán, Las Pavas. El. 1700 m. 9 MAR 1924. Venturi 2986 (holotype: ILL).-- [This species recognized by Yuncker, 1955]

horrescens Trel. ex Badillo, Cat. Fl. Venezolana 1: 245. 1945 (nomen nudum). TYPE: Venezuela, Fed. Distr., upper Cotiza, near Caracas. El. above 1400 m. 23 SEP 1917. Pittier 7400 (holotype: US?; fragments of the type at ILL).-- [= P. venezueliana C.DC. (fide Trel. & Yuncker, 1950)]

houelmonte Trel. ex Stehlé, Bull. Soc. Bot. France 83: 628. 1936 (nomen subnudum), ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited). TYPE: Guadeloupe. 25 FEB 1936. Stehlé & Stehlé 365 (holotype: NY; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

huacachiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 53. 1936. TYPE: Peru, Huánuco, Huacachi near Muña. El. 1950 m. MAY-JUN 1923. Macbride 3899 (holotype: F 534962; isotype: ILL; paratype at ILL: Macbride 3416).

huacapistana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 54. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 89 (holotype: ILL; paratype at ILL: Macbride 4678).

huantana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 55. 1936. TYPE: Peru, Ayacucho, Aina. El. 750-1000 m. 7, 17 MAY 1929. Killip & Smith 22728 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 22780).

huantana var. enenyasana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 55. 1936. TYPE: Peru, Junín, Pichis Trail, Eneñas. El. 1600-1900 m. JUN-JUL 1929. Killip & Smith 25727 (holotype: US; isotype: ILL).

huanucoana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 55. 1936. TYPE: Peru, Huánuco, Huánuco. El. 2100 m. 5-8 APR 1923. Macbride 3256 (holotype: F 534326; isotype: ILL).

* humilis A. Dietr. var. stehlei Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 54. 1948. TYPE: Guadeloupe, Ajoupa des Bains-Jaunes. El. 900 m. Stehlé & Stehlé & Quentin 2457 -- wrongly published as no. 2547 (LECTOTYPE designated herein: NY; isolectotype: ILL, P).-- [= P. questeliana Stehlé & Trel. in Stehlé (fide Howard, 1973); the name P. humilis A. Dietr. upheld by Boufford, 1982]

hydrocotyloides Miq. var. major Yuncker, Bol. Inst. Bot. (São Paulo) 3: 144, fig. 128. 1966. TYPE: Brazil, Guanabara, Copacabana. 25 OCT 1862. Isern 6669 (holotype: ILL).-- [This variety recognized by Yuncker, 1974]

hydrocotyloides var. setosa Yuncker, Bol. Inst. Bot. (São Paulo) 3: 144, fig. 127. 1966. TYPE: Brazil, São Paulo, Itú. 4 DEC 1924. Hoehne s.n. (= SP 12909) (holotype: ILL).-- [This variety recognized by Yuncker, 1974]

imbracteata Yuncker, Lilloa 27: 175, pl. 55. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3737 (holotype: US 1176599; isotype: ILL).

inaudax Trel. in Yuncker, Field Mus. Publ. Bot. 17: 334. 1938. TYPE: Honduras, Comayagua, above El Achote, near Siguatepeque. El. 1850 m. 1 AUG 1936. Yuncker, Dawson & Youse 6242 (holotype: ILL).-- [= P. condormiens (fide Standley & Steyerm., 1952)]

infralutea Trel. & Yuncker, Piperaceae no. S. Amer. 2: 644, fig. 567. 1950. TYPE: Colombia, Caldas, above Salento. El. 2600-2800 m. 2-10 AUG 1922. Pennell 9295 (holotype: US 1142815; isotype: ILL).

intermixta Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 26. 1926. TYPE: Cuba, Oriente. Wright 523, pro parte (holotype: G; paratypes at ILL: Ekman 8846, 14801).-- [= P. trichocaulis Trel. (fide Yuncker, 1950-51).

ioeides Trel. & Yuncker, Piperaceae no. S. Amer. 2: 562, fig. 490. 1950. TYPE: Colombia, Putumayo, between El Encaño and Sibundoy, Páramo de San Antonio del Bordoncillo. El. 3250 m. 4 JAN 1941. Cuatrecasas 11758 (holotype: US 1799116; isotype: ILL).

itayana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 56. 1936. TYPE: Peru, Loreto, Río Itaya, Soledad. El. 110 m. Killip & Smith 29753 (holotype: US; paratypes at ILL: Killip & Smith 28724, 29364, 29618).

izalcoana Trel. in Standley, J. Wash. Acad. Sci. 13: 366. 1923. TYPE: El Salvador, Sonsonate, vicinity of Izalco. 19 MAR 1922. Standley 21874 (holotype: ILL).-- [= P. bernoullii C.DC. (fide Standley & Steyerm., 1952)]

jamesoniana C.DC. var. longifolia Trel. & Yuncker, Piperaceae no. S. Amer. 2: 605, fig. 530. 1950. TYPE: Colombia, Putumayo, Umbría. El. 325 m. 3 OCT 1930. Klug 1743 (holotype: US 1456501; isotype: ILL).-- [This variety recognized by Yuncker, 1955a]

juniniana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 57. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1200 m. Schunke 357 (holotype: F 571411; isotype: ILL; paratype at ILL: Killip & Smith 24809).

klugiana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 616, fig. 540. 1950. TYPE: Colombia, Putumayo, Umbría. 0°54'N, 76°10'W. El. 325 m. OCT-NOV 1930. Klug 2109 (holotype: US 1456756; isotype: ILL; paratype at ILL: Ewan 16763).

koepperi Trel. in Yuncker, Field Mus. Publ. Bot. 9: 275. 1940. TYPE: Honduras, Atlántida, Mt. Cangrejal. El. 300 m. 16 JUL 1938. Yuncker, Koepper & Wagner 8508 (holotype: ILL; paratype at ILL: Yuncker, Koepper & Wagner 8380).-- [= P. rotundifolia (fide Standley & Steyerm., 1952)]

laesa Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 303. 1940. TYPE: Panama, Chiriquí, vicinity of "New Switzerland," central valley of Río Chiriquí Viejo. El. 1800-2000 m. 6-14 JAN 1939. Allen 1422 (holotype: ILL).-- [= P. palmana C.DC. (fide Burger, 1971 and Yuncker, 1950)]

lancetillana Trel. in Yuncker, Field Mus. Publ. Bot. 17: 334. 1938. TYPE: Honduras, Lancetilla Valley, hills above Lancetilla, near Tela. El. 60 m. 7 AUG 1934. Yuncker 4943 (holotype: ILL).-- [= P. obtusifolia (cf. Standley & Steyerm., 1952)]

lancetillana var. spathifolia Trel. in Yuncker, Field Mus. Publ. Bot. 17: 335. 1938. TYPE: Honduras, Lancetilla Valley near Lancetilla. El. 60 m. 18 AUG 1934. Yuncker 5040 (holotype: ILL).-- [= P. obtusifolia (fide Standley & Steyerm., 1952)]

lankesteri Trel. in Standley, Field Mus. Publ. Bot. 18(4): 317. 1937. TYPE: Costa Rica, Pejivalle. Lankester 1294 (holotype: F; fragments of the type at ILL).-- [= P. candelaber Trel. (fide Burger, 1971)]

la-sierrana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 530, fig. 469. 1950. TYPE: Colombia, Antioquia, La Sierra, 18 km N of Medellín. El. ca 2000 m. 8 MAR 1931. Archer 1635 (holotype: US 1542694; isotype: ILL).

late-ovata Trel., Contr. U.S. Nat. Herb. 26(4): 191. 1929. TYPE: Costa Rica, San José, Laguna de la Chonta, near Santa María de Dota. El. 2000-2100 m. 18 DEC 1925. Standley 42310 (holotype: US 1251136; paratype at ILL: Standley 42201).-- [= P. emarginella (fide Burger, 1971)]

laudabilis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 335. 1938. TYPE: Honduras, Comayagua, El Achote, above Siguatepeque. El. 1350 m. 3 AUG 1936. Yuncker, Dawson & Youse 6298 (holotype: ILL).-- [= P. collocata (fide Standley & Steyerm., 1952)]

laxiflora Kunth var. perrubescens Trel. & Yuncker, Piperaceae no. S. Amer. 2: 481. 1950. TYPE: Colombia, Santander, Dorada Creek, 10 km S of Raizuda, etc. El. ca 300 m. 7 MAY 1937. Haught 2197 (holotype: US 1742427; paratype at ILL: Haught 1911a).

leonardi Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 322, 329. 1927. TYPE: Haiti, Mission Fonds Verettes. Leonard 4028 (holotype: US 1076422; paratypes at ILL: Ekman 1296, 1528, 2743, 4606, 4711; Leonard 8375).

* leonardi var. acuminata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 322. 1927. TYPE: Haiti, Morne Brouet. 26 JUL 1924. Ekman 1108 (holotype, or LECTOTYPE designated herein: ILL; paratypes at ILL: Leonard 7871, 8279).

leridana Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 303. 1940. TYPE: Panama, Chiriquí, Finca Lérida to Boquete. El. 1300-1700 m. 8-10 JUL 1938. Woodson, Allen & Seibert 1176 (holotype: ILL).-- [= P. maculosa (L.) Hooker (fide Burger, 1971; Trel. & Yuncker, 1950 and Yuncker, 1950)]

leuconeura Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 58. 1936. TYPE: Peru, Junín, La Merced, Hacienda Schunke. El. 1200 m. AUG-SEP 1923. Macbride 5628 (holotype: F 536667; isotype: ILL).

leucostachya C.DC. var. tolimensis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 465. 1950. TYPE: Colombia, Tolima, Cordillera Central, Quebrada Cajamarca, New Quindío Trail. 14 AUG 1922. Killip 9747 (holotype: GH; fragments of the type at ILL).

lignescens C.DC. var. subcuneilimba Trel., Contr. U.S. Nat. Herb. 26(4): 193. 1929. TYPE: Costa Rica, San José, vicinity of Santa María de Dota. El. 1500-1800 m. DEC 1925. Standley 41564 (holotype: US 1251105; isotype: ILL; paratype at ILL: Standley 42115).-- [Cited with the species by Burger, 1971]

ligustrina Hillebrand var. oopuolana Yuncker, Bernice P. Bishop Mus. Bull. 112: 35. 1933. TYPE: Hawaii, E Maui, vicinity of Oopuola stream. 7 JUL 1927. Degener & Wiebke 2628 (holotype: ILL; paratypes at ILL: Degener & Wiebke 3066; Wiebke 3068, 3071).-- [This variety recognized by Kartesz & Kartesz, 1980]

limaensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 58. 1936. TYPE: Peru, Lima, San Geronimo in Lima. El. 150 m. 19 SEP 1923. Macbride 5920 (holotype: F; isotype: ILL).-- [This is also a paratype of P. pseudo-galapagensis Trel. in op. cit. 79]

lindmaniana Dahlst., Kongl. Svenska Vetenskapsakad. Handl. 33(2): 44, tab. 8, fig. 7. 1900. TYPE: Brazil, Mato Grosso, Serra do Itapirapuau. 23 APR 1894. Lindman 2925 (holotype: S; isotype: ILL).-- [This species recognized by Yuncker, 1974]

linearis C.DC. in Seemann, J. Bot. 4: 145. 1866. TYPE: Ecuador, "in sylvis Andium Quitensium." El. 1800 m. Jameson 89 [holotype: G; fragment of isotype (from LE) at ILL].-- [= P. swartziana Miq. (fide Trel. & Yuncker, 1950; Yuncker, 1950-51 and 1955)]

* lineatipila A. Rich. forma mogotana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 19. 1926. TYPE: Cuba, Pinar del Río, Sierra Sitio Sto. Tomas, region of the Mogotes. 6 OCT 1923. Ekman 16635 (LECTOTYPE, designated herein: ILL).-- [= P. glabella (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957, 1966 and 1974)]

loefgrenii Yuncker, Bol. Inst. Bot. (São Paulo) 3: 146, fig. 130. 1966 [as loefgrennii]. TYPE: Brazil, São Paulo, Barreira do Ataque. 12 JAN 1897. Loefgren 3606 (holotype: ILL).-- [This species upheld by Yuncker, 1974]

longispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 59. 1936. TYPE: Peru, Huánuco, Muña. El. 2100 m. MAY-JUN 1923. Macbride 3928 (holotype: F 534990; isotype: ILL; paratypes at ILL: Killip & Smith 22380, 22426, 24140, 24147, 24188, 24342).

lundellii Trel. ex Standley in Standley & Record, Field Mus. Publ. Bot. 12: 406. 1936. TYPE: British Honduras [Belize], Orange Walk Distr., Honey Camp. NOV 1928. Lundell 96a (holotype: F 597985; fragments of the type at ILL).-- [= P. crassiuscula Millsp. (fide Standley & Steyerm., 1952; = P. pereskiaefolia (Jacquin) Kunth (fide Burger, 1971)]

macaraoana Trel. ex Badillo, Cat. Fl. Venezolana 1: 245. 1945 (nomen nudum). TYPE LOCALITY: Venezuela. Four syntypes cited (perhaps lectotypification needed): Allard 58, 172; Pittier 11549, 11907 [fragments of Pittier 11907 (obtained from LE) at ILL].-- [= P. blanda (fide Trel. & Yuncker, 1950; Yuncker 1955, 1957, 1966 and 1974)]

macbrideana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 59. 1936. TYPE: Peru, Huánuco, Huacachi, near Muña. El. 1950 m. MAY-JUN 1923. Macbride 4144 (holotype: F 535218; isotype: ILL).

* maestrana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20, 29. 1926. TYPE: Cuba, Oriente, Sierra Maestra, Arroyo Bayajá. El. 200-400 m. 8 AUG 1922. Ekman 14767 [LECTOTYPE, designated herein: ILL (the specimen at ILL was listed as "type" by Yuncker, 1950, but it was not marked as such by Trelease); isolectotype: HAB, NY; paratypes at ILL: Ekman 7272, 14393].-- [This species recognized by Yuncker, 1950-51]

maguirei Yuncker in Maguire & Collaborators, Bull. Torrey Bot. Club 75: 291. 1948. TYPE: Suriname, Tafelberg, vicinity SE margin of Arrowhead Basin. 19 AUG 1944. Maguire 24420 (holotype: NY; isotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950 and Yuncker, 1957]

majalis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 60. 1936. TYPE: Peru, Junín, Pichis Trail, Dos de Mayo. El. 1700-1900 m. 2, 3 JUL 1929. Killip & Smith 25886 (holotype: US; isotype: ILL).

mala Trel. in Yuncker, Field Mus. Publ. Bot. 17: 335. 1938. TYPE: Honduras, Comayagua, Siguatepeque. El. 1050 m. 8 JUL 1936. Yuncker, Dawson & Youse 5737 (holotype: ILL).

malmeana Dahlst., Kongl. Svenska Vetenskapsakad. Handl. 33(2): 169, tab. 6, fig. 1. 1900. TYPE: Paraguay, near Paraguari. AUG 1893. Malme 896 (holotype: S; isotype: ILL).-- [= P. aceroana (fide Yuncker, 1955)]

manseriche**a**na Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 60. 1936. TYPE: Peru, Loreto, mouth of Río Santiago, Pongo de Manseriche. El. 210 m. 1 DEC 1931. Mexia 6196 (holotype: UC; isotype: ILL).-- [= P. vulcanicola C.DC. var. manseriche**a**na (Trel.) Trel. & Yuncker (1950)]

marcapatana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 61. 1936. TYPE: Peru, Cuzco, Quispicanchi, Marcapata. El. 3000 m. 15-16 FEB 1929. Weberbauer 7801 (holotype: F 605155; isotype: ILL).-- [This species recognized by Yuncker, 1955]

marshalliana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 61. 1936. TYPE: Peru, Huánuco, Pozuzo. El. 600 m. Macbride 4710 (holotype: F 551172; paratype at ILL: Schunke 460).

martinicensis C.DC. in Stehlé, Bull. Soc. Bot. France 84: 409. 1937. TYPE: Guadeloupe, Houteurs de Goyave, Rivières Moreau et Bouteillé. El. 300 m. Stehlé & Branquec 975 (holotype: NY; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

martinicensis var. lata Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited). TYPE: Guadeloupe, Goyave. Stehlé & Stehlé 976 (holotype: NY; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

matapalo Trel. in Standley, J. Wash. Acad. Sci. 13: 366. 1923. TYPE: El Salvador, San Salvador. AUG 1922. Calderon 1121 (holotype: ILL).-- [= P. pililimba C.DC. ex Schroeder (fide Standley & Steyerm., 1952); = P. olivacea C.DC. (cf. Burger, 1971)]

* medianiana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 25. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, San Juán. El. 1950 m. 17 SEP 1929. Ekman 13605 (holotype, or LECTOTYPE designated herein: ILL).

megalepis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 62. 1936. TYPE: Peru, Huánuco, trail to Tambo de Vaca, Muña. El. 2400 m. 5-7 JUN 1923. Macbride 4275 (holotype: F 535357; isotype: ILL).

* megalopoda Trel. in Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 6: 533. 1930. TYPE: Puerto Rico, between Guayama and Cayay. El. 300 m. 5 DEC 1929. E.G. Britton 9352 (LECTOTYPE, designated herein: ILL; isolectotype: NY).

megapotamica Dahlst., Kongl. Svenska Vetenskapsakad. Handl. 33(2): 194, tab. 8, fig. 1. 1900. TYPE: Brazil, Rio Grande do Sul, Hamburgerberg. 20 OCT 1892. Malme 206 (holotype: S; paratype at ILL: Malme 700).-- [This species recognized by Yuncker, 1974]

membranacea Hooker & Arnott var. puukukuiana Yuncker, Bernice P. Bishop Mus. Bull. 112: 43. 1933. TYPE: Hawaii, W Maui, along the trail leading to Puu Kukui. El. 5700 ft. Rock 10376 [holotype: BISH; paratypes at ILL: Hawaii, Kilauea: Degener 3807; Degener & Swezey 3804. E Maui: Degener & Wiebke 2394, 2630 and 2636 (2 sheets)].-- [This variety recognized by Kartesz & Kartesz, 1980]

membranacea var. waimeana Yuncker, Bernice P. Bishop Mus. Bull. 112: 43. 1933. TYPE: Hawaii, Kauai, Kaholuamano. Rock 17183 (holotype: BISH; paratype at ILL: Molokai: Degener & Wiebke 2759).-- [This variety recognized by Kartesz & Kartesz, 1980]

mesitasana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 469, fig. 410. 1950. TYPE: Colombia, Las Mesitas. 7 JAN 1943. Silvano Jorge & Carlos 175 (holotype: ILL).

* michelensis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 24: 360. 1928. TYPE: Haiti, La Hotte, Chapelle, St. Michel. 1926. Ekman 6606 (holotype, or LECTOTYPE designated herein: ILL).

microlepis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 63. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 91 (holotype: ILL).

micromamillata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 63. 1936. TYPE: Peru, Huánuco, Huacachi near Muña. El. 1950 m. MAY-JUN 1923. Macbride 3872 (holotype: F 534935; isotype: ILL).

microphyllophora Trel. & Yuncker, Piperaceae no. S. Amer. 2: 577, fig. 501. 1950. TYPE: Colombia, Santander, vicinity of Charta. El. 2000 m. 1-11 FEB 1927. Killip & Smith 19016 (holotype: GH; isotype: ILL).

mollipubis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 335. 1938. TYPE: Honduras, Comayagua, near El Achote, above the plains of Siguatepeque. El. 1350 m. 7 AUG 1936. Yuncker, Dawson & Youse 6367 (holotype: ILL).

* moncionis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 26. 1931. TYPE: Santo Domingo [Dominican Republ.], Monte Cristi, Lagunas de Cenobí, Moncíon. El. 1100 m. 17 JUN 1929. Ekman 12886 (holotype, or LECTOTYPE designated herein: ILL).

* montazosana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 26. 1931. TYPE: Santo Domingo [Dominican Republ.], La Vega, Los Montazos, Valle Nuevo Road, Constanza. El. 2000 m. 21 OCT 1929. Ekman 13888 (holotype, or LECTOTYPE designated herein: ILL).

montefrionis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 23 (as montefrioni). 1926. TYPE: Cuba, Oriente, Sierra Maestra, Monte Frío. El. 1000 m. 19 APR 1915. Ekman 5598 (holotype: ?; fragments of the type at ILL).-- [= P. penicillata C.DC. in Urban (fide Yuncker, 1950-51)]

montis-verticis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 336. 1938. TYPE: Honduras, Comayagua, cloud zone above El Achote, near Siguatepeque. El. 1850 m. 1 AUG 1936. Yuncker, Dawson & Youse 6244 (holotype: ILL).

munyecoana Trel., Contr. U.S. Nat. Herb. 26(4): 197. 1929. TYPE: Costa Rica, Cartago, El Muñeco, Río Navarro. El. 1400-1500 m. 6, 7 MAR 1926. Standley & Torres 51754 (holotype: US 1251352; isotype: ILL; paratype at ILL: Standley & Valerio 47216).-- [= P. angularis C.DC. in DC. (fide Burger, 1971)]

murispica Trel. ex Badillo, Cat. Fl. Venezolana 1: 245. 1945 (nomen nudum). TYPE: Venezuela, Tovar de Aragua. El. 2100-2200 m. Pittier 10009 (holotype: ?; fragments of the type at ILL).-- [= P. ?blanda (fide Trel. & Yuncker, 1950; Yuncker, 1955, 1957, 1966 and 1974)]

muscipara Trel. & Yuncker, Piperaceae no. S. Amer. 2: 731, fig. 654. 1950. TYPE: Colombia, Cauca, "La Gallera", Micay Valley. El. 2200-2600 m. 29-30 JUN 1922. Killip 8005 (holotype: US 1142461; isotype: ILL).

muscotecta Trel. in Standley, Field Mus. Publ. Bot. 18(4): 1545. 1938. TYPE: Costa Rica, Sarapiquí, Vara Blanca. El. 1800 m. Skutch 3369 (holotype: US; fragments of the type at ILL).-- [= P. pittieri C.DC. (fide Burger, 1971)]

mutilata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 26. 1926. TYPE: Cuba, Oriente, La Prenda. JUL 1922. Hioram 6336 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Yuncker, 1950-51]

myrtifolia (Vahl) A. Dietr. var. major Trel. in Questel, Fl. St. Bartholomew 94. 1941 (without a Latin diagnosis); Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 59. 1948. TYPE: St. Barthélémy. Questel 803 (holotype: NY; fragments of the type at ILL).-- [= P. myrtifolia (fide Howard, 1973)]

naevifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 65. 1936. TYPE: Peru, Junín, Huacapistana. El. 1800 m. 6 JUN 1929. Killip & Smith 24278 (holotype: US; isotype: ILL).

nebuligaudens Trel. in Yuncker, Field Mus. Publ. Bot. 17: 336. 1938. TYPE: Honduras, Comayagua, cloud region above El Achote, near Siguatepeque. El. 1850 m. 28 JUL 1936. Yuncker, Dawson & Youse 6186 (holotype: ILL).

* negotiosa Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited); validly published in op. cit. 2(2): 60. 1948. TYPE: Guadeloupe, Ravine Chaude de Dugommier. El. 650-800 m. Stehlé, Stehlé & Quentin 1613 (holotype, or LECTOTYPE designated herein: NY; fragments of the type at ILL).-- [= P. urocarpa (fide Howard, 1973)]

nequejahuirana Trel., Bull. Torrey Bot. Club 55: 169. 1928. TYPE: Bolivia, Nequejahuira. El. 8000 ft. 1926. Tate 642 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Yuncker, 1955]

nievecitana Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 304. 1940. TYPE: Panama, Bocas del Toro, vicinity of Nievecita. El. 0-50 m. 8-19 AUG 1938. Woodson, Allen & Seibert 1865 (holotype: ILL).-- [This species recognized by Yuncker, 1950]

nigricans Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 65. 1936. TYPE: Peru, Junín, La Merced. El. 700 m. MAY-JUN 1929. Killip & Smith 23674 (holotype: US; isotype: ILL).

non-hispidula Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 67. 1936. TYPE: Peru, Lima, Lurín. El. 60 m. 23 SEP 1923. Macbride 5967 (holotype: F 536971; isotype: ILL).-- [This species recognized and regarded as closely related to P. mandonii by Yuncker, 1974]

novae-helvetiae Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 304. 1940. TYPE: Panama, Chiriquí, vicinity of "New Switzerland," central valley of Río Chiriquí Viejo. El. 1800-2000 m. 6-14 JAN 1939. Allen 1417 (holotype: ILL).-- [= P. pascuicola C.DC. (fide Yuncker, 1950)]

novella Trel. in Yuncker, Field Mus. Publ. Bot. 17: 336. 1938. TYPE: Honduras, Comayagua, cloud zone above El Achote, near Siguatepeque. El. 1800 m. 28 JUL 1936. Yuncker, Dawson & Youse 6139 (holotype: ILL).

nudicaulis C.DC., Bull. Torrey Bot. Club 19: 48. 1892. TYPE: Bolivia, near Yungas. 1890. Bang 331a [holotype: NY (fide Yuncker); isotype (obtained from GH): ILL].-- [This species recognized by Yuncker, 1955]

* nummularia Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 26. 1926. TYPE: Cuba, Pinar del Río, San Juán y Martínez, Río San Juán. 15 NOV 1923. Ekman 18083 (LECTOTYPE designated herein: ILL; isolectotype: ILL).-- [This species recognized by Yuncker, 1950-51]

obex Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 67. 1936. TYPE: Peru, Huánuco, Muña. El. 7000 ft. MAY-JUN 1923. Macbride 3992 (holotype: F 535056; isotype: ILL).

oblanceaelimba Trel. ex Badillo, Cat. Fl. Venezolana 1: 245. 1945 (nomen nudum). TYPE: Venezuela, Tovar de Aragua. El. 1800-2000 m. Allart 485 (holotype: ?; fragments of the type at ILL).-- [= P. acuminata (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51 and 1974)]

oblanceolata Trel. var. glabra Yuncker, Revista Soc. Cub. Bot. 6(2-3): 36. [1949] 1951. TYPE: Cuba, Oriente, Las Ninfas, Guantánamo. 19 SEP 1918. Hioram 2231 (holotype: NY; paratype at ILL: Ekman 14733).

oblongibacca C.DC. ex Schroeder var. subvillosa Yuncker, Ann. Missouri Bot. Gard. 37: 106. 1950. TYPE: Panama, Canal Zone, near Río Medio. 11 FEB 1937. Miller 1740 (holotype: US; fragments of the type at ILL).-- [= P. macrostachya (Vahl) A. Dietr. (cf. Burger, 1971)]

obovalis Trel. & Yuncker ex Hodge, Rev. Fac. Nac. de Agron. Medellín 8: 424. 1948 (nomen nudum); validly published in Piperaceae no. S. Amer. 2: 630, fig. 551. 1950. TYPE: Colombia, Chocó, Río San Juán, vicinity of Palestina. El. 5-50 m. 12-14 MAR 1944. Cuatrecasas 16906 (holotype: US 1852511; paratypes at ILL: Cuatrecasas 13711, 16945; Killip 34829).

obruenda Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 68. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 202 (holotype: ILL).

* ocoana Ekman ex Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 26. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, Bejucal, S. José de Ocoa. El. 1300 m. 10 MAR 1929. Ekman 11861 (holotype, or LECTOTYPE designated herein: ILL).

okarana Trel., Bull. Torrey Bot. Club 55: 170. 1928. TYPE: Bolivia, Okara. El. 7500 ft. 1926. Tate 970 (holotype: NY; fragments of the type at ILL).-- [= P. galioides (fide Yuncker, 1955)]

olafiana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 320, 328. 1927. TYPE: Haiti, Massif de la Hotte, Torbec. El. 1700 m. 1925. Ekman 5319 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 2522).-- ["A habit replica of the Jamaican P. swartziana" (Trel., loc. cit.)]

olivacea C.DC. var. perlongispica Trel., Contr. U.S. Nat. Herb. 26(4): 221. 1929. TYPE: Costa Rica, San José, near Quebradillas, about 7 km N of Santa María de Dota. El. 1800 m. 24 DEC 1925. Standley 43368 (holotype: US 1251171; isotype: ILL; paratypes at ILL: Standley 41646; Standley & Valerio 43367).-- [This species recognized by Burger, 1971]

opaca Trel. (nom. invalid.) var. ciliata Trel. in Yuncker, Field Mus. Publ. Bot. 17: 336. 1938. TYPE: Honduras, Comayagua, cloud zone above El Achote, near Siguatepeque. El. 1850 m. 28 JUL 1936. Yuncker, Dawson & Youse 6187 (holotype: ILL; paratypes at ILL: Yuncker, Dawson & Youse 6008, 6078 and 6366).-- [The specific epithet was published only in this varietal combination; = P. reflexa (fide Standley & Steyerm., 1952); = P. tetraphylla (cf. Yuncker, 1962, 1974)]

orientalis Trel., Contr. U.S. Nat. Herb. 26(4): 211. 1929. TYPE: Costa Rica, Limón, La Colombiana Farm. El. 70 m. 6, 7 MAR 1924. Standley 36943 (holotype: US 1229274; paratype at ILL: Standley & Valerio 49013).-- [= P. macrostachya (fide Burger, 1971)]

osana Trel. in Standley, Field Mus. Publ. Bot. 18(4): 319. 1937. TYPE: Costa Rica, Puntarenas, peninsula of Osa, Río Sándalo. At sea level. 1936. Dodge & Goerger 10079 (holotype: MO; isotype: ILL; paratype at ILL: Dodge & Goerger 9958).-- [= P. serpens (Sw.) Loud. (fide Burger, 1971)]

oscarii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 656, fig. 574. 1950. TYPE: Colombia, Santander, vicinity of Barranca Bermeja, etc. El. 100-500 m. 11 OCT 1934. Haught 1391 [holotype: US 1592005; paratypes at ILL: Killip 11716, 11718 (fragments)].

otoni Trel. in Standley, Field Mus. Publ. Bot. 18(4): 319. 1937. TYPE: Costa Rica, Guanacaste, Hacienda Santa María. El. 720-850 m. 17 JAN 1930. Dodge, Jiminez & Thomas 7768 (holotype: GH; isotype: ILL).-- [= P. peltilimba C.DC. ex Trel. (fide Burger, 1971)]

ovato-lanceolata Trel. & Yuncker, Piperaceae no. S. Amer. 2: 701, fig. 623. 1950. TYPE: Colombia, El Valle, Río Digua Valley, Chorrera La Elsa. El. 975 m. 2, 3 APR 1939. Killip 34808 (holotype: US 1771599; isotype: ILL; paratype at ILL: Cuatrecasas 13035).-- [This species recognized by Yuncker, 1955a]

pachiteana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 69. 1936. TYPE: Peru, Huánuco, Puerta Lira, on Río Pachitea. El. 300 m. 23 JUL 1929. Killip & Smith 26831 (holotype: US; isotype: ILL).

palmana C.DC. var. pseudo-oxystachya Trel., Contr. U.S. Nat. Herb. 26(4): 221. 1929. TYPE: Costa Rica, Heredia, Yerba Buena above San Isidro. El. 200 m. FEB 1926. Standley & Valerio 49222 (holotype: US 1251497; paratype at ILL: Standley & Valerio 49115).-- [Cited with the species by Burger, 1971]

palmana var. valerionum Trel. in Standley, Field Mus. Publ. Bot. 18(4): 320. 1937. TYPE: Costa Rica, Heredia, Cerro Central de Zurquí. El. 1600-1700 m. Dodge, Valerio, Thomas & Valerio 6146 (holotype: GH; isotype: ILL).

palpebrata Trel. ex Stehlé, Bull. Soc. Bot. France 84: 409. 1937 (without a Latin diagnosis); Candollea 8: 81. 1940. TYPE: Martinique, Sources de Didier. Stehlé & Stehlé 984 (cited in 1940 wrongly as "n. 894") [holotype: ILL; paratypes at ILL: Stehlé & Stehlé 1008, 2141 (= fragments), 2338, 3235, 3373, 3385, 3387].-- [= P. nigropunctata (fide Howard, 1973)]

palpebrata var. absalonis Trel. ex Stehlé, Bull. Soc. Bot. France 85: 577. 1938 (without a Latin diagnosis). TYPE: Martinique, Fontaine Absalon. El. 450 m. Stehlé & Stehlé 2169 (holotype: ?; fragments of the type at ILL).-- [= P. nigropunctata (fide Howard, 1973)]

* palpebrata var. lata Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 63. 1948 (nomen nudum). TYPE: Martinique, Fonds ... aux Deux-Choux. El. 680 m. 29 APR 1939. Stehlé & Stehlé 3248 (holotype, or LECTOTYPE designated herein: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

palpebrata var. major Trel. ex Stehlé, Bull. Soc. Bot. France 85: 578. 1938 (without a Latin diagnosis). TYPE: Martinique, Pont d l'Alma ed le long de la Rivière Blanche. El. 350 m. Stehlé & Stehlé 2193 (holotype: NY; fragments of type at ILL).-- [= P. nigropunctata (fide Howard, 1973)]

pampalcana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 69. 1936. TYPE: Peru, Ayacucho, Pampalca. El. 3200 m. MAY 1929. Killip & Smith 23282 (holotype: US; isotype: ILL).

* papulata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 26. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, Picacho del Ingenito, San Juán. El. 1200 m. 8 SEP 1929. Ekman 13517 (holotype, or LECTOTYPE designated herein: ILL).

parietariaefolia Trel., Contr. U.S. Nat. Herb. 26(2): 45. 1927. TYPE: Panama, Chiriquí, valley of the Río Caldera, between El Boquete and the cordillera. El. 1400-1600 m. 5-19 FEB 1918. Killip 3520 (holotype: US 1266032; isotype: ILL).-- [This species recognized by Yuncker, 1950; = P. elata C.DC. ex Schroeder (fide Burger, 1971)]

parmata Trel., Contr. U.S. Nat. Herb. 26(4): 212. 1929. TYPE: Costa Rica, Cartago, along the Río Turrialba. El. 500 m. MAR 1894. Donnell Smith 4926 (holotype: US 796648; paratype at ILL: Standley & Valerio 44103).-- [= P. maculosa (fide Burger, 1971)]

parva Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 70. 1936. TYPE: Peru, Junín, Pichis Trail, Dos de Mayo. El. 1700-1900 m. 2, 3 JUL 1929. Killip & Smith 25881 (holotype: US; isotype: ILL).

parvipunctulata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 70. 1936. TYPE: Peru, San Martín, San Roque. El. 1350-1500 m. JAN-FEB 1930. Williams 7145 (holotype: F 623573; isotype: ILL).

peltaphylla Trel. & Yuncker, Piperaceae no. S. Amer. 2: 719, fig. 641. 1950. TYPE: Colombia, Santander, vicinity of El Roble. El. ca 1500 m. 16 FEB 1927. Killip & Smith 19364 (holotype: US 1354620; isotype: ILL).

penicillata C.DC. var. magnifolia C.DC. in Urban, Symb. Ant. 7: 190. 1912. TYPE: Jamaica, John Crow Park. 1906. Johnson 8 (holotype: NY; isotype: ILL).-- [The species recognized by Adams et al., 1972 and Yuncker, 1950-51]

pennellii Trel. & Yuncker, Piperaceae no. S. Amer. 2: 608, fig. 533. 1950. TYPE: Colombia, Norte de Santander, vicinity of Toledo. El. 1700-1900 m. 3-11 MAR 1927. Killip & Smith 20049 (holotype: US 1355192; isotype: ILL; paratypes at ILL: Colombia: Arbeláez & Cuatrecasas 8108; Cuatrecasas 18284, 19568; Daniel 2124; Haught 4111; Killip & García 33696; Killip & Smith 15208, 15316, 15345, 16558, 17078 in part, 20082, 20170; Pennell 9294; Ecuador: Rimbach 267).-- [This species recognized by Yuncker, 1955a; = affin. P. angularis (cf. Burger, 1971)]

pentadactyla Yuncker, Lilloa 27: 283, pl. 164. [1953] 1955. TYPE: Bolivia, La Paz, San Carlos, vicinity of Mapiri. El. 800 m. 1 DEC 1926. Buchtien 637 (holotype: ILL).

percrassicaulis Trel. in Feddes Repert. Spec. Nov. Regni Veg. 25: 54. 1928. TYPE: Haiti, La Selle, Pétionville, Morne La Visite. El. 1800 m. 11 APR 1927. Ekman 7993 [holotype: ?; isotype: ILL (perhaps this is the holotype?)].

pereneana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 72. 1936. TYPE: Peru, Junín, Colonia Perené. El. 680 m. 14-25 JUN 1929. Killip & Smith 25413 (holotype: US; isotype: ILL).

perherbacea Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 318, 325. 1927. TYPE: Haiti, Gros Morne. El. 400 m. 10 OCT 1925. Ekman 5052 (holotype: ?; isotype: ILL).

perherbacea var. oligocenica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 24: 360. 1928. TYPE: Haiti, Massif du Nord, Oligocene limestone on M. Pedregal. El. 400 m. 24 JUN 1926. Ekman 6435 (holotype: ?; isotype: ILL).

* perherbacea var. picachoana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 27. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, San Juán, Picacho del Ingenito. El. 1400 m. 8 SEP 1929. Ekman 13522 (holotype, or LECTOTYPE designated herein: ILL).

perlongicaulis Yuncker, Bol. Inst. Bot. (São Paulo) 3: 165, fig. 146. 1966. TYPE: Brazil, Paraná, Jacareí. 27 SEP 1908. Dusén 6655 (holotype: S; isotype: ILL).-- [This species upheld by Yuncker, 1974]

perlongispica Yuncker, Lilloa 27: 277, pl. 157. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 3729 (holotype: US 1176587; isotype: ILL).

* perodiniana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 322, 330. 1927. TYPE: Haiti, Pérodin. El. 900 m. 1925. Ekman 3411 (holotype, or LECTOTYPE designated herein: ILL; paratype at ILL: Leonard 8993).

perplexa Trel. ex Yuncker, Field Mus. Publ. Bot. 17: 337. 1938 (nomen nudum). TYPE LOCALITY: Honduras, "on tree near Lake Yojoa, Department of Cortés, at 630 meters."-- no specimen cited. (Authentic specimen with matching type information at ILL: Yuncker 4865).

persulcata Yuncker ex Espinosa, Univ. Loja, Estud. Bot. Ecuador 2: 32. 1949 (nomen subnudum), in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 517, fig. 456. 1950. TYPE: Ecuador, Loja, Horta-Naque. El. 3500 m. 8 NOV 1946. Espinosa 962 (holotype: ILL).

pertomentella Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 73. 1936. TYPE: Peru, San Martín, Río Mayo, Tarapoto. El. 360-900 m. DEC 1929. Williams 6202 (holotype: F 623588; paratype at ILL: Williams 6204).

petenensis Trel. var. hondurensis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 337. 1938. TYPE: Honduras, Comayagua, El Achote, above Siguatepeque. El. 1350 m. 17 JUL 1936. Yuncker, Dawson & Youse 5922 (holotype: ILL).-- [= P. obtusifolia (cf. Standley & Steyerm., 1952)]

petrophila C.DC. var. brevipetiola Trel. & Yuncker, Piperaceae no. S. Amer. 2: 457, fig. 402. 1950. TYPE: Colombia, Santander, vicinity of El Roble. El. ca 1500 m. 16 FEB 1927. Killip & Smith 19363 (holotype: US 1354619; isotype: ILL).

pichisensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 74. 1936. TYPE: Peru, Junín, Pichis Trail, Dos de Mayo. El. 1700-1900 m. 2,3 JUL 1929. Killip & Smith 25829 (holotype: US; isotype: ILL).

piedrana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 19, 27. 1926. TYPE: Cuba, Oriente, Gran Piedra. El. 700 m. 11 NOV 1916. Ekman 8274 (holotype: ?; isotype: ILL).-- [= P. guadaloupensis C.DC in Seemann (fide Yuncker, 1950-51)]

* pilipeduncula Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 27. 1931. TYPE: Santo Domingo [Dominican Republ.], La Vega, Constanza. El. 1300 m. 24 OCT 1929. Ekman 13907 (holotype, or LECTOTYPE designated herein: ILL).

pinedoana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 75. 1936. TYPE: Peru, Junín, Río Pinedo, N of La Merced. El. 700-900 m. 30 MAY 1929. Killip & Smith 23620 (holotype: US; isotype: ILL).

pitiguayana Trel., Bull. Torrey Bot. Club 55: 169. 1928. TYPE: Bolivia, La Paz, Unduavi River Valley, Pitiguaya. El. 5800 ft. 7-15 MAY 1926. Tate 722 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Yuncker, 1955]

playapampana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 75. 1936. TYPE: Peru, Huánuco, Playapampa. El. 2700 m. 16-24 JUN 1923. Macbride 4496 (holotype: F 535582; isotype: ILL).

pleiomorpha Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 75. 1936. TYPE: Peru, Junín, Puerto Bermúdez. El. 375 m. 14-17 JUL 1929. Killip & Smith 26426 (holotype: US; isotype: ILL).

plurispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 76. 1936. TYPE: Peru, Huánuco, Cani near Mito. El. 2550 m. 16-26 APR 1923. Macbride 3414 (holotype: F 534485; isotype: ILL).

pololensis Trel. ex Standley in Standley & Record, Field Mus. Publ. Bot. 12: 406. 1936. TYPE: Guatemala, Petén, Monte Polol. 26 APR 1933. Lundell 3040 (holotype: MICH; isotype: ILL; paratypes at ILL: Lundell 3100, 3102, 3830).-- [= P. glabella (fide Standley & Steyerm., 1952)]

* polycephala Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 76. 1936. TYPE: Peru, Cuzco, Urubamba Valley, Gucay. El. 3000 m. JAN 1927. Herrera 1460 (holotype, or LECTOTYPE designated herein: ILL).

polymorpha Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 77. 1936. TYPE: Peru, Ayacucho, Aina. El. 750-1000 m. 7, 17 MAY 1929. Killip & Smith 22774 (holotype: US; isotype: ILL).

polystachya (Aiton) Hooker var. godetiana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 319, 326. 1927. TYPE: Haiti, La Selle, Godet, Morne Tranchant. 4 SEP 1924. Ekman 1755 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 1239).-- [This species recognized by Adams et al., 1972; = P. affin. blanda (cf. Yuncker, 1974)]

pongoana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 77. 1936. TYPE: Peru, Loreto, Pongo de Manseriche, near mouth of Río Santiago. El. 400 m. 2 DEC 1931. Mexia 6210a (holotype: UC; isotype: ILL; paratype at ILL: Mexia 6196a).

pontina Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 77. 1936. TYPE: Peru, Junín, Río Paucartambo Valley, near Perené Bridge. El. 700 m. 19 JUN 1929. Killip & Smith 25366 (holotype: US; isotype: ILL).

porriginifera Trel. & Yuncker, Piperaceae no. S. Amer. 2: 572, fig. 496. 1950. TYPE: Colombia, Cauca, Río Palo Valley, between Tacueyó and La Tolda. El. 1780-1900 m. 19 DEC 1944. Cuatrecasas 19494 (holotype: US 1854407; isotype: ILL; paratype at ILL: Cuatrecasas 19501).

* porschiana Trel. in Cuf., Archivio Bot. Sist. Fitogeogr. & Genet. 10: 27. 1934. TYPE: Costa Rica, Vulcanus Poas. El. 22-2400 m. 26 APR 1930. Cufodontis 737 (LECTOTYPE, designated herein: ILL).-- [= P. hylophila (fide Burger, 1971)]

praematura Trel. & Yuncker, Piperaceae no. S. Amer. 2: 672, fig. 587. 1950. TYPE: Colombia, Santander, vicinity of Las Vegas. El. 2600-3000 m. 21-23 DEC 1926. Killip & Smith 16055 (holotype: GH; isotype: ILL).

praestigiatrix Trel. ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited); also publ. as P. stehleana Trel. ex Stehlé var. praestigiatrix Trel. & Stehlé in op. cit. 2(2): 49. 1948 (nomen nudum). TYPE: Guadeloupe, Dugommier. Stehlé & Stehlé 1619 (holotype: NY; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

praetenuis Trel. ex Standley in Standley & Record, Field Mus. Publ. Bot. 12: 406. 1936. TYPE: Belize. 12 MAR 1933. Lundell 1929 (holotype: MICH; fragments of the type at ILL).-- [This species recognized by Standley & Steyerm., 1952]

praeteruentifolia Trel. in Yuncker, Field Mus. Publ. Bot. 17: 337. 1938. TYPE: Honduras, Comayagua, near Siguatepeque. El. 1050 m. 3 JUL 1936. Yuncker, Dawson & Youse 5614 (holotype: ILL).-- [This species recognized by Standley & Steyerm., 1952]

* productamenta Trel. in Feddes Repert. Spec. Nov. Regni Veg. 24: 360. 1928. TYPE: Haiti, cliffs between Cornillon and Thomazeau, Les Matheux. El. 700-900 m. 19 MAR 1926. Ekman 5773 (holotype, or LECTOTYPE designated herein: ILL).

profissa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 78. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 193 (holotype: ILL).

propugnaculi Trel. in Feddes Repert. Spec. Nov. Regni Veg. 25: 54. 1928. TYPE: Haiti, Massif des Matheux, Morne Delpech. El. 1550 m. 14 NOV 1927. Ekman 9322 [isotype (or perhaps the holotype?): ILL].

pruinosifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 78. 1936. TYPE: Peru, Lima, Río Blanco. El. 3000-3500 m. 15-17 APR 1929. Killip & Smith 21742 (holotype: US; isotype: ILL).

pseudo-alpina Trel., Contr. U.S. Nat. Herb. 26(4): 217. 1929. TYPE: Costa Rica, Alajuela, San Ramón, Colinas de Piedades. El. 1100-1200 m. Brenes 14180 (holotype: US 1080165; paratypes at ILL: Standley 41375, 41626).-- [This species recognized by Burger, 1971]

pseudoalternifolia Trel. & Yuncker, Piperaceae no. S. Amer. 2: 547, fig. 478. 1950. TYPE: Colombia, Caldas, Páramo del Quindío. El. 3500-3600 m. 15-20 AUG 1922. Pennell & Hazen 10083 (holotype: US 1142969; isotype: ILL).

pseudo-galapagensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 79. 1936. TYPE: Peru, Lima, Lima. 1838-1842. Wilkes Expl. Exped. (holotype: GH; fragment of the type at ILL; paratype at ILL: Macbride 5920).-- [See also P. limaensis Trel. in op. cit. 58]

pseudo-hoffmannii Trel., Contr. U.S. Nat. Herb. 26(4): 225. 1929. TYPE: Costa Rica, Guanacaste, vicinity of Tilarán. El. 500-650 m. JAN 1926. Standley & Valerio 44198 (holotype: US 1251189; isotype: ILL; paratype at ILL: Standley & Valerio 45608).-- [= P. deppeana (fide Burger, 1971)]

pseudo-salicifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 79. 1936. TYPE: Peru, Huánuco, Río Huallaga canyon below Santo Domingo. El. 1200 m. 3 JUN 1923. Macbride 4254 (holotype: F 535334; isotype: ILL).

pseudo-tetraphylla Trel., Contr. U.S. Nat. Herb. 26(4): 224. 1929. TYPE: Costa Rica, Cartago, Finca Las Cóncavas. El. 1200-1300 m. 7, 8 DEC 1925. Standley 41488 (holotype: US 1251099; isotype: ILL; paratypes at ILL: Standley 41458, 42397, 42607; Standley & Valerio 43358).-- [= P. quadrifolia (fide Burger, 1971)]

pseudo-tetraphylla var. dodgei Trel. in Standley, Field Mus. Publ. Bot. 18(4): 322. 1937. TYPE: Costa Rica, Cartago, Finca Coliblanco, s. slope of Volcán de Turrialba. El. 1980 m. 11 OCT 1929. Dodge 4715 (holotype: GH; isotype: ILL).

pseudo-tetraphylla var. juvenalis Trel., Contr. U.S. Nat. Herb. 26(4): 224. 1929. TYPE: Costa Rica, San José, Cerro de las Vueltas. El. 2700-3000 m. DEC 1925. Standley & Valerio 44003 (holotype: US 1251181; isotype: ILL; paratype at ILL: Standley & Valerio 43694).-- [= P. quadrifolia (fide Burger, 1971)]

pterocaulis Miq. var. filispica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20 (as forma), 28. 1926. TYPE: Cuba, Pinar del Río, Ballestina to Ranzel, Sierra de los Órganos. El. 600 m. 1922. Ekman 13771 (holotype: ?; isotype: ILL; paratype at ILL: Ekman 13894).-- [= P. alata (cf. Yuncker, 1950-51, 1957, 1966 and 1974)]

* pterocaulis var. longispica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 27. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, San Juán. 1929. Ekman 13523 (holotype, or LECTOTYPE designated herein: ILL).-- [= P. alata (cf. Yuncker, 1950-51, 1957 and 1974)]

* pterocaulis var. palmamochana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20, 28. 1926. TYPE: Cuba, Oriente, divide between Río Yara and Río Palmamocha, Sierra Maestra. El. 1100 m. 16 JUL 1922. Ekman 14334 (holotype, or LECTOTYPE designated herein: ILL; paratype at ILL: Ekman 14336).-- [= P. alata (cf. Yuncker, 1950-51, 1957, 1966 and 1974)]

pterocaulis forma stipiticarpa Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20. 1926. TYPE: Cuba, Oriente, Sierra de Nipe. 20 JUL 1914. Ekman 2075 [isotype (or perhaps the holotype ?): ILL].-- [= P. alata (cf. Yuncker, 1950-51, 1957, 1966 and 1974)]

puberulibacca C.DC. var. atricha Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 80. 1936. TYPE: Peru, Huánuco, Muña. El. 2100 m. MAY-JUN 1923. Macbride 4009 (holotype: F 535073; isotype: ILL).

puberulipes Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 80. 1936. TYPE: Peru, Huánuco, Piedra Grande near Río Santo Domingo. El. 1500 m. 14-19 MAY 1923. Macbride 3856 (holotype: F 534919; isotype: ILL).

pubescentinervis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 81. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 6 DEC 1924. Stevens 127 (holotype: ILL).

pubinervosa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 81. 1936. TYPE: Peru, Junín, Río Paucartambo Valley, near Perené Bridge. El. 700 m. 19 JUN 1929. Killip & Smith 25769 (holotype: US; paratype at ILL: Killip & Smith 25269).

* pullispica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 26: 341. 1929. TYPE: Haiti, Massif du Nord, Haut-Piton. El. 1000 m. 31 MAR 1928. Ekman 9832b (holotype, or LECTOTYPE designated herein: ILL).-- [Note by Trelease: "A xerophytic form of P. crassispica?"]

punctatilamina Trel. & Yuncker, Piperaceae no. S. Amer. 2: 586, fig. 510. 1950. TYPE: Colombia, El Valle, La Laguna. El. 1250-1400 m. 10-20 DEC 1943. Cuatrecasas 15406 (holotype: ILL).

punctulatissima Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 228. 1927. TYPE: Bolivia, cataracts of the Bopi River. El. 3000 ft. 11 AUG 1921. Rusby 592 (holotype: ILL).-- [This species recognized by Yuncker, 1955]

* pustulatibacca Trel. & Stehlé in Stehlé, Candollea 10: 288. 1946; originally published as P. pustulaebacca Trel. ex Stehlé, Carib. For. 6, Suppl. 344. 1945 (nomen nudum). TYPE: Barbados. 4 APR 1937. Stehlé & Stehlé 1647 (LECTOTYPE, designated herein: NY; isolectotype: ILL).-- [= P. magnoliifolia (fide Howard, 1973)]

puteolata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 82. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 66 (holotype: ILL; paratypes at ILL: Killip & Smith 24155, 24190).-- ["near P. tetragona" Ruiz & Pavón (fide Trelease's annotation on the type sheet)]

putumayoensis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 620, fig. 543. 1950. TYPE: Colombia, Putumayo, along Río Putumayo, Puerto Porvenir, etc. El. 230-250 m. 19 NOV 1940. Cuatrecasas 10675 (holotype: US 1798154; paratype at ILL: Haught 5412).

quadricoma Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 82. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1800 m. Schunke 370 (holotype: F 571424; fragment of the type at ILL).

* quadrivii Trel. in Feddes Repert. Spec. Nov. Regni Veg. 25: 54. 1928. TYPE: Haiti, Massif de la Hotte, Miragoane, Quatre Chemins. El. 1000 m. 31 OCT 1927. Ekman 9207 (holotype, or LECTOTYPE designated herein: ILL).

quaerata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 83. 1936. TYPE: Peru, Junín, Río Pinedo, N of La Merced. El. 700-900 m. 30 MAY 1929. Killip & Smith 23653 (holotype: US; isotype: ILL).

quaesita Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 83. 1936. TYPE: Peru, Junín, Puerto Bermúdez. El. 375 m. 14-17 JUL 1929. Killip & Smith 26676 (holotype: US; isotype: ILL).-- [This species recognized by Yuncker, 1955]

quatrometralis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 83. 1936. TYPE: Peru, Junín, Puerto Yessup. El. 400 m. 10-12 JUL 1929. Killip & Smith 26330 (holotype: US; isotype: ILL).

* questeliana Stehlé & Trel. in Stehlé, Candollea 8: 77. 1940. TYPE: Guadeloupe, chemin des Grands Fonds. El. 200 m. Questel 2518 (holotype, or LECTOTYPE designated herein: NY; paratypes at ILL: Questel 107, 801).-- [This species recognized by Howard, 1973; = P. humilis (fide Boufford, 1982)]

quimiriana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 83. 1936. TYPE: Peru, Junín, La Merced, E of Quimirí Bridge. El. 800-1300 m. 1-3 JUN 1929. Killip & Smith 23864 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 23730).

quindioensis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 555, fig. 486. 1950. TYPE: Colombia, Caldas, below Páramo del Quindío. El. 3500-3800 m. 15-20 AUG 1922. Pennell & Hazen 10082 (holotype: GH; isotype: ILL; paratype at ILL: Ecuador: Rimbach 259).

quispicanchiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 84. 1936. TYPE: Peru, Cuzco, Quispicanchi, Marcapata. 15-16 FEB 1929. Weberbauer 7802 (holotype: F 605156; isotype: ILL).

ramosa Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 320, 327. 1927. TYPE: Haiti, La Selle, Morne Cabaio. El. 2250 m. 20 AUG 1924. Ekman 1575 (holotype: ?; isotype: ILL).

redondoana Trel. in Standley, Field Mus. Publ. Bot. 18(1): 323. 1937. TYPE: Costa Rica, San José, Potreros of Rancho Redondo. El. 2220-2600 m. NOV 1929. Dodge & Thomas 5423 (holotype: GH; isotype: ILL).-- [= P. galioides (fide Burger, 1971)]

reflexa (L.f.) A. Dietr. var. itabirana C.DC., Bull. Herb. Boissier. Ser. 2. 1: 359. 1901. TYPE: Brazil, Minas Gerais, Pico de Itabira do Campo. El. 1560 m. 11 SEP 1887. Schwacke 5907 (holotype: ?; isotype: ILL).-- [= P. decora (fide Yuncker, 1974)]

rejecta Trel., Contr. U.S. Nat. Herb. 26(4): 205. 1929. TYPE: Costa Rica, Heredia, Yerba Buena, above San Isidro. El. 2000 m. FEB 1926. Standley & Valerio 50219 (holotype: US 1251316; isotype: ILL; paratype at ILL: Standley & Valerio 50248).-- [= P. rotundifolia (fide Burger, 1971)]

remyi C.DC. var. waipioana Yuncker, Bernice P. Bishop Mus. Bull. 112: 55, 56. 1933. TYPE: Hawaii, Waipio Valley. Rock 4646 (holotype: BISH; paratype at ILL: Degener, Pohina & Iwasaki 3885).-- [This variety recognized by Kartesz & Kartesz, 1980]

retivenulosa Yuncker, Bol. Inst. Bot. (São Paulo) 3: 185, fig. 163. 1966. TYPE: Brazil, Paraná, Volta Grande, Marumbi. El. 700 m. 13 FEB 1904. Dusén 3709 (holotype: R; isotype: ILL).-- [This species upheld by Yuncker, 1974]

retropuberula Yuncker, Lilloa 27: 184, pl. 64. [1953] 1955. TYPE: Bolivia, La Paz, San Carlos, vicinity of Mapiri. El. 850 m. 5 NOV 1926. Buchtien 628 (holotype: US 1399480; isotype: ILL).

rhodophlebia Trel. in Yuncker, Field Mus. Publ. Bot. 17: 337. 1938. TYPE: Honduras, Cortés, near Potrerillos. 31 JUL 1934. Yuncker 4896 (holotype: ILL).

rhodophylla Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 84. 1936. TYPE: Peru, Cuzco, Ollantaitambo. El. 2900-3100 m. Pennell 13654 (holotype: F 558031; fragments of the type at ILL).

rhombeo-elliptica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 85. 1936. TYPE: Peru, Huánuco, Huacachi near Muña. El. 1950 m. MAY-JUN 1923. Macbride 4171 (holotype: F 535246; isotype: ILL).

rhombifolia Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 226. 1927. TYPE: Bolivia, La Paz, Bopi River Valley. El. 3000 ft. 11 SEP 1921. Rusby 581 (holotype: ILL).-- [This species recognized by Yuncker, 1955]

rhombilimba Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 86. 1936. TYPE: Peru, Ayacucho, Aina. El. 700-1000 m. 7, 17 MAY 1929. Killip & Smith 22564 (holotype: US; isotype: ILL).

rinconensis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 337. 1938. TYPE: Honduras, Comayagua, near El Rincón, about 10 miles W of Siguatepeque. El. 1400-1500 m. 24 JUL 1936. Yuncker, Dawson & Youse 6080 (holotype: ILL).

rio-albae Trel. in Standley, Field Mus. Publ. Bot. 18(4): 324. 1937. TYPE: Costa Rica, Río Alba, El Copey. El. above 1800 m. 24 JUN 1932. Stork 2986 (holotype: ILL).-- [= P. quadrifolia (fide Burger, 1971)]

rio-caliensis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 452, fig. 397. 1950. TYPE: Colombia, El Valle, Río Cali Valley between Puente de los Cárpatos and La Margarita. El. ca 2000 m. 2 NOV 1944. Cuatrecasas 18467 (holotype: US 1854266; paratype at ILL: Killip & García 33776).

riparia Yuncker, Bol. Inst. Bot. (São Paulo) 3: 169, fig. 150. 1966. TYPE: Brazil, Minas Gerais, Dist. Ilheu, Faz. da Tabunha, Cachoeira do Munhin. El. 200 m. 27 AUG 1930. Mexia 5008 (holotype: BM; isotype: ILL).-- [This species upheld by Yuncker, 1974]

rivi-vetusti Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 304. 1940. TYPE: Panama, Chiriquí, vicinity of "New Switzerland," central valley of Río Chiriquí Viejo. El. 1800-2000 m. 6-14 JAN 1939. Allen 1360 (holotype: ILL).-- [= P. pascuicola (fide Yuncker, 1950); = P. angularis (fide Burger, 1971)]

robleana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 528, fig. 466. 1950. TYPE: Colombia, Santander, between El Roble and Tona. El. 1500-1900 m. 17 FEB 1927. Killip & Smith 19408 (holotype: US 1354659; isotype: ILL).

roigana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 17, 24. AUG 1926, in Britton, Bull. Torrey Bot. Club 53: 459. OCT 1926. TYPE: Cuba, Pinar del Río, Sierra de Viñales, Mogote de la Bandera. 9 DEC 1923. Roig & Azcuy 2902 [holotype: ?; isotype: ILL; paratypes at ILL: Ekman 16539a (2 sheets), 16640].-- [= P. verticillata (L.) A. Dietr. (fide Yuncker, 1950-51)]

romaensis Trel. in Yuncker, Field Mus. Publ. Bot. 9: 275. 1940. TYPE: Honduras, Atlántida, Roma siding of S.F. Co. R.R., E of La Ceiba. El. 360 m. 21 JUL 1938. Yuncker, Koepper & Wagner 8585 (holotype: ILL).-- [= P. obtusifolia (fide Standley & Steyerm., 1952)]

roqueana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 86. 1936. TYPE: Peru, San Martín, San Roque. El. 1350-1500 m. JAN-FEB 1930. Williams 7635 (holotype: F 629588; isotype: ILL; paratypes at ILL: Williams 7272, 7382).-- [= P. martiana Miq. (fide Yuncker, 1974)]

rosea Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 86. 1936. TYPE: Peru, Huánuco, Muña. El. 2100 m. MAY-JUN 1923. Macbride 3927 (holotype: F 534989; isotype: ILL).

* rotundifolia (L.) Kunth var. subelliptica Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18. 1926 (nomen nudum). TYPE: Cuba, Pinar del Río, Mameyar. 13 SEP 1922. Ekman 17511 (holotype, or LECTOTYPE designated herein: ILL).-- [= P. rotundifolia var. rotundifolia (fide Trel. & Yuncker, 1950; Yuncker, 1950, 1950-51, 1955, 1957 and 1974)]

rubefacta Trel. in Yuncker, Field Mus. Publ. Bot. 17: 338. 1938. TYPE: Honduras, Comayagua, El Rincón, W of Siguatepeque. El. 1400-1500 m. 24 JUL 1936. Yuncker, Dawson & Youse 6081 (holotype: ILL).-- [= P. glabella (fide Standley & Steyerm., 1952)]

rubefacta var. cangrejalana Trel. in Yuncker, Field Mus. Publ. Bot. 9: 276. 1940. TYPE: Honduras, Atlántida, slopes of Mt. Cangrejal. El. 330 m. 30 JUL 1938. Yuncker, Koepper & Wagner 8737 (holotype: ILL; paratype at ILL: Yuncker, Koepper & Wagner 8775).-- [= P. glabella (fide Standley & Steyerm., 1952)]

rubefacta var. reducta Trel. in Yuncker, Field Mus. Publ. Bot. 9: 276. 1940. TYPE: Honduras, Atlántida, along Danto River, slopes of Mt. Cangrejal. El. 300-330 m. 30 JUL 1938. Yuncker, Koepper & Wagner 8736 (holotype: ILL; paratypes at ILL: Yuncker, Koepper & Wagner 8510, 8735).

rubens Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 88. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1200 m. Schunke 353 (holotype: F 571407; fragments of the type at ILL).

rubramenta Trel. & Yuncker, Piperaceae no. S. Amer. 2: 450, fig. 396. 1950. TYPE: Colombia, Santander, Monte Osuro, SE of Puerto Berrio. El. 100 m. 17 JUL 1939. Haught 2862 (holotype: US 1707368; isotype: ILL; paratype at ILL: Haught 1599).

rubricaulis (Nees) A. Dietr. var. parvifolia Yuncker, Bol. Inst. Bot. (São Paulo) 3: 171, fig. 152. 1966. TYPE: Brazil, Santa Catarina, Ilha de Santa Catarina, etc. 28 MAR 1957. Smith & Reitz 12278 (holotype: US 2370557; paratype at ILL: Loefgren 3065).-- [This variety recognized by Yuncker, 1974]

rubrifolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 88. 1936. TYPE: Peru, Junín, Schunke Hacienda, above San Ramón. El. 1400-1700 m. 8-12 JUN 1929. Killip & Smith 24664 (holotype: US; isotype: ILL; paratype at ILL: Killip & Smith 25937).

* rubripetiola Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 27. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, Cordillera de Neyba, S. Juán. El. 1425 m. 1929. Ekman 13485 (holotype, or LECTOTYPE designated herein: ILL).

rufispica Yuncker, Bol. Inst. Bot. (São Paulo) 3: 172, fig. 153. 1966. TYPE: Brazil, Minas Gerais, Viçosa, road to São Miguel. El. 700 m. 21 OCT 1930. Mexia 5200 (holotype: ILL).-- [This species upheld by Yuncker, 1974]

rugata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 89. 1936. TYPE: Peru, Junín, La Merced, E of Quirimí Bridge. El. 800-1300 m. 1-3 JUN 1929. Killip & Smith 23823 (holotype: US; isotype: ILL).

rurrenabaqueana Trel. in Rusby, Mem. N.Y. Bot. Gard. 7: 226. 1927. TYPE: Bolivia, Beni, vicinity of Rurrenabaque. El. 1000 ft. 6 OCT 1921. Rusby 794 (holotype: ILL).-- [This species recognized by Yuncker, 1955; = P. nematostachya Link (fide Yuncker, 1957 and 1974)]

sachatzinzumba Trel. & Yuncker, Piperaceae no. S. Amer. 2: 694, fig. 612. 1950. TYPE: Ecuador, Napo-Pastaza, near Canelos. El. 300-400 m. 5-11 FEB 1935. Mexia 6868 (holotype: US 1619090; isotype: ILL).

saligna Kunth var. majuscula Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 580. 1950. TYPE: Colombia, El Valle, Río Bugalagrande Valley, Barragán, etc. El. 3450-3520 m. 20 MAR 1946. Cuatrecasas 20216 (holotype: US 1900420; paratype at ILL: Cuatrecasas 18819).

salmonicolor Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 90. 1936. TYPE: Peru, San Martín, San Roque. El. 1350-1500 m. Williams 7329 (holotype: F 624523; fragments of the type at ILL).

salmonicolor var. viridis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 91. 1936. TYPE: Peru, San Martín, San Roque. El. 1350-1500 m. Williams 7258 (holotype: F 629593; fragments of the type at ILL).

san-buenaventurana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 91. 1936. TYPE: Peru, Lima, San Buenaventura. El. 2700 m. Pennell 14566 (holotype: PH; fragments of the type at ILL).

* san-juanana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 28. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, San Juán, Picacho del Ingenito. El. 1400 m. 1929. Ekman 13524 (holotype, or LECTOTYPE designated herein: ILL).

sanquininiana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 638, fig. 561. 1950. TYPE: Colombia, El Valle, Río Sanquininí Valley, La Laguna. El. 1250-1400 m. 10-20 DEC 1943. Cuatrecasas 15657 (holotype: US 1853187; isotype: ILL; paratype at ILL: Cuatrecasas 18255).

santanana Trel. in Standley, Field Mus. Publ. Bot. 18: 325. 1937. TYPE: Costa Rica, San José, Finca Santana. Dodge & Goerger 10476 (holotype: MO; fragments of the type at ILL).-- [= P. cooperi C.DC. (fide Burger, 1971)]

santanderana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 742, fig. 666. 1950. TYPE: Colombia, Santander, upper Río Lebrija Valley, NW of Bucaramanga. El. 400-700 m. 29 DEC 1926. Killip & Smith 16282 (holotype: US 1352031; isotype: ILL; paratype at ILL: Killip & Smith 16199).

santiagoana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 92. 1936. TYPE: Peru, Loreto, Río Santiago, above Pongo de Manseriche. El. 200 m. 23 NOV 1931. Mexia 6146 (holotype: UC; isotype: ILL).

sarcodes Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 304. 1940. TYPE: Panama, Chiriquí, trail from Cerro Punta to headwaters of Río Caldera. El. 2250-2500 m. 14 JAN 1939. Allen 1452 (holotype: ILL).-- [= P. adscendens (fide Trel. & Yuncker, 1950 and Yuncker, 1950); = P. acuminata (fide Burger, 1971)]

sarcostachya Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 92. 1936. TYPE: Peru, Loreto, Santa Rosa. El. 135 m. 1-5 SEP 1929. Killip & Smith 28889 (holotype: US; isotype: ILL).

sarcostachya var. repens Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 92. 1936. TYPE: Peru, Junín, Río Paucartamba Valley, near Perené Bridge. El. 700 m. 19 JUN 1929. Killip & Smith 25307 (holotype: US; isotype: ILL).

scabiosa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 92. 1936. TYPE: Peru, Huánuco, Piedra Grande near Río Santo Domingo. El. 1500 m. 14-19 MAY 1923. Macbride 3857 (holotype: F 534920; isotype: ILL).

scandens Ruiz & Pavón var. longispica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 93. 1936. TYPE: Peru, Loreto, Balsapuerto. El. 150-350 m. 28-30 AUG 1929. Killip & Smith 28382 (holotype: US; isotype: ILL).-- [= P. serpens (cf. Trel. & Yuncker, 1950; Yuncker, 1955, 1974)]

scheryi Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 28: 426. 1941. TYPE: Panama, Chiriquí, Quebrada Velo. El. 1800 m. 8 JUL 1940. Woodson & Schery 247 (holotype: ILL).-- [= P. maculosa (fide Yuncker, 1950)]

schunkeana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 94. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1200 m. Schunke 342 (holotype: F 571398; paratype at ILL: Killip & Smith 24526).

* scopulorum Trel. in Feddes Repert. Spec. Nov. Regni Veg. 25: 54. 1928. TYPE: Haiti, Ile la Gonave, cliffs of the Grande Ravine. El. 450 m. 1927. Ekman 8790 (holotype, or LECTOTYPE designated herein: ILL).

scutilimba Yuncker, Lilloa 27: 275, pl. 154. [1953] 1955. TYPE: Bolivia, La Paz, Tipuani. El. 500 m. NOV 1933. Cárdenas 1336 (holotype: ILL).

seibertii Trel. in Woodson & Seibert, Ann. Missouri Bot. Gard. 24: 185. 1937. TYPE: Panama, Chiriquí, valley of the upper Río Chiriquí Viejo, vicinity of Monte Lirio, Bugava Distr. El. 1300-1900 m. JUN-JUL 1935. Seibert 201 (holotype: MO; isotype: ILL).-- [This species recognized by Yuncker, 1950; = P. elata (fide Burger, 1971)]

semi-decurrens Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20, 29. 1926. TYPE: Cuba, Pinar del Río, on cliffs, Cerro de Mendoza. El. 150 m. 16 JUN 1923. Ekman 16740 (holotype: ?; isotype: ILL).-- [= P. erythropremna (fide Yuncker, 1950-51)]

semielongata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 95. 1936. TYPE: Peru, Junín, La Merced, Hacienda Schunke. El. 1200 m. AUG-SEP 1923. Macbride 5644 [holotype: F 536682; isotype: ILL (this collection is also the type of P. crotalophora Trel. in J.F. Macbr., op. cit. 34); paratype at ILL: Killip & Smith 24683].-- [= P. crotalophora (fide Trel. & Yuncker, 1950)]

seposita Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 96. 1936. TYPE: Peru, Junín, Hacienda Chalhuapuquio. 8 DEC 1924. Stevens 213 (holotype: ILL).

siguaneana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 25. 1926. TYPE: Cuba, Sta. Clara, Lomas de Siguanea, Río Navarro. 1922. Ekman 13890 (holotype: ?; isotype: ILL).-- [= P. hirta (fide Yuncker, 1950-51)]

siguatepequensis Trel. in Standley, Field Mus. Publ. Bot. 8: 5. 1930. TYPE: Honduras, Comayagua, Siguatepeque. El. 1100 m. FEB 1928. Standley 56534 (holotype: F 580969; isotype: ILL).

simulatio Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 305. 1940. TYPE: Panama, Chiriquí, vicinity of Casita Alta, Volcán de Chiriquí. El. 1500-2000 m. JUN-JUL 1938. Woodson, Allen & Seibert 895 (holotype: ILL).-- [= P. leucosticta (fide Yuncker, 1950)]

smithii Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 96. 1936. TYPE: Peru, Loreto, Yurimaguas to Balsapuerto. El. 135-150 m. 26-31 AUG 1929. Killip & Smith 28115 (holotype: US; isotype: ILL).

socorronis Trel. ex I.M. Johnston, Proc. Cal. Acad. Sci. 20: 58. 1931. TYPE: Mexico, Socorro Island, near summit of Mt. Evermann. 8 MAY 1925. Mason 1653 (holotype: CAS; isotype: ILL).

spiculata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 97. 1936. TYPE: Peru, Junín, Chanchamayo Valley. Schunke 352 (holotype: F 571406; isotype: ILL).

spiculata var. elliptica Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 97. 1936. TYPE: Peru, Junín, Chanchamayo Valley. Schunke 388 (holotype: F 571442; fragments of the type at ILL).

staminea Trel., J. Wash. Acad. Sci. 19: 328. 1929. TYPE: Honduras, Atlántida, Lancetilla Valley, near Tela. El. 100 m. 16 JAN 1928. Standley 54614 (holotype: F 583590; isotype: ILL).-- [This species recognized by Standley & Steyerm., 1952; = P. emiliana (fide Burger, 1971)]

standleyi Trel. in Standley, J. Wash. Acad. Sci. 13: 366. 1923. TYPE: El Salvador, San Salvador, vicinity of Tonacatepeque. 30 DEC 1921. Standley 19426 (holotype: ILL).-- [= P. quadrifolia (fide Standley & Steyerm., 1952)]

stehleana Trel. ex Stehlé, Bull. Soc. Bot. France 83: 627. 1936 (nomen subnudum); Candollea 8: 79. 1940. TYPE: Guadeloupe, Forêt des Bains-Jaunes. El. 600-1050 m. Stehlé & Stehlé 25 (holotype: NY; fragments of the type at ILL; paratypes at ILL: Stehlé & Stehlé 368, 1335, 1342, 1343, 1349).-- [= P. nigropunctata (fide Howard, 1973)]

* stehleana var. charpentieri Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 49, 50(fig. 1). 1948 (nomen nudum, but with illustration). TYPE: Guadeloupe. Stehlé & Charpentier 2551 (holotype, or LECTOTYPE designated herein: NY; fragments of the type at ILL).-- [= P. nigropunctata (fide Howard, 1973)]

stehleana var. tardenaevifera Trel. ex Stehlé, Bull. Soc. Bot., France 83: 628. 1936 (nomen subnudum), ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited). TYPE: Guadeloupe. Stehlé & Stehlé 336 (holotype: NY; isotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

* stehleana var. tardigranulata Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(1): 3. 1937 (nomen nudum, but type cited). TYPE: Guadeloupe, Malanga. El. 680 m. Stehlé & Stehlé 1752 (holotype, or LECTOTYPE designated herein: NY; isotype or isolectotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

* stehleana var. variifolia Trel. & Stehlé ex Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 49. 1948 (nomen nudum). TYPE: Guadeloupe. 29 SEP 1936. Stehlé & Stehlé 1233 (holotype, or LECTOTYPE designated herein: ILL; fragments of the type at NY).-- [= P. nigropunctata (fide Howard, 1973)]

stenophyllopsis Trel., Contr. U.S. Nat. Herb. 26(4): 201. 1929. TYPE: Costa Rica, Alajuela, Fraijanes. El. 1500-1700 m. 12-13 FEB 1926. Standley & Torres 47590 (holotype: US 1251248; isotype: ILL).-- [= P. angularis (fide Burger, 1971)]

stipitifolia Trel., Contr. U.S. Nat. Herb. 26(4): 220. 1929. TYPE: Costa Rica, San José, Cerro de las Vueltas. El. 2700-3000 m. DEC 1925. Standley & Valerio 44013 (holotype: US 1251184; paratype at ILL: Standley 42802).-- [= P. esperanzana Trel. (fide Burger, 1971)]

suavis Trel. (nom. invalid.) var. hondurensis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 338. 1938. TYPE: Honduras, Comayagua, near El Achote, above Siguatepeque. El. 1350 m. 15 JUL 1936. Yuncker, Dawson & Youse 5878 (holotype: ILL). -- [The specific epithet was published only in this varietal combination; = P. maculosa (fide Standley & Steyerm., 1952)]

subandina Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 98. 1936. TYPE: Peru, Junín, Pichis Trail. El. 400 m. JUN-JUL 1929. Killip & Smith 26218 (holotype: US; isotype: ILL).

subbasellaefolia Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 325, 332. 1927. TYPE: Jamaica, John Crow Peak. Nicholls 50 (holotype: US 429006; paratypes at ILL: Haiti: Ekman 1889, 3216, 3469).

subcalvescens Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 98. 1936. TYPE: Peru, Junín, Huacapistana. 6 DEC 1924. Stevens 84 (holotype: ILL; paratype at ILL: Killip & Smith 24248).

subdichotoma Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 98. 1936. TYPE: Peru, Huánuco, Muña. El. 2100 m. MAY-JUN 1923. Macbride 4008 (holotype: F 535072; isotype: ILL).

subdita Trel., Contr. U.S. Nat. Herb. 26(4): 194. 1929. TYPE: Costa Rica, Cartago, La Estrella. Cooper 192 [= Donnell Smith 5927] (holotype: US 796574; paratype at ILL: Standley 41516).-- [= P. montecristana Trel. (fide Burger, 1971)]

subgeminispica Trel. in Yuncker, Field Mus. Publ. Bot. 17: 338. 1938. TYPE: Honduras, hills above Lancetilla. El. 90 m. 11 AUG 1934. Yuncker 4987 (holotype: ILL).

subretusa Yuncker, Bol. Inst. Bot. (São Paulo) 3: 174, fig. 155. 1966. TYPE: Brazil, Rio de Janeiro. Glaziou 7836 (holotype: B; paratype at ILL: Mexia 4073).-- [This species upheld by Yuncker, 1974]

subrubescens Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 483, fig. 425. 1950. TYPE: Colombia, Antioquia, near Guapá, etc. El. 50 m. 3 MAY 1945. Haught 4623 (holotype: US 1709179; isotype: ILL; paratypes at ILL: Haught 4783, 5508).

subsericata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 98. 1936. TYPE: Peru, Junín, Chanchamayo Valley. El. 1500-1800 m. Schunke 479 [holotype: F 571537; fragments of the type at ILL; paratypes at ILL: Killip & Smith 24815, 25513, 25547; Schunke 545 and 549 (fragments)].

subternifolia Yuncker, Bol. Inst. Bot. (São Paulo) 3: 176, fig. 156. 1966. TYPE: Brazil, Rio de Janeiro, Itatiaia. 13 JUN 1902. Dusén 586 (holotype: S; isotype: ILL; paratypes at ILL: Loefgren 3522; Mexia 4270a).-- [This species upheld by Yuncker, 1974]

subvillosa Heurck & Müll. Arg. in Heurck forma dumauseana Trel. & Stehlé in Stehlé & Quentin, Fl. Guadel. Depend. & Martinique 2(2): 61. 1948. TYPE: Martinique, Forêt de Dumausé. El. 950 m. 14 JUL 1939. Stehlé & Stehlé 3369 (holotype: ILL).-- [= P. hirtella (fide Howard, 1973)]

suizana Trel., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 33: 47. 1936 (without a Latin diagnosis). TYPE: Colombia, Tolima, La Suiza. El. 2600 m. 11 MAY 1932. Cuatrecasas 2407 (holotype: MA; isotype: ILL).-- [= P. crispa Sodiro (fide Trel. & Yuncker, 1950)]

suratana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 615, fig. 539. 1950. TYPE: Colombia, Santander, Río Suratá Valley, above Suratá. El. 2000-2300 m. 5-6 JAN 1927. Killip & Smith 16615 (holotype: GH; isotype: ILL; paratypes at ILL: Fassett 25040; Killip & Smith 16564).-- [This species recognized by Yuncker, 1955a]

sympodialis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 687, fig. 602. 1950. TYPE: Colombia, Caldas, Río Santa Rita, Salento. El. 1600-1800 m. 29 JUL 1922. Killip & Hazen 8980 (holotype: US 1142745; isotype: ILL).

* taco-tacoi Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 16, 23. 1926. TYPE: Cuba, Pinar del Río, Río Taco Taco, Sierra de los Órganos. 12 OCT 1923. Ekman 17620 (holotype, or LECTOTYPE designated herein: ILL; isotype or isolectotype: ILL).-- [= P. petiolaris C.DC. (fide Yuncker, 1950-51)]

tafelbergensis Yuncker in Maguire and Collaborators, Bull. Torrey Bot. Club 75: 292. 1948. TYPE: Suriname, Arrowhead Basin, Tafelberg. El. 625 m. 24 AUG 1944. Maguire 27170 (holotype: NY; isotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950 and Yuncker, 1957]

tamboana Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 498, fig. 444. 1950. TYPE: Colombia, Cauca, Río Sucio, SW of Tambo. El. 1100 m. 20 NOV 1946. Haught 5263 (holotype: ILL).

tejana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 611, fig. 535. 1950. TYPE: Colombia, Norte de Santander, along road from Pamplona to Toledo, etc. El. 2500-2800 m. 28 FEB 1927. Killip & Smith 19910 (holotype: US 1355080; isotype: ILL; paratype at ILL: Jiminez 83).

tenae Trel. & Yuncker, Piperaceae no. S. Amer. 2: 482, fig. 424. 1950. TYPE: Ecuador, Napo-Pastaza, near Tena. El. 400 m. 2-11 APR 1935. Mexia 7162 (holotype: US 1619108; isotype: ILL).

tenebraegaudens Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 305. 1940. TYPE: Panama, Chiriquí, Bajo Mona, mouth of Quebrada Chiquero, along Río Caldera. El. 1500-2000 m. 3 JUL 1938. Woodson, Allen & Seibert 993 (holotype: ILL).-- [= P. maculosa (fide Burger, 1971; Trel. & Yuncker, 1950 and Yuncker, 1950)]

teresitensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 100. 1936. TYPE: Peru, Junín, Teresita. 29 OCT 1924. Stevens 88 (holotype: ILL).

terraegaudens Trel. & Yuncker, Piperaceae no. S. Amer. 2: 657, fig. 575. 1950. TYPE: Colombia, Santander, vicinity of El Roble. El. ca 1500 m. 16 FEB 1927. Killip & Smith 19383 (holotype: US 1354639; isotype: ILL).

tetraphylla (G. Forster) Hooker & Arnott var. tetraphylla forma protractifolia Yuncker, Bol. Inst. Bot. (São Paulo) 3: 177. 1966. TYPE: Brazil, Paraná, Campina Grande do Sul. 22 JAN 1960. Hatschbach 6671 [holotype: IPB?; paratypes at ILL: Duarte s.n. (= SP 12582); Gehrt 813].-- [This taxon recognized by Yuncker, 1974]

theodori Trel. var. glabricaulis Yuncker, Lilloa 27: 189. [1953] 1955. TYPE: Bolivia, La Paz, N. Yungas, Polo-Polo, near Coroico. El. 1100 m. OCT-NOV 1912. Buchtien 4560 (holotype: US 1176997; fragments of the type at ILL; paratype at ILL: Buchtien 7244).

ticunhuayana Trel., Bull. Torrey Bot. Club 55: 170. 1928. TYPE: Bolivia, Cordillera Real, Ticunhuaya. El. 5000 ft. 1926. Tate 1082 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Yuncker, 1955]

timbuchiana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 100. 1936. TYPE: Peru, Loreto, Timbuchi on the Río Nanay. JUN-JUL 1929. Williams 1163 (holotype: F 608106; isotype: ILL).

toroi Trel. & Yuncker, Piperaceae no. S. Amer. 2: 640, fig. 563. 1950. TYPE: Colombia, Antioquia, vicinity of Medellín. 14 NOV 1927. Toro 794 (holotype: NY; fragments of the type at ILL).

tortugana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 319, 327. 1927. TYPE: Haiti, Morne Barranca, Ile la Tortue. El. 300 m. 24 MAY 1925. Ekman 4111 (holotype: ?; isotype: ILL).

tovariana C.DC. in DC. var. subcaespitosa Trel. & Yuncker, Piperaceae no. S. Amer. 2: 709, fig. 632. 1950. TYPE: Colombia, Santa Marta, Sierra del Líbano. El. 1800 m. H.H. Smith 1911 (holotype: NY; paratype at ILL: Archer 1274).

translucens Trel. in Standley, Field Mus. Publ. Bot. 18: 328. 1937. TYPE: Costa Rica, Limón, Finca Castilla. El. 30 m. Dodge & Goerger 9292 [holotype: MO; isotype (small piece): ILL].-- [= P. pellucida (fide Burger, 1971)]

trapezoidalis Yuncker, Lilloa 27: 202, tab. 80. [1953] 1955. TYPE: Argentina, San Javier, Acaragua. El. 200 m. 30 JAN 1947. Berboin 2339 (holotype: LIL 179605; paratypes at ILL: Claren 11778; Ekman 1237).

treleasei Yuncker, Bernice P. Bishop Mus. Bull. 112: 46. 1933. TYPE: Hawaii, Molokai, Pukoo. Forbes 274-MO [holotype: BISH; paratypes at ILL: Degener & Wiebke 2843 (2 sheets), 2873].-- [This species recognized by Kartesz & Kartesz, 1980]

tremulaeformis Trel. in Yuncker, Field Mus. Publ. Bot. 9: 276. 1940. TYPE: Honduras, Atlántida, Río Danto, slopes of Mt. Cangrejal. 30 JUL 1938. Yuncker, Koepper & Wagner 8722 (holotype: ILL).-- [= P. major (Miq.) C.DC. (fide Standley & Steyerm., 1952); = P. urocarpa (cf. Yuncker, 1950-51 and 1974)]

tressis Trel. in Yuncker, Field Mus. Publ. Bot. 17: 339. 1938. TYPE: Honduras, Comayagua, near El Achote, above Siguatepeque. El. 1350 m. 21 JUL 1936. Yuncker, Dawson & Youse 6001 (holotype: ILL).-- [= P. collocata (fide Standley & Steyerm., 1952)]

trichopus Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 101. 1936. TYPE: Peru, Huánuco, Piedra Grande near Río Santo Domingo. El. 1500 m. 14-19 MAY 1923. Macbride 3855 (holotype: F 534918; isotype: ILL).-- [This species recognized by Trel. & Yuncker, 1950]

tricolor Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 101. 1936. TYPE: Peru, Junín, Pichis Trail, San Nicholás. El. 1100 m. 4-5 JUL 1929. Killip & Smith 25973 (holotype: US; isotype: ILL).

trinervula C.DC. in DC. var. suboppositifolia Trel. & Yuncker, Piperaceae no. S. Amer. 2: 648. 1950. TYPE: Colombia, Cauca, Cordillera Central, headwaters of the Río Palo, Quebrada de Santo Domingo. El. 2700-2800 m. 13 DEC 1944. Cuatrecasas 19197 (holotype: US 1854385; isotype: ILL).-- [This variety recognized by Yuncker, 1955a]

trineuroides Dahlst., Kongl. Svenska Vetenskapsakad. Handl. 33(2): 198, tab. 8, fig. 2. 1900. TYPE: Brazil, Rio Grande do Sul, São Angelo prope Cachoeira. 4 FEB 1893. Malme 538 (holotype: S; isotype: ILL).-- [This species recognized by Yuncker, 1974]

trullaefolia Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 102. 1936. TYPE: Peru, Cuzco, Ollantaitambo. El. 3000 m. 27 APR 1915. Cook & Gilbert 401 (holotype: US; fragments of the type at ILL).

trumani Trel. in Yuncker, Field Mus. Publ. Bot. 17: 339. 1938. TYPE: Honduras, Cortés, Lake Yojoa. El. 630 m. 30 JUL 1934. Yuncker 4847 (holotype: ILL).

truncata Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 322, 330. 1927. TYPE: Haiti, Mission Fonds Verettes. Leonard 3831 (holotype: US 1076201; paratypes at ILL: Ekman 2509, 3005; Leonard 8307).

turboensis Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 463, fig. 405. 1950. TYPE: Colombia, Antioquia, Guapá, 53 km S of Turbo. El. ca 40 m. 23 APR 1945. Haught 4595 (holotype: US 1709164; isotype: ILL).

turquinana Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 20, 28. 1926. TYPE: Cuba, Oriente, Sierra Maestra, top of Pico Turquino. El. 2040 m. 22-24 JUL 1922. Ekman 14530 (holotype: ?; isotype: ILL).-- [= P. maxonii C.DC. in Urban (fide Yuncker, 1950-51)]

tutunendoana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 660, fig. 577. 1950. TYPE: Colombia, Chocó, Tutunendo, 20 km N of Quibdó. El. ca 80 m. 19, 20 MAY 1931. Archer 2157 (holotype: US 1519171; isotype: ILL; paratype at ILL: Antonio Camilo 74).

tyleri Trel. in Gleason, Bull. Torrey Bot. Club 58: 355. 1931. TYPE: Venezuela, summit of Mt. Duida, valley beyond Ridge 23B. El. 5950 ft. Tate 476 (holotype: NY; fragments of the type at ILL).-- [This species recognized by Trel. & Yuncker, 1950 and Yuncker, 1974]

udimontana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 747, fig. 671. 1950. TYPE: Ecuador, Napo-Pastaza, between Puyo and Canelos. El. 325-375 m. 1-3 FEB 1935. Mexia 6830 (holotype: US 1619084; isotype: ILL).

umbellifera Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 586, fig. 509. 1950. TYPE: Colombia, Cauca, Quebrada Manchai, NE of Silvia. El. 3100 m. 22 OCT 1946. Haught 5125 (holotype: US 1709492; paratype at ILL: Cuatrecasas 19244).

unguiculata Trel. in Feddes Repert. Spec. Nov. Regni. Veg. 23: 325, 332. 1927. TYPE: Haiti, Mission Fonds Verettes. Leonard 3800 (holotype: US 1076231; paratype at ILL: Ekman 3145).

urbani Trel. in Feddes Repert. Spec. Nov. Regni Veg. 23: 18, 27. 1926. TYPE: Cuba, Oriente, Guantánamo, Monte Libanon. El. 700-800 m. 28 NOV 1922. Ekman 15826 (holotype: ?; isotype: ILL).-- [This species recognized by Yuncker, 1950-51]

vallensis Trel. & Yuncker, Piperaceae no. S. Amer. 2: 615, fig. 538. 1950. TYPE: Colombia, El Valle, Río Digua Valley, between La Elsa and Río Blanco. El. 640 m. 2-5 APR 1939. Killip 34786 (holotype: US 1771578; isotype: ILL).

vallículae Trel. in Woodson & Seibert, Ann. Missouri Bot. Gard. 24: 186. 1937. TYPE: Panama, Coclé, w. slope and summit of Cerro Valle Chiquito. El. 700-800 m. 25 JUL 1935. Seibert 503 (holotype: MO; isotype: ILL).-- [This species recognized by Yuncker, 1950]

variculata Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 103. 1936. TYPE: Peru, Junín, Chahuapanas. El. 340 m. 20, 21 JUL 1929. Killip & Smith 26792 (holotype: US; isotype: ILL).

veneciana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 545, fig. 475. 1950. TYPE: Colombia, Cundinamarca, Venecia-Pandi. JUL 1930. Herb. Nac. Colombiano 601 (holotype: US 1471102; paratype at ILL: Laureano Javier 4).

venezueliana C.DC. var. aterrima Trel. & Yuncker, Piperaceae no. S. Amer. 2: 598. 1950. TYPE: Colombia, Santander, Río Suratá Valley, near Suratá. El. 2000-2300 m. 5-6 JAN 1927. Killip & Smith 16655 (holotype: GH; isotype: ILL).

venosa Yuncker in Trel. & Yuncker, Piperaceae no. S. Amer. 2: 463, fig. 406. 1950. TYPE: Colombia, El Valle, Los Farallones, etc. El. 2600-2870 m. 13 OCT 1944. Cuatrecasas 18123 [holotype: US 1854251; probable isotype: ILL (as No. 18125)].

ventricosicarpa Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 104. 1936. TYPE: Peru, Loreto, Soledad on Río Itaya. El. 110 m. 20-22 SEP 1929. Killip & Smith 29800 (holotype: US; isotype: ILL).

versicolor Trel., Contr. U.S. Nat. Herb. 26(4): 200. 1929. TYPE: Costa Rica, Cartago, vicinity of Pejivalle. El. 900 m. 7-8 FEB 1926. Standley & Valerio 47270 (holotype: US 1251235; isotype: ILL).-- [= P. alata (fide Burger, 1971)]

verticillatispica Trel. & Yuncker, Piperaceae no. S. Amer. 2: 745, fig. 669. 1950. TYPE: Ecuador, Pichincha, between Quito and Santo Domingo. El. 1200 m. 4 APR 1942. Haught 3217 (holotype: US 1707985; isotype: ILL).-- [This species recognized by Yuncker, 1955a]

wagneri Trel. in Yuncker, Field Mus. Publ. Bot. 9: 276. 1940. TYPE: Honduras, Yoro, Coyoles. 29 JUN 1938. Yuncker, Koepper & Wagner 8127 (holotype: ILL; paratype at ILL: Yuncker, Koepper & Wagner 8055).-- [= P. crassiuscula (fide Standley & Steyerm., 1952); = P. pereskiaefolia (fide Burger, 1971)]

* wilsonii Stehlé, Candollea 8: 78. 1940. TYPE: Guadeloupe, mangrove de Pointe-à-Pitre au Gosier. El. 5 m. Stehlé & Stehlé 2545 (LECTOTYPE, designated herein: NY; isolectotype: ILL).-- [= P. nigropunctata (fide Howard, 1973)]

woodsonii Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 305. 1940. TYPE: Panama, Chiriquí, vicinity of Casita Alta, Volcán de Chiriquí. El. 1500-2000 m. JUN-JUL 1938. Woodson, Allen & Seibert 933 (holotype: ILL).-- [= P. hispidula (fide Burger, 1971; Trel. & Yuncker, 1950; Yuncker, 1950 and 1955)]

yananoensis Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 106. 1936. TYPE: Peru, Huánuco, Yanano. El. 1800 m. 13-16 MAY 1923. Macbride 3741 (holotype: F 534803; isotype: ILL).

yananoensis var. caniana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 106. 1936. TYPE: Peru, Huánuco, Cani near Mito. El. 2550 m. 16-26 APR 1923. Macbride 3460 (holotype: F; isotype: ILL).

* yaquena Trel. in Feddes Repert. Spec. Nov. Regni Veg. 29: 28. 1931. TYPE: Santo Domingo [Dominican Republ.], Azua, Valle del Yaque. El. 1500 m. 6 OCT 1929. Ekman 13689 (holotype, or LECTOTYPE designated herein: ILL).

yapasana Trel. in J.F. Macbr., Field Mus. Publ. Bot. 13(No. 357): 106. 1936. TYPE: Peru, Junín, Pichis Trail. El. 1350-1600 m. 28-29 JUN 1929. Killip & Smith 25478 (holotype: US; isotype: ILL).

yeracuiana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 722, fig. 645. 1950. TYPE: Colombia, Chocó, Corcovada Region, upper Río San Juán, ridge along Yeracuí Valley. El. 200-275 m. 24, 25 APR 1939. Killip 35301 (holotype: US 1772036; isotype: ILL).

yojoana Trel. in Yuncker, Field Mus. Publ. Bot. 17: 339. 1938. TYPE: Honduras, Cortés, Lake Yojoa. El. 630 m. 31 JUL 1934. Yuncker 4913 (holotype: ILL; paratypes at ILL: Yuncker 4823, 4902).

yousei Trel. in Yuncker, Field Mus. Publ. Bot. 17: 339. 1938. TYPE: Honduras, Comayagua, near El Achote, above Siguatepeque. El. 1350 m. 21 JUL 1936. Yuncker, Dawson & Youse 5995 (holotype: ILL; paratype at ILL: Yuncker, Dawson & Youse 6134).-- [= P. obtusifolia (fide Standley & Steyerm., 1952)]

yunckeri Trel. in Yuncker, Field Mus. Publ. Bot. 17: 340. 1938. TYPE: Honduras, Comayagua, in wet soil along bank of a stream, 5 km NW of Siguatepeque. El. 1100 m. 9 AUG 1936. Yuncker, Dawson & Youse 6392 (holotype: ILL).-- [Standley & Steyerm., 1952, placed the name in synonymy under P. obtusifolia, a disposition not supported by the specimen at hand]

zarzalana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 642, fig. 565. 1950. TYPE: Colombia, El Valle, Cauca Valley, 2-3 km E of Zarzal. El. 970-1050 m. 21 JUL 1922. Pennell, Killip & Hazen 8440 [holotype: US 1142584; isotype: ILL; paratypes at ILL: Arbeláez & Cuatrecasas 5648; Killip 5392b; Killip & Cuatrecasas 38411; Killip & Smith 16259; Juzepczuk 5333 (fragments); Lehmann 8482 (fragments); Silvano Jorge & Carlos 155, 164, 165, 166, 167 and 234].

zipaquirana Trel. & Yuncker, Piperaceae no. S. Amer. 2: 561, fig. 489. 1950. TYPE: Colombia, Cundinamarca, S of Zipaquira. El. 2700-2900 m. 20-24 OCT 1917. Pennell 2625 (holotype: US 1042373; paratype at ILL: Jiminez 43).

Piper

albopunctulatissimum Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 287. 1940. TYPE: Panama, Coclé, north rim of El Valle de Antón. El. 600-1000 m. 12 FEB 1939. Allen 1652 (holotype: ILL).-- [This species recognized by Yuncker, 1950]

frostii Trel. ex Standley, Contr. Arnold Arbor. 5: 54. 1933 (nomen subnudum). TYPE: Panama, Canal Zone, Barro Colorado Island. Syntypes (perhaps lectotypification needed): Bailey 495; Frost 42, 165 (Bailey 495 at ILL).-- [= P. aequale Vahl (fide Yuncker, 1950)]

gatunense Trel. var. cocleanum Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 292. 1940. TYPE: Panama, Coclé, north rim of El Valle de Antón. El. 600-1000 m. 14 MAY 1939. Allen 1784 (holotype: ILL).-- [= P. augustum Rudge var. cocleanum (Trel.) Yuncker (1950)]

gatunense var. latum Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 292. 1940. TYPE: Panama, Coclé, north rim of El Valle de Antón. El. 600-1000 m. 21 MAY 1939. Allen 1808 (holotype: ILL).-- [= P. augustum var. cocleanum (fide Yuncker, 1950)]

muelleri C.DC. in DC., Prodromus 16(1): 243. 1869. TYPE: Mexico, Orizaba. F. Mueller 180 [holotype: BR; fragment of the type (one leaf) at ILL].-- [This is the TYPE SPECIES of Arctottonia Trel., Proc. Amer. Philos. Soc. 69: 315. 1930, but the combination of A. muelleri (C.DC.) Trel. was not explicitly published; the species was retained under Piper (as above) by Bornstein, 1985 annotation]

seducentifolium Trel. in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 297. 1940. TYPE: Panama, Prov. Panamá, near Arraiján. El. 15 m. 22 JUN 1938. Woodson, Allen & Seibert 781 (holotype: ILL).-- [= P. acutissimum Trel. (fide Yuncker, 1950); = P. arieianum C.DC. (cf. Burger, 1971 and Croat, 1978)]

* sinuatispicum Trel. in Feddes Repert. Spec. Nov. Regni Veg. 26: 342. 1929. TYPE: Haiti, La Hotte, Les Roseaux. El. 1300 m. 28 JUN 1928. Ekman 10166 (holotype, or LECTOTYPE designated herein: ILL).

tatei Trel., Amer. J. Bot. 8: 215. 1921. TYPE: Nicaragua, "presumably from Chontales." 1867-68. Tate 367 [holotype: K; fragment (flowers) and an excellent tracing of the type at ILL].-- [= P. yucatanense C.DC. (fide Bornstein, 1985 annotation)]

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I have received help, via correspondence, from A. R. Bornstein (GH), Wm. Burger (F), A. F. Cholewa (NY), and C. Tuccinardi (US). Special thanks and appreciation for assistance in the preparation of this catalogue goes to the typist, Joyce Roberts, and to Laurel McKee for double-checking the references and proofing the manuscript.

REFERENCES

Adams, C. D. and Collaborators. 1972. Flowering plants of Jamaica. University of the West Indies. Mona, Jamaica.

Boufford, D. E. 1982. Notes on Peperomia (Piperaceae) in the southeastern United States. J. Arnold Arb. 63: 317-325.

Burger, Wm. 1971. Family No. 41, Piperaceae. In: Flora Costaricensis. Wm. Burger, Editor. Fieldiana Bot. 35: 5-227.

Croat, T. B. 1978. Flora of Barro Colorado Island. Stanford Univ. Press, Stanford, CA.

Howard, R. A. 1973. Notes on the Piperaceae of the Lesser Antilles. J. Arnold Arb. 54: 377-411.

Jones, A. G. 1985. An annotated catalogue of type specimens in the University of Illinois Herbarium (ILL)— 1. Piperaceae, except Peperomia. Phytologia 58: 1-102.

Kartesz, J. T. and R. Kartesz. 1980. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. The University of North Carolina Press, Chapel Hill.

Standley, P. C. and J. A. Steyermark. 1952. Piperaceae. In: Flora of Guatemala. Fieldiana Bot. 24(3): 228-337.

Trelease Wm. and T. G. Yuncker. 1950. The Piperaceae of northern South America. 2 vols. The University of Illinois Press. Urbana.

Yuncker, T. G. [1949] 1950-1951. The Cuban species of Peperomia [in 3 parts]. Revista Soc. Cub. Bot. 6(1): 5-33 [part 1, issued 1950]; 6(2-3): 20-54 [part 2, issued 1951]; 6(4): 9-34 [part 3, issued 1951].

_____. 1950. Piperaceae. In: Woodson, R. E. and R. W. Schery. Flora of Panama. Part IV, fasc. 1. Ann. Missouri Bot. Gard. 37(1): 1-120.

_____. 1953. The Piperaceae of Trinidad and Tobago. Lilloa 26: 239-278.

_____. [1953] 1955. The Piperaceae of Argentina, Bolivia and Chile. Lilloa 27: 97-303.

_____. 1955a. Plants collected in Ecuador by W. H. Camp. Piperaceae. Mem. N. Y. Bot. Gard. 9(2): 147-169.

_____. 1957. Piperaceae. Pp. 218-290. In: Lanjouw, J., Editor. Flora of Suriname. Vol. 1, part 2. Royal Tropical Institute, Amsterdam. Mededeling No. 30.

_____. 1962. Nomenclatural notes on Piperaceae. Brittonia 14: 188-190.

_____. 1966. Piperaceae. pp. 71-87. In: Stoffers, A. L., Editor. Flora of the Netherlands Antilles. Vol. 2. Naturwetensch. Stud. Suriname & Nederlandse Antillen No. 42. Utrecht.

_____. 1974. The Piperaceae of Brazil— III: Peperomia; taxa of uncertain status. Hoehnea 4: 71-413, figs. 293-459.

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AECHMEA TUITENSIS (BROMELIACEAE: BROMELIOIDEAE, PODAECHMEA), A NEW SPECIES FROM WESTERN MEXICO

Patricia Magaña and Emily J. Lott
Herbario Nacional, Instituto de Biología, UNAM
Apdo. Postal 70-367, Deleg. Coyoacán,
04510 México, D.F., México

Recent field work for a bachelor's thesis on the Bromeliaceae of the coast of Jalisco, Mexico (Magaña unpubl.) has resulted in several interesting collections, among them a small lithophilic Aechmea which apparently has been in cultivation under the name A. macvaughii (Gardner, 1984). Comparison of our plant and another collection of A. macvaughii (Lott 1925, MEXU), from Colima, Mexico confirmed that two different species are involved.

AECHMEA TUITENSIS P. Magaña & E.J. Lott, sp. nov.

A. macvaughii L.B. Smith statura minore, foliis ad 56 cm longis, 2-4.5 cm latis, scapo erecto, inflorescentia erecta simplici, 11-18 cm longa, bracteis floralibus 4.5 cm longis, petalis oblongis, obtusis et lobis stigmatis torsivis differt.

Plants small semicaulescent rosettes 30-60 cm tall at anthesis; propagating freely by basal rhizomes. Leaves 15-20, the sheaths ovate, 8-11 cm long, 4-7 cm wide, green to red, densely white-lepidote, fleshy, the venation conspicuous, the margin entire; leaf blades triangular, 20-45 cm long, 2-4 cm wide, the apex attenuate, terminating in a spine 5-7 mm long, densely lepidote, green to red, fleshy, serrate, with yelow spines 3-4 mm long. Scape erect, 20-37 cm long, 4-7 mm wide, densely lepidote, green; bracts of the scape erect, the lower ones foliaceous, 15-17 cm long, 1-3 cm wide, the upper ones elliptic, acuminate, 7-15 cm long, 1-2 cm wide, chartaceous, margin serrate, the apex terminating in a spine 2-4 cm long, densely lepidote, pink. Inflorescence racemose, densely white lepidote-lanate throughout the trichomes branched, erect, 11-18 cm long, 5-12 cm wide, the rachis terminating in a coma of linear bracts. Floral bracts linear, 2.5-4 cm long, 2-3 cm wide, the mucro 2-4 mm long; reflexed, the venation conspicuous, pink. Flowers patent, the pedicels 2-5 mm long, 2 mm wide. Sepals free, lanceolate, more or less symmetrical, 1.5-2.7 cm long, 4-8 mm wide, mucronate, coriaceous, with conspicuous venation, densely lepidote, dark green, the apex purple. Petals oblong-spatulate, apex recurved, obtuse, 4-4.5 cm long, 3-6 cm wide, with a fimbriate scale 4 mm long at the base, blackish-purple. Stamens and pistil exserted; filaments white, 3 cm long, the second series adnate to the base of the petals; anthers yellow, 4-8 mm long; ovary globose, 1 cm diam, densely lepidote, the style 4.5 cm long, the stigma spiral (Type II of Brown & Gilmartin 1984). Fruits globose berries 1 cm

diam (immature), densely lepidote, green to purple.

Etymology: The specific epithet refers to the town of El Tuito, Jalisco, which gives its name to the area where the new species was collected.

TYPE: MEXICO. JALISCO. Mpio. Talpa de Allende, a 20 km al E de El Tuito, sobre la terracería a la Mina del Cuale-San Sebastian, alt. ca. 1050 m., 10 Mar 1985 (fl), P. Magaña et al. 192 (Holotype: MEXU; Isotypes: MO, US).
Additional collections: MEXICO. JALISCO. Mpio. Talpa de Allende, same locality, 30 May 1985 (fl & fr), P. Magaña et al. 242 ENCB, F, MEXU, NY, SEL).

A. tuitensis was collected in oak-pine woodland at ca alt. 1050 m. and flowers March-May. The local name for the plant is "piños".

Aechmea tuitensis differs from A. macvaughii in several important characters (Table 1), especially in its much smaller size, ovate triangular leaves, simple erect inflorescence, much larger floral bracts and entire sepals. In addition, the leaves of our plant lack the waxy glaucous covering beneath which Smith (1964) mentions in the type description of A. macvaughii.

The proposed new species clearly belongs to subgenus Podaechmea Mez because of its lepidote inflorescences, pedicellate polystichous flowers, mucronate sepals and well-developed petal-appendages (Smith & Downs 1979). Its simple erect inflorescence differs from the amply compound and lax inflorescence common to the other five species of the subgenus.

Apparently our new species is the plant of which seeds were offered for propagation by Gardner (1984). Gardner (1984) refers to A. macvaughii as a "large plant with the leaves up to one meter in length" as in the type description (Smith 1964). Gardner (1984) also describes A. macvaughii as having a simple spike, which is clearly shown in the accompanying photograph. However, according to the type description of A. macvaughii (Smith 1964), it has a pendulous, bipinnate inflorescence, as does our material collected in Colima (Lott et al. 1925) in similar habitat to that mentioned in the type description (Smith 1964). Therefore, it seems that there has been a confusion between the cultivated material made available to Gardner and the original description of A. macvaughii, which hitherto had been known only from the type locality. Additionally J. Utley (pers. comm.) has seen both our material of A. tuitensis and the material being distributed as A. macvaughii and concurs that they are the same.

Table 1

Characteristics distinguishing A. tuitensis and A. macvaughii

Characters	A. tuitensis	A. macvaughii
Leaf size	28-56 X 2-7 cm	to 120 X 16 cm
Leaf shape	ovate-triangular	ligulate
Inflorescence	erect, simple	pendulous, branched
Floral bracts	4.5 cm long	1 cm long
Petals	oblong-spatulate	lanceolate
Habitat	oak-pine woodland, alt. ca 1050 m	mixed tropical forest with Brosimum, alt 500-600 m

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We thank John Utley for discussion of the problem and review of the manuscript, J.L. Villaseñor for help with the Latin diagnosis, and O. Téllez for photographs.

LITERATURE CITED

Brown, G.K. & A.J. Gilmartin. 1984. Stigma structure and variation in Bromeliaceae, neglected taxonomic characters. Brittonia 36(4):364-374.

Gardner, S. 1984. Aechmea macvaughii seeds available. Jour. Bromeliad Soc. 34(3):104.

Smith, L.B. 1964. Notes on Bromeliaceae XXII. Mexico. Phytologia 10(6):454-458.

Smith, L.B. & R.J. Downs. 1979. Bromelioideae (Bromeliaceae). New York: The New York Botanical Garden (Flora Neotropica Monograph No. 14, pt. 3).

ASCLEPIADACEAE BRASILIENSES, III. TWO NEW SPECIES OF METASTELMA (ASCLEPIADACEAE) FROM BRAZIL.

Jorge Fontella Pereira *

Jardim Botânico do Rio de Janeiro

Rua Pacheco Leão, 915

22460 - Rio de Janeiro-Brasil

Recente examination of plant collections from the State of Bahia (Brazil) has revealed the presence of two species of Metastelma new to science.

Metastelma Giuliettianum Fontella, sp.nov. Metastelma myrtifolium affinis sed habitu volubili, foliis tomentosis et mucronatis, corollae lobis extus pubescentibus, coronae lobis gynostegio 2-plo longioribus, polliniis minoribus, differt.

Slender vines. Stems terete, tomentose. Leaves opposite and decussate; lamina ovate or elliptic, tomentose, basally obtuse or truncate, mucronate at the apex, the margins revolute at least when dry, bullate above, 18-25 mm long, 12-18 mm wide, with up to 4 conical glands at juncture of petiole; petioles tomentose, 3-4 mm long. Inflorescence an extra-axillary umbelliform cyme, sessile or subsessile, ca. 9-flowered; pedicels pubescent up to 3 mm long. Calyx deeply lobed, lobes ovate, apex acute, pubescent outside, glabrous insi-

* Bolsista do CNPq

de, 1.3-1.5 mm long, ca. 1 mm wide, with one or two minute glands at inside base of each sinus. Corolla subcampanulate, cream colored; tube 1.8-2 mm long, pubescent outside, glabrous inside; lobes oblong, apex obtuse and incurved, pubescent on outer surface, barbellate within (trichomes retrorse), 4-4.5 mm long, 1.3-1.5 mm wide. Corona 5-lobed, lobes linear or lanceolate, erect, apex acute or acuminate, surpassing the gynostegium, 2-2.2 mm high, 0.4-0.6 mm wide. Anthers scutate, 0.45-0.54 mm long, 0.66-0.72 wide at base, appendages ovate, 0.27-0.33 mm long. Corpusculum linear or oblong, up to 0.20 mm long and ca. 0.07 mm wide; translador arms horizontal, 0.07-0.09 mm long; pollinia elliptical or subeliptical, with the edges obtuse or rounded, 0.22-0.24 mm long, 0.08-0.10 mm wide. Stigmatic appendix apiculate, covered by anther appendages.

Brasil: Estado da Bahia-Mucugê, margem da Estrada Andaraí-Mucugê, Estrada Nova à 4 Km de Mucugê, 21 VII 1981, leg. J.R.Pirani, I.Cordeiro, A.Furlan, J. Semir, N.L.de Menezes, A.M.Giulietti et L.Rossi- CFCR-1669 (SPF-holotype).

Metastelma Harleyi Fontella, sp.nov.
Metastelma ditassoides affinis sed foliis glabris, nervis obsoletis, coronae lobis gynostegium superantibus, polliniis clavatis, differt.

Slender vines. Stems terete, with two longitudinal lines of pubescence alternating with the leaf petioles. Leaves opposite and decussate; glabrous or with a few trichomes at juncture of blade and petiole; lamina oblong to elliptic, with nerves incospicuous, basally obtuse or subtruncate, mucronate at the apex, the margins revolute at least when dry, 10-20 mm long, 5-8

mm wide, 2-3 glands present at juncture with petiole; petiole up to 4 mm long. Inflorescence a extra-axillary umbelliform cyme, 12-15-flowered; peduncles glabrous, 1-2 mm long; pedicels glabrous, 4-6 mm long. Calyx deeply lobed, lobes ovate, glabrous, apex acute or obtuse, 1-1.2 mm long, 0.8-1.0 mm wide at the base, with one or two minute glands at inside base of each sinus. Corolla rotate, cream-colored; tube glabrous outside, inside pubescent, up to 1 mm long; lobes ovate or elliptic, erect, acute at apex, glabrous outside, puberulent inside at margins and apex, pubescent at middle and base, 2.2-2.5 mm long, 1.3-1.5 mm wide. Corona 5-lobed, lobes lanceolate to suboblong, apex acute or acuminate, sometimes bilobed, surpassing the gynostegium, 1.8-2.0 mm high, ca.0.5 mm wide. Anthers scutate, ca. 0.7 mm long, 0.7-0.8 mm wide at base, appendages ovate, ca. 0.6 mm long. Corpusculum oblong or ovate, apex emarginate, ca. 0.17 mm long, 0.08-0.09 mm wide; translator arms horizontal-descending, 0.13-0.15 mm long; pollinia clavate, 0.28-0.31 mm long, 0.18-0.20 mm wide. Stigmatic appendix apiculate, covered by anther appendages.

Brasil: Estado da Bahia-Middle and upper N.E. slopes of the Pico das Almas ca. 25 Km W.N.W. of the Vila do Rio de Contas, ca. 41º57'W, 13º33'S. Alt. 1600-1850 m. Sandstone conglomerate metamorphic and quartzite rock outcrop with associated scrubby vegetation with damp flushes and grassland and marsh in some areas. Plant growing on summit ridge. Bushy climber with woody stems and white-latex. Leaves coriaceous, very dark glossy green above, pale beneath. Calyx pale green. Corolla cream, 19 III 1977, leg. R.M.Harley 19685 et al. (CEPEC - holotype).

Acknowledgements

The author wishes to thank Dorothy Araujo for revision of the English text.

NEW SPECIES AND STATUS CHANGES IN ANDEAN INULEAE (ASTERACEAE)

Michael O. Dillon
Department of Botany
Field Museum of Natural History, Chicago, IL 60605-2496

and

Abundio Sagástegui-Alva
Herbarium Truxillense (HUT)
Universidad Nacional de Trujillo, Trujillo, Peru

ABSTRACT - Two new species of Inuleae are described from the Andes of northern Peru and southern Ecuador: **Gamochaeta monticola** Dillon & Sagást. and **Loricaria ollgaardii** Dillon & Sagást., and **L. thyrsoidea** (Cuatr.) Dillon & Sagást. is elevated to species status.

Study of the flora of the Andes of northern Peru and southern Ecuador continues to yield many new species In preparation for an upcoming treatment of the Inuleae (Asteraceae) for the Flora of Peru, the following species descriptions and status change are made.

Gamochaeta monticola Dillon & Sagást., sp. nov. Fig. 1.

Herbae caespitosae perennes; caules erecti simplices vel ramosi, usque ad 6 cm alti. Folia basalia sessilia, rosulata, oblanceolata, 1-4 cm longa, 4-7 mm lata, bicoloria, basi attenuata, apice acuta vel rotundata, inferne incano-tomentosa, superne lanuginosa, margine integrae, marcescentia; folia caulina alterna, sessilia, gradatim minoria. Capitulescentiae spiciformes. Capitula disciformia, 3.5-4 mm alta, 2-2.5 mm lata; phyllaria ca. 22, 3-4-seriata, externa ovata, ca. 2.2 mm longa, ca. 1.2 mm lata, intima oblongo-linearia, 2.9-3.2 mm longa, 0.4-0.7 mm lata. Flores marginales feminei, 42-45; corollae filiformae, ca. 2 mm longae. Disci flores hermaphroditi 2-3; corollae anguste tubulosae, ca. 2 mm longae. Achaenia oblonga, 0.5-0.7 mm longa, glabra; pappi setae ca. 2.5 mm longae, basi connatae, albae.

TYPE: PERU. Dept. La Libertad. Prov. Santiago de Chuco: entre Chota y Shorey, ladera, 3250 m, 15 Nov 1983, A. Sagástegui A. et al. 11100 (HUT, holotype; F, MO, isotypes).

Cespitose, perennial herbs; stems simple or branched, 1-6 cm tall. Basal leaves densely rosulate, oblanceolate, 1-4 cm long, 4-7 mm wide, sessile, basally attenuate to a pseudo-petiole, apically acute to rounded, mucronate, discolorous, lower surface incanose-tomentose, upper surface lanose, the margins entire, the cauline leaves alternate, gradually smaller. Capitulescences spiciform. Capitula disciform, 3.5-4 mm high, 2-2.5 mm wide; involucres campanulate; phyllaries ca. 22, 3-4-seriate, imbricate, scarious, stramineous, the outer ovate, ca. 2.2 mm long, ca. 1.2 mm wide, dorsally lanate, apically acuminate, the inner oblong-linear, 2.9-3.2 mm long, 0.4-0.7 mm wide, glabrous, apically acute; marginal florets pistillate, 42-45, the corollas filiform, ca. 2 mm long; disc florets hermaphroditic, 2-3, the corollas narowly tubular, ca. 2 mm long, the style branches truncate, penicillate. Achenes oblong, 0.5-0.7 mm long, brown, glabrous; pappus bristles ca. 2.5 mm long, fused basally, white.

DISTRIBUTION: Infrequent in open areas within "jalca" formations of northern Peru (Departments of Ancash, Cajamarca and La Libertad, 3100-4870 m).

Gamochaeta monticola is a distinctive member of the genus, possessing rosulate basal leaves and erect, spicate capitulescences. It most closely resembles G. humilis Wedd. of southern Peru and northern Bolivia; however, the latter species normally has a more branched, decumbent habit, smaller, spatulate leaves, and a laxly spiciform or terminally glomerulate capitulescence.

Additional material examined: PERU. Dept. Ancash. Prov. Carhuaz: Huascarán National Park, Quebrada Ishinca, 4380-4500 m, Smith et al. 9486 (F, MO, USM). Prov. Huaylas: Huascarán National Park, Quebrada Alpamayo, 4350-4500 m, Smith et al. 9801 (USM). Prov. Yungay: Huascarán National Park, Quebrada Ancosh, Smith & Goodwin 8886 (MO, USM). Dept. Cajamarca. Prov. Celendín: ca. 57 km NE of Cajamarca along road to Celendín, ca. 3650 m, 4 Jan 1979, Dillon & Turner 1614 (F); Sendamal, 3100 m, 19 Aug 1984, Sagástegui, Mostacero, & Leiva 12228 (F, HUT, MO). Prov. San Miguel: Taulis Alto, jalca, ladera, 3100 m, 20 Jun 1980, Sagástegui et al. 9548 (F, HUT, MO). Dept. La Libertad. Prov. Otuzco: Motil-Shorey, 3500 m, 23 Nov 1964, Sagástegui & Fernández 4914 (HUT, US); Cerro Ragache, Salpo, 3500 m, 23 May 1984, Sagástegui, Diestra, & Leiva 11627 (HUT, MO) .

Loricaria ollgaardii Dillon & Sagást., sp. nov. Fig. 2.

Frutices dioicii ramosi ca. 50 cm usque alti; caules foliacei, complanati, 1.5-2 mm alti. Folia disticha, linearia, 3-4 mm longa, 0.5-0.8 lata, ecarinata, viridia vel brunneolo-viridia. Capitulescentiae solitares, terminales. Capitula

feminea 4-5 mm alta, ca. 2 mm lata; phyllaria 8-11, ca. 3-seriata, extima ovata, 2-3 mm longa, 1-1.5 mm lata; receptacula epaleacea. Flores pistillati, 5-8; corollae filiformae, ca. 3 mm longae. Achaenia ca. 1 mm longa, glabra; pappi setae ca. 3.5 mm longae. Specimina masculina: non visa.

TYPE: ECUADOR. Prov. Loja: Amaluza-Palanda, western slope, near the pass (at Laguna Areviatadas Pilares), 22 Sep 1976, 3350-3450 m, B. Øllgaard & H. Balslev 9687 (F, holotype; MO, NY, isotypes).

Dioecious shrubs to 50 cm tall, much-branched; stems folious, moderately compressed, 1.5-2 mm wide. Leaves distichous, imbricate, sessile, linear in lateral view, 3-4 mm long, 0.5-0.8 mm wide, dorsally ecarinate, the outer surface glabrous, green to brownish-green, the inner surface lanate. Capitulescences solitary, terminal on branchlets. Feminine capitula sessile, 4-5 mm high, ca. 2 mm wide; involucres cylindrical; phyllaries 8-11, ca. 3-seriate, imbricate, scarious, the outer ovate, 2-3 mm long, 1-1.5 mm wide, apically acute to obtuse, lacerate, the inner oblanceolate to oblong, 3-4 mm long, 0.5-1 mm wide, apically acute to obtuse, lacerate; receptacles epaleaceous; florets 5-8, the corollas filiform, ca. 3 mm long, the style branches exserted. Achenes ca. 1 mm long (immature), 4-angled, glabrous, brown; pappus bristles apically slender, acute, ca. 3.5 mm long. (Masculine specimens not seen).

DISTRIBUTION: Known only from the type locality. According to the label data, this species occurs in grass páramo and associated bogs.

Loricaria øllgaardii possesses epaleaceous receptacles and terminal capitula on lateral branchlets. These characters place it in section Thyopsis Cuatr. (Cuatrecasas, 1954). Its nearest relatives appear to be L. thuyoides var. microphylla (Wedd.) Cuatr. (Ecuador) and L. pauciflora Cuatr. (Colombia); however, L. øllgaardii can be separated from these species by the characters presented in Table 1.

It is a pleasure to name this species for Dr. Benjamin Øllgaard of the Botanical Institute, University of Aarhus, Denmark. Dr. Øllgaard is a long time worker in "Flora of Ecuador" project and researcher in the Lycopodiaceae, a plant group that Loricaria superfically resembles.

Table 1. Morphological comparison of Loricaria ollgaardii and its closest relatives.

	L. ollgaardii	L. thuyoides var. microphylla	L. pauciflora
Leaves	3-4 mm long 0.5-0.8 mm wide ecarinate	3-6 mm long 0.7-1 mm wide carinate	5-6 mm long ca. 1 mm wide carinate
Capitula	terminal	axillary	axillary
Phyllaries	8-11	14-16	4-8
Feminine florets	5-7	13-14	ca. 4

Loricaria thyrsoidea (Cuatr.) Dillon & Sagást., comb. nov.

Loricaria thuyoides (Lam.) Schultz-Bip. var. thyrsoidea Cuatr., Feddes Repert. Sp. Nov. Regni Veg. 56: 170. 1954. TYPE: Peru, Dept. Lima, Prov. Canta, near Antaicocha, Cerro Colorado, E of Canta, 4000-4100 m, 20 Jun 1925, F. W. Pennell 14685 (F, holotype; US, isotype).

This taxon's thyrsoid capitulescences are unique for Loricaria and quite unlike all other varieties of L. thuyoides. Given current speices boundries, we feel that this and other differences make this taxon worthy of specific status.

REFERENCE

Cuatrecasas, J. 1954. Synopsis der Gattung Loricaria Wedd. Feddes Repert. Sp. Nov. Regni Veg. 56: 149-172.

EXPLANATION OF FIGURES

Fig. 1. Gamochaeta monticola. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, style branches of hermaphroditic florets. (Drawn from Sagástegui et al. 11100, HUT).

Fig. 2. Loricaria ollgaardii. A, apical protion of a flowering branch; B, lateral view of leaf; C, feminine capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret. (Drawn from Øllgaard & Balskev 9687, F).

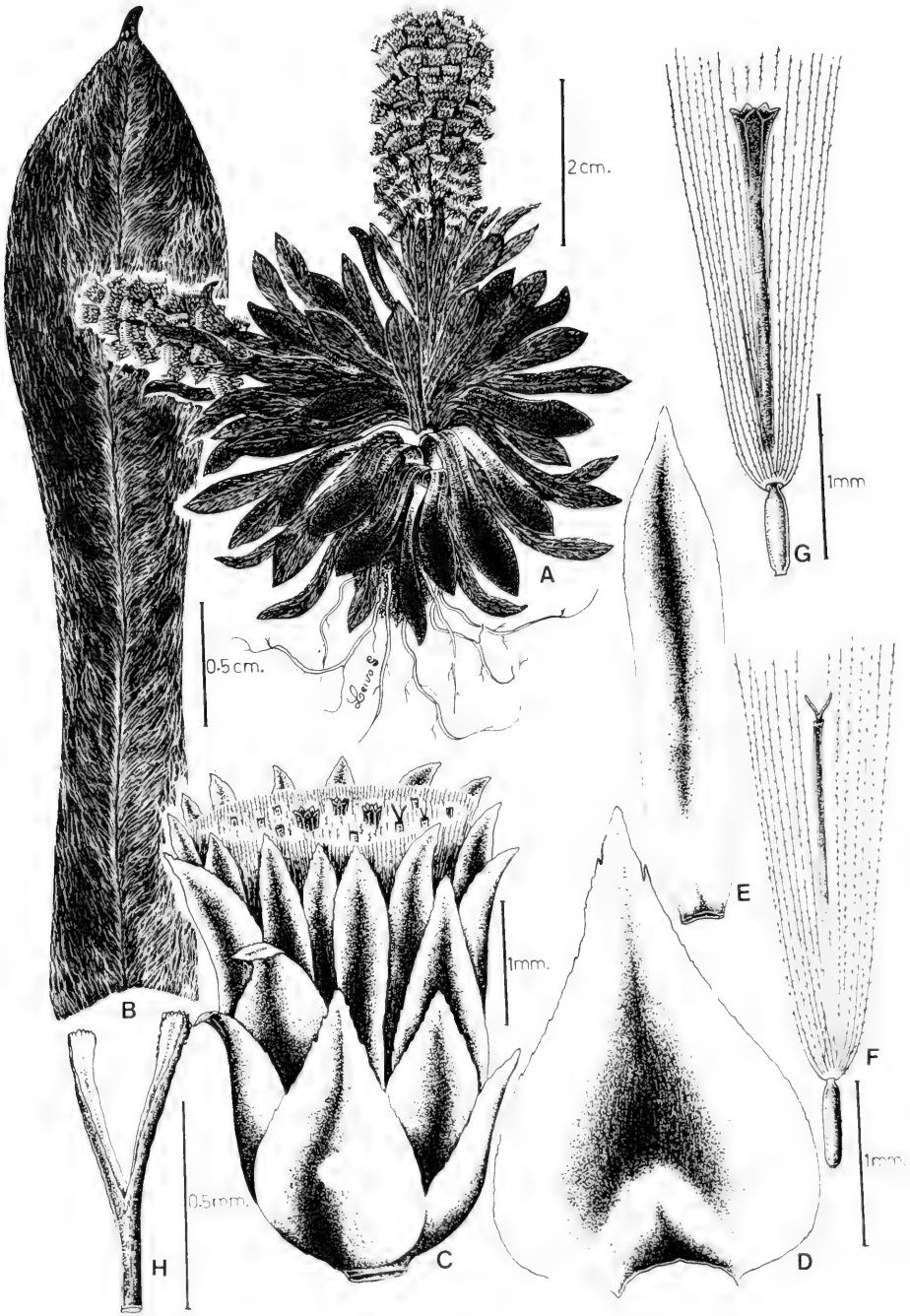


FIG. 1

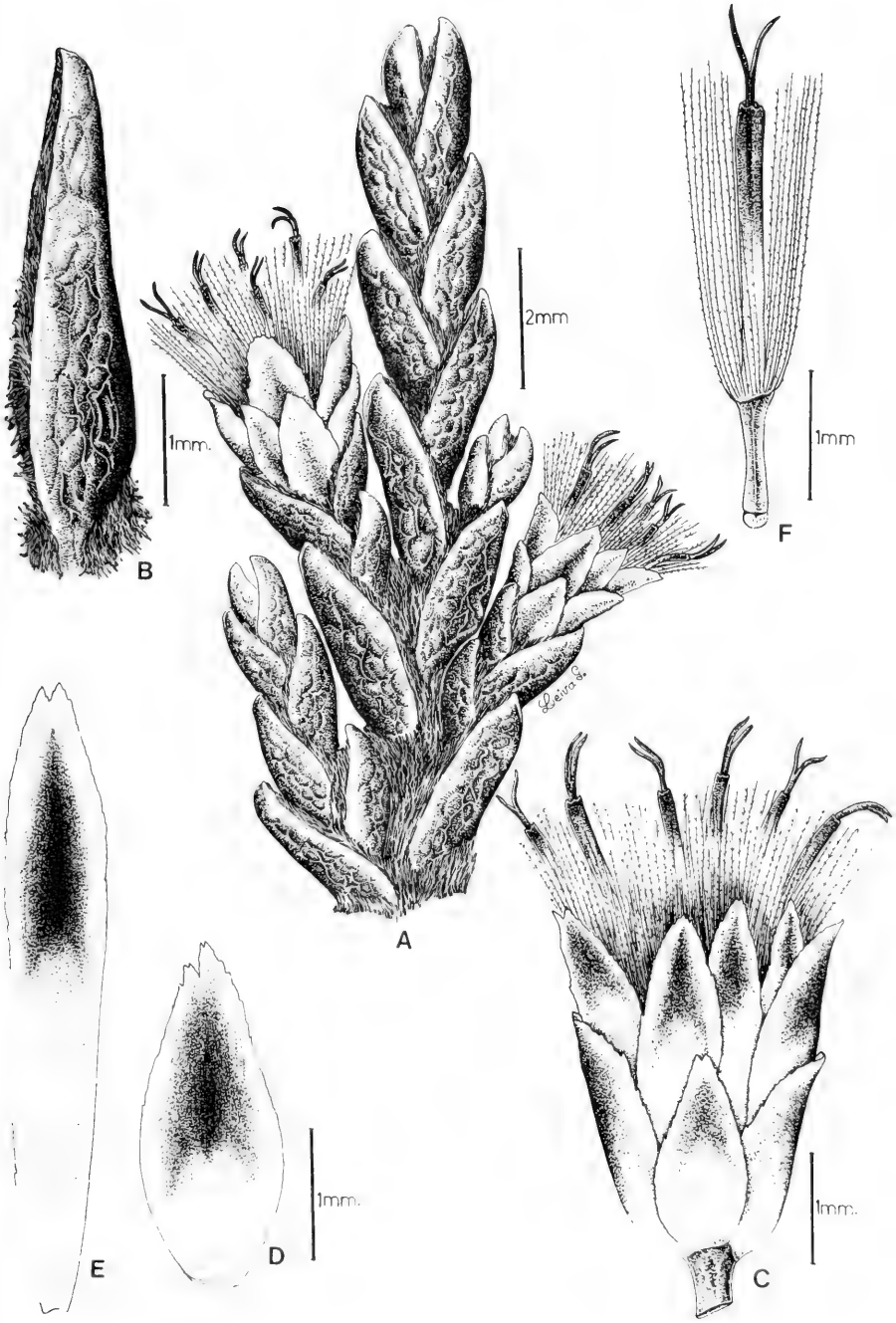


FIG. 2

NOTES ON THE GENUS *CLERODENDRUM* (*VERBENACEAE*). XIII

Harold N. Moldenke

CLERODENDRUM Burm.

Additional & emended bibliography: Lemaire & Van Houtte, Fl. Serres. ser. 1, 4: pl. 324. 1848; Lindl., Gard. Chron. 1860: 339 & 456. 1860; Engl., Abhandl. Preuss. Akad. Wiss. 1894: 27. 1894; Mold., Geogr. Distrib. Avicenn. 2--12, 14--17, 19--23, 26, 28, 29, & 36--38. 1939; Mold., Biol. Abstr. 27: 984, 1887, 2026, & 3121. 1953; Coates & Palgrave, Trees Cent. Afr. 427--[429]. 1957; Anon., Amer. Midl. Nat. 60: 388. 1960; Phillips & Barber, Ornament Shrubs 31 & 109--110. 1981; Mold., Phytologia 59: 100--126. 1986.

Additional excluded species:

Clerodendron squiresii Merr., Journ. Arnold Arb. 19: 64--65. 1938 = *Glossocarya siamensis* Craib.

Clerodendron whitei Hook. ex Mold., Résumé 271 in syn. 1959 = *Chlorocodon whitei* Hook. f., *Asclepiadaceae.*

Clerodendron whitei Hook. f. ex Mold., Prelim. Alph. List Inv. Names 22 in syn. 1940 = *Chlorocodon whitei* Hook. f., *Asclepiadaceae.*

Clerodendrum gneissicola Mold., in herb. [*Perrier 15044* from Madagascar, type, and *14977*] = *Schrebera* sp., *Oleaceae.*

Volkameria foetida Hamilt. ex D. Don, Prodr. Fl. Nepal. 103 in syn. 1825 = *Caryopteris foetida* (D. Don) Thellung.

CLERODENDRUM CYRTOPHYLLUM Turcz.

Additional bibliography: Mold., Geogr. Distrib. Avicenn. 37. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 131, 133, 136, 136, 158, & 181. 1949; Mold., Journ. Calif. Hort. Soc. 15: 87. 1954; Wiltshire, Commonw. Mycol. Inst. Ind. Fungi 1: 422. 1954; Mold., Résumé 169, 172, 174, 175, 215, 259, 260, 262, 263, 275, 449, & 450. 1959; Prain, Ind. Kew. Suppl. 4, imp. 3, 101 (1959) and 5, imp. 2, 61. 1960; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560 & 561. 1960; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 691. 1961; Liu, Illust. Nat. Introd. Lign. Pl. Taiwan 2: 1214, fig. 1022. 1962; Mold., Résumé Suppl. 3: 18 & 19. 1962; Li, Woody Fl. Taiwan 826. 1963; Mold., Résumé Suppl. 8: 3 & 4. 1964; Kow, Pharmacog. Stud. Crude Drugs Taiwan 60. 1966; Tingle, Check List Hong Kong Pl. 38. 1967; Hsu, Taiwania 14: 14. 1968; Hyland, U. S. Dept. Agr. Pl. Invent. 172: 307. 1968; Mold., Résumé Suppl. 17: 7. 1968; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Ind. 6: 263. 1969; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Franch., Pl. David., imp. 2, 1: 231. 1970; Willaman & Li, Lloydia 33, Suppl. 3a: 220. 1970; Mold., Fifth Summ. 1: 287, 292, 293, 299, 313, 358, 438, 439, 442--445, 462, & 469 (1971) and 2: 864. 1971; Huang, Pollen Fl. Taiwan 243 & 281, pl. 165, fig. 31--33. 1972; Dournes, Journ. Agric. Trop. Bot. Appliq. 20: 66 & 169. 1973; L. H. & E. Z. Bailey, Hortus Second, imp. 18, 188. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; L. H. & E. Z. Bailey, Hortus Third 285. 1976; Hsiao, Fl. Taiwan 4:

420 & 421 (1978) and 6: 121, 1980; Hu, Enum. Chin. Mat. Med. 113 & 218. 1980; Mold., Phytol. Mem. 2: 277, 281, 282, 291, 303, 348, & 535. 1980; Mold., Phytologia 51: 162. 1982; Reis & Lipp, New Pl. Sources Drugs 251. 1982; Duke & Ayensu, Med. Pl. China 2: 636. 1985; Mold., Phytologia 58: 416 (1985) and 59: 125--126. 1986.

Illustrations: Hayata, Icon. Pl. Formos. 2: fig. 39. 1912; Itô, Taiwan Shokubutu Dzusetu [Illust. Formos. Pl.] 598. 1928; Kanehira, Formos. Trees, ed. 2, fig. 605. 1936; Liu, Illust. Nat. Introd. Logn. Pl. Taiwan 2: 1214, pl. 1022. 1962; Huang, Pollen Fl. Taiwan 243, pl. 165, fig. 31--33. 1972; Duke & Ayensu, Med. Pl. China 2: 636. 1985.

A slender, erect, woody or semi-woody undershrub, shrub, or small tree, 1--6 m. tall, "the entire plant with a nauseating smell"; stems to 5 cm. in diameter; crown spreading to 2.5 m.; branches and branchlets rather slender, gray-brown, very obtusely tetragonal, densely puberulent or subpubescent when young, becoming less so or even glabrate in age, not very twiggy; nodes not at all swollen, not annulate; principal internodes 1--4 cm. long; leaf-scars very small, circular, prominulent; leaves numerous, decussate-opposite, ill-scented, without scales; petioles very slender, 0.6--5 cm. long, flattened and subcanaliculate above, densely puberulent or pubescent, basally not noticeably ampliate; leaf-blades chartaceous or thin-membranous, dull dark- or deep-green above, rather lighter beneath, shiny, oblong or elliptic to oblong-elliptic, lanceolate-elliptic, lanceolate, or oblong-ovate, 5--27 cm. long, 2.8--6 cm. wide, usually apically obtusely long-acuminate or sometimes only acute, marginally entire, basally rounded or obtuse (rarely acute), very obscurely pulverulent-puberulent or glabrous above, minutely puberulent or glabrate beneath; midrib very slender, flat or subprominulent above, prominent beneath; secondaries very slender, 5--8 per side, arcuate-ascending, flat above, prominent beneath, joined in many loops near the margins; vein and veinlet reticulation rather abundant, often obscure above, the larger parts prominulent beneath; inflorescence axillary and terminal, in cymose or corymbiform, very loosely spreading, dichotomous, and pubescent panicles 6--30 cm. long and wide, divaricate, many-flowered, minutely bracteate, the cymes long-pedunculate; peduncles slender, 6--9.5 cm. long, brown, densely puberulent, divaricate; inflorescence ramifications numerous, uniformly slender, brown, puberulent; bracts linear, about 5 mm. long; flowers fragrant or odorless (depending on the time of day?), small, sometimes described as "very attractive" or as "ill-smelling"; calyx green or greenish, persistent, 4- or 5-dentate or -lobed, the lobes ovate or triangular, apically acute; corolla white or cream-color, mostly greenish-yellow or yellow before unfolding, externally pubescent, the tube slender, 8--10 mm. long, the 5 lobes imbricate, oblong, 4.5--9 mm. long; stamens 4, long-exserted, twice as long as the corolla-tube; filaments green or greenish; anthers oblong, deep-purple or brown, composed of 2 thecae; pollen grains subprolate to oblate-spheroidal, 43--53 x 43--54 mu, the colpi 35--42 x 2 mu; style pale-green or only apically greenish, as long as or shorter than the stamens; stigma shortly bifid; ovary externally glabrous;

fruiting-calyx accrescent, fleshy, red, more or less enveloping the fruit; fruit drupaceous, at first green, later red to blue or bluish-black, finally purple or red-purple to black, attractive, globose, 5--6 mm. long and wide; seeds black; chromosome number: x = 12.

This species is based on *Fortune A.17* from Hong Kong. It is widely distributed in China (especially the northern and central portions), Korea, Taiwan, and Indochina; sometimes cultivated. The pollen description given above is taken from Huang (1972), based on *Huang 5607* from Taiwan.

Turczaninow's original (1863) description of the species is: "(*Euclerodendra paniculata*). Cl. ramis teretiusculis, ad apicem tetragonis glabris; foliis petiolatis oblongo-ovatis vel lanceolatis integerrimis incurvis falcatisve longe acuminatis, basi rotundatis subcordatisque glaberrimis, subtus pallidioribus; cymis axillaribus terminalibusque puberulis, paniculam, folia paulo superantem constituentibus; calycis 4 fidi corollae tubo cylindrico triplo brevioris, lobis triangularibus acutis. China borealis, *Fortune No. 17 A.*"

Li (1963) says that "An examination of the type of *C. glaberrimum* Hayata proves that it cannot br distinguished from *C. cyrtophyllum* Turcz. The inflorescence, as shown also in Kanehira's illustration, is hairy and not glabrous. The longer and narrower leaves as characterized by Hayata also fall within the range of variation of this widespread and common species." He cites *Faurie 298, 404, 1024, & 1025, Henry 1, 562, & 1295, Kawakami & Hayata s.n., Kawakami & Mori 7045* (the type of *C. glaberrimum*), *Kanehira 21158, Makino s.n., Matuda 755, Oldham 393 & 396* (the type of *C. formosanum*), *Ko s.n., Sasaki 204 & 21564, Tanaka 347, Tanaka & Shimada 11166,* and *Wilson 10789*, all from Taiwan.

Rehder (1931) comments that "On examination of the type of *Cordia venosa* Hemsl. at Kew I found that this species is identical with *Clerodendron cyrtophyllum* Turcz. The type specimen was collected by E. Faber in 1887 on the Ningpo Mountains and distributed as *Faber, no. 183.* The specimen consists of a small branch with two rather sparingly branched inflorescences only 6--10 cm. in diameter bearing a small number of mature fruits with enlarged calyces and young calyces without corollas. On account of its small inflorescences the specimen looks quite unlike the usual specimens with inflorescences 15--30 cm. in diameter, but on closer examination the specimen agrees in all its parts perfectly with *C. cyrtophyllum.* Flowering material of this species from the same locality collected by E. Faber in 1888 under *no. 645* is represented in this herbarium."

Collectors have encountered *Clerodendrum cyrtophyllum* in forests and woodlands, valley forests, thickets and open thickets, on savannas and mountainsides, in shady woods and coppices, along roadsides and "tombsides", on open or wooded slopes, on bare or open grassy hillsides, especially in gravelly red soil or dry sandy soil, in open fields and potato fields, in dry clay meadows, on the borders of terraces, in dense shaded ravines, among rocks, and in open shrubby and moist shady places in general, at 100--2200 m. altitude, in flower from May to January, and in fruit from June to December.

Chung reports this plant "common in rocky situations" on Amoy island; Lei found it "abundant in sandy soil on dry level land of village commons: on Hainan island; Taam describes it as "abundant among scattered shrubs on dry clay level land and on slopes" in Hong Kong, where Woo found it to be "common in thickets along streams". Fung reports it "fairly common in sandy soil and rocks in thickets on dry gentle slopes" on Hainan; Clemens reports it "locally abundant on low hills" in Annam. In Fukien it is described as "common" by Norton and as "common in open fields" by Chung. In Kwangsi it is said to be "rare in open thickets" by Chung, but as "fairly common as scattered shrubs" by Tsang. In Kwangtung Tsang describes it as "fairly common in dry sandy forest soil" and "abundant along roadsides in dry clay meadows". On Taiwan it is said to be "common" by Henry, "at low altitudes" by Kao, and "common in roadside thickets" by Wilson.

Hu speaks of the plant as "a pretty species for ornamental use". Stewart refers to it as "a big tree". On *Chung 2062* the inflorescences are said to have been reddish. Insect-galled leaves are seen on *Fung 20406*.

The corollas of *Clerodendrum cyrtophyllum* are mostly described as "white" [viz., by the Baileys (1976) and Hsiao (1978) and on *Bois 526*, *Chung 1687*, *Chung & Tso 43398*, *Clemens & Clemens 4121*, *Fan & Li 40*, *Fung 20406*, *Henry 1873*, *Hu 5555* & *12345a*, *Lei 86*, *McClure 9489*, *Morse 658*, *Taam 1535* & *2281*, *Tak 2*, *Tsang 2* & *21358*, *Tsang & Fung 412*, *Woo & Woo 367*, and *Ying 8541*, but as "whitish" by Dunn & Tutcher (1912), "creamy-white but greenish-yellow at unfolding" on *Ching 2008*, "greenish-white" on *Chan 1161*, *Keng 755*, and *Pételot 1067*, "yellowish-white on *Henry 1*, *Hu 11245*, and *Liang 62208*, "yellowish" on *Norton 1552*, "greenish-yellow" on *Fennell 1263*, "greenish" on *Ching 6428*, "yellow-greenish" or "yellowish-green" on *Steward & Cheo 732*, "yellow" on *Chung 1740* and *Lau 20288*, "pink" on *Chung 2219*, and "blue" on *Chung 1626* (possibly an error for fruit color).

Vernacular and common names recorded for the species are "Chinese glorybower", "chue sze ching", "dà qīng gēn". "green-white clerodendron", "hosaba-kusagi", "i tsz tsoi", "iu tsz tsoi", "iu tsz ts'oi", "kô:p ma:ng" [=night-sickness], "lu-pien-ch'ing", "makiba-kusagi", "May flower glorybower", "nan yang", "po'chháu-iu", "ta-ch'ing-kên", "tzou tsing tsoi", and "yiu tze ts'oi".

McClure reports that the leaves of this plant are eaten as a vegetable on Hainan island. Dournes (1973) reports that a decoction of the leaves is used to treat "night sickness" - hence one of the vernacular names listed above. Tsang also states that the leaves are edible, and McClure asserts that the leaves are consumed as a vegetable by the Ius aborigines along the North River in Kwangtung. Chiu is authority for the statement that the leaves are also employed in the treatment of pox and itch. Duke & Ayensu (1985) add that the leaves and roots are used as an antipyretic in China, as well as a detoxicant and diuretic, a preventive for epidemic meningitis, and in the treatment of tonsilitis, pharyngitis, mumps, and both insect- and snakebites. Hu (1981) reports that the leaves and the roots are regularly sold in Chinese pharmacies as "Herba et Radix

Clerodendri Cyrtophylli".

Willaman & Li (1970) and Kow (1966) report the presence of an unnamed alkaloid in the stems of this species. Wiltshire (1941) reports that the species is often a host for the fungus *Meliola clerodendri* Yamamoto in Japan and Taiwan, citing *Yamamoto s.n.* from Taiwan as voucher.

It is worth mentioning that the *Fennell 1263* collection, cited below, represents material grown in Florida from the seed of a Stewart & Cheo collection made in Kwangsi, China, at 1200 feet altitude; Hyland's (1968) *no. 302818*, cultivated in Maryland, was also from Taiwanese material. Bailey (1935) lists *Clerodendrum cyrtophyllum* as offered to the horticultural trade at that time only by the Taihoku dealers.

Dunn & Tutcher (1912) record the species from Lantau Island, St. John's Island, and Pakhoi. Maximowicz (1886) cites *Fortune 11* & *17*, *Oldham 398*, and unnumbered collections of David, Grijs, Hance, Krone, and Stewart from Amoy, Kiangsi, Korea, Canton, Hainan, and St. John's Island. Franchet (1884) cites *Franchet 832* from Kiangsi and *Fortune 11* from Korea. Hsiao (1978) cites *Faurie 404*, *Henry 1*, *Kanehira 21158*, *Oldham 393*, and *Wilson 10789* from Taiwan, describing the plant as "wide-spread throughout the island from low to medium altitudes".

Dop (1935) cites unnumbered collections of Lecomte & Finet from Cambodia, Harmand and Thorel from Laos, Clemens, Eberhardt, Harmand, Lecomte & Finet, and Poilane from Annam, and Balansa, Bois, Bon, Brousmiche, Chevalier, d'Alleizette, Duport, Demange, Lecomte & Finet, Mouret, Pételot, and Simond from Tonkin. Altschul (1973) cites *Chung 1715* and *Tsang 24204*.

A key to distinguish *C. cyrtophyllum* from other taxa occurring in Indochina will be found under *C. hahnianum* Dop in the present series of notes, which see.

Among inaccuracies and errors found in the literature of *C. cyrtophyllum* may be mentioned that Prain (1901) cites Maximowicz's 1886 work as "1887", while both Hsiao (1978) and Li (1963) cite it as "1866". Liu (1962) cites Turczaninow's 1863 work as "36, III". while Lecomte (1935) cites it as "XXXVI, I". The Itô (1928) reference is sometimes cited as "1927".

The *Liu & Cheng 4813* collection, cited below, bears a label inscribed "Flora of Chekiang", but the collection was apparently made in Kiangsu. *Lei 86* is a mixture with something non-verbenaceous.

Material of *C. cyrtophyllum* has been misidentified and distributed in some herbaria as *C. hainanense* Hand.-Mazz., *C. trichotomum* Thunb., *C. trichotomum* var. *fargesii* (Dode) Rehd., and *Premna* sp.

On the other hand, the *Woo 152*, distributed as typical *C. cyrtophyllum*, actually is the type collection of *C. cyrtophyllum* f. *dentatum* Mold., while *Tso 21153* is *C. clachistanthum* Merr.

Citations: CHINA: Anhwei: *Cheng 4043* (W--1671656); *Ching 3074* (La); *Chow 62* (Ac, N), *142* (Ac, W--3008381); *Fan & Li 40* (W--1756422); *Ip 5131* (Ca--233115), *5217* (Ca--232737), *6340* (Vi), *s.n.* [Herb. Univ. Nanking 6340] (W--1279786); *Sun 1153* (N). Chekiang:

Barchet 564 (W--596127); *Cheng 5012* (Ca--295728); *Cheo & Wilson 115* [Herb. Univ. Nanking 12761] (Bi, Ca--316399, Ca--354677), *192* [Herb. Univ. Nanking 12838] (Ca--316398, Ca--354568); *Chiao 1500* [Herb. Univ. Nanking 14806] (Bi), *s.n.* [Herb. Univ. Nanking 14511] (Ur, W--1426911), *s.n.* [Herb. Univ. Nanking 14635] (W--1427009), *s.n.* [Herb. Univ. Nanking 14699] (Go, W--1427053), *s.n.* [Herb. Univ. Nanking 14806] (W--1427115); *Ching 2008* (Ca--281554, Ca--295647, W--1246867), *5012* (Ba, Ba); *Hu 1519* (Ca--362219); *Keng 724* (Ca--361746), *755* (Ca--361717), *1056* (Ca--362012); *Lin & Cheng 5122* (Ca--295668); *F. N. Meyer 436* (Ar--19837, Ca--219018, Du--11065), *1611* [S.P.I. 43021] (Ar--19838, N). Fukien: *Chang 4156b* (Bz--19118); *Cheng 1008* (Ca--286950, Mu), *1072* (Ca--563799), *1506* (Du--250185), *1740* (Du--250184); *Ching 2223* (Ca--281557, W--1247068); *Chung 694* (Ca--420354), *1740* (Ca--225549), *2062* (Ca--19124), *2138* (Ca--19123), *2219* (Bz--19122), *2796* (Ca--243760), *2856* (Ca--243624, Ca--420280), *5272* (N); *En 2138* (Bz--19120, Mu), *2279* (Bz--19121), *2724* (Bz--19119, Mu); *Ging 15708* (Ur); *Metcalf & Chang 141* (Vi); *Tai 11158* (Um--151); *J. B. Norton 1552* (W--1172730), *1553* (W--1172731). Hunan: *Dahlström 343* (S); *Fan & Li 19* (Bz--19111), *457* (Bz--19112). Kiangsi: *L. H. Bailey s.n.* [Kuling, July 9, 1917] (Ba), *s.n.* [Kuling, July 20, 1917] (Ba); *Cheng 55* (W--3008400); *Cheo 94* (Gg--310910, W--1756410); *Chiao s.n.* [Herb. Univ. Nanking 18755] (Mi, W--1554150); *Ching 4813* (I); *Chung & Sun 280* (N), *607* (N), *733* (N); *Ip s.n.* [Herb. Univ. Nanking 1811] (Ca--230445, It, W--1279788); *Lau 4013* (S, W--1752755); *A. N. Steward s.n.* [Herb. Univ. Nanking 2733] (Ca--230444, Ca--230446, W--1279787); *Tsiang 9805* (N); *E. H. Wilson 1525* (W--777225, W--777226). Kiangsu: *Ching 4813* (Ba); *Lin & Cheng 4813* (Ca--295697); *Ling ?364* [Herb. Univ. Nanking 12316] (Ca--316397). Kwangsi: *Ching 6428* (Ca--409788, N, W--1248675); *Morse 658* (N, N); *Steward & Cheo 732* (Bz--19113, Bz--19114, N, S); *Tsang 23885* (N), *24204* (N), *24648* (N), *27927* (Ca--1286198, W--1757341). Kwangtung: *Chun 5124* (Ws); *Lau 20288* (N); *May 131* (Bz--19117); *Tsang 21162* (S), *21358* (Ca--11268, I, Mi, N, N, S); *Tsiang 2617* (N); *Tsui 815* (N, W--1754877); *Wang 3237* (N); *Ying 854* (Du--250181, W--1513069), *1180* (Du--200928). Kweichow: *Carabera 3121* (S); *Tsiang 6932* (N, S, W--1554961). Yünnan: *Chiu H.60* (Ba); *A. Henry 1873* (N, N). Province undetermined: *Hu 1146* (Ca--246841); *Ting & Shih 1606* (Ac). CHINESE COASTAL ISLANDS: Amoy: *Chung 1394* (Ca--225671), *1399* (Ca--225364), *1626* (Ca--225568), *1687* (Ca--224943), *1715* (Ca--225509); *DeGrijs s.n.* [Herb. Hance 397 in part] (Pd, Pd). Hainan: *Chun 7098* (Ca--243582), *7106* (Ca--243582); *Chun & Tso 43398* (B, N), *43494* (N); *Fung 20406* (B, Bz--19115, Ca--11473, Mi, N, W--1751182); *Gressitt 847*(E--1108862, I), *1138* (Gg--316084, I); *Hance 397* in part (Pd), *s.n.* (T); *How 70979* (Ca--594927, Mi, N, S); *Lei 86* in part (B, Ba, Bz--19110, Ca--611714, Mi, N, W--1753864); *Liang 62208* (Go, N, S, W--1670807); *McClure s.n.* [Herb. Canton Chr. Coll. 9489] (Bi, Gg--127991, N); *Tsang 2* [Herb. Lingnan Univ. 15501] (Bz--19116, Ca--315742, I, S, W--1248868); *Tsang & Fung 412* [Herb. Lingnan Univ. 17946] (B, W--1659925); *Wang 33199* (Mi, Mu, N), *35473* (N); *Wu 1087* (Du--250182). Lantau: *Taam 1706* (Ba). HONG KONG: *Chan 1161* (Mi); *Fortune A.17* (F--photo of isotype, Ld--photo of isotype, Mu--786--isotype, N--isotype, N--photo

of isotype, S--isotype, Sg--photo of isotype); *Hu 5555* (W--2697259), *11245* (W--2730879), *12345a* (W--2731277); *Taam 1535* (Ba, Ca--82714, Mi, N, W--2063822), *1706* (Mi), *2281* (Ba, Mi, W--2072992); *P. W. Woo 152* (Mi); *Woo & Woo 367* (Mi). LAOS: *Thorel 2417* (B). Vietnam: Annam: *Clemens & Clemens 4121* (Ca--340579, Gg--156207, Mi, N, Ut--99202, W--1428092); *Harmand s.n.* (B); *Pételot 3895* (N, W--1597334); *Poilane 22799* (Ca--54815); *Squires s.n.* [Hue, Apr. 15] (Ca--307329). Tonkin: *Balansa 921* (K, Ld--photo, N, N--photo), *3825* (B), *3884* (K); *Bois 526* (B); *Demange s.n.* [Hanoi] (Ca--38892); *Eberhardt 4360* (S); *A. Henry 9557* (W--457161); *Pasquier s.n.* [Pételot 1865] (Ca--259684); *Pételot 778* (Gg--215749), *1067* (Ca--223753), *1077* (B, Ca--223763), *1939* (B, Ca--38892, W--1597335). Province undetermined: *McClure 700* [Herb. Canton Chr. Coll. 7505] (I). TAIWAN: *Asai s.n.* [Herb. Govt. Formosa 21483] (Ca--344545, La); *Chuang 3916* (N); *A. Henry 1* (N), *1873* (W--455725, W--455726); *Hsu 4688* (S); *Kanehira 313* (Ca--345300), *s.n.* [Hassen-zan, Aug. 18, 1927; Herb. Govt. Formosa 21158] (La); *Kao 30101* (Ba), *30132* (La); *Kawakami & Mori 7045* [Herb. Govt. Formosa 21064] (N--photo); *Ko s.n.* [July 9, 1936] (W--2063405); *Oldham 398* (S, X); *Sasaki s.n.* [Herb. Govt. Formosa 21455] (Ca--344567, La); *Tanaka 347* (La, S, W--1528127); *Tanaka & Shimada 11166* (B, Br, Ca--517587, Go, La, Mi, Mu, N, S, W--1577464); *E. H. Wilson 10789* (W--1052320). CULTIVATED: California: *Walther 421* (Gg--163464, K). Florida: *Fennell 1263* [Pl. Introd. 105678] (Ba).

CLERODENDRUM CYRTOPHYLLUM f. *DENTATUM* Mold., Phytologia 51: 162. 1982.

Bibliography: Mold., Phytologia 51: 162. 1982.

This form differs from the typical form of the species in having its leaf-blades marginally very coarsely dentate near the apex with 1--3 large divaricate teeth on each side.

The form is based on *J. P. W. Woo 152* from a thicket along a stream at Sheung Shui, Hong Kong, collected on July 16, 1972, and deposited in the herbarium of the University of Michigan at Ann Arbor. The collector notes that the plant was "common" in the type locality and describes it as a shrub, 2 m. tall, the corollas white, and the fruit at first green, then red, and finally purple. Thus far the form is known only from the original collection.

Citations: HONG KONG: *J. P. W. Woo 152* (Mi--type).

CLERODENDRUM DALEI Mold., Phytologia 4: 287--288. 1953.

Bibliography: Mold., Biol. Abstr. 27: 3121. 1953; Mold., Phytologia 4: 287--288. 1953; Hauman, Assoc. Étud. Tax. Fl. Afr. Trop. Ind. 1954; Mold., Résumé 145 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Fifth Summ. 1: 240 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 230 & 535. 1980.

A shrub; branches and branchlets slender, light-gray, very sparsely puberulent, eventually glabrescent; modes not annulate; principal internodes 0.9--5.3 cm. long; leaves decussate-opposite, numerous; petioles slender, 7--10 mm. long, minutely scattered-pilosulous or glabrous, nigrescent in drying; leaf-blades submembranous, elliptic, dark and nigrescent above in drying, much lighter beneath, 7--

11 cm. long, 2--4 cm. wide, apically long-acuminate, marginally entire, basally long-acuminate, glabrous on both surfaces; midrib very slender, flat above, prominulous beneath; secondaries filiform, 4--6 per side, arcuate-ascending, flat and often obscure above, only very slightly subprominulous beneath; vein and veinlet reticulation rather sparse, indiscernible above, flat beneath; inflorescence axillary and fasciculate or terminating much abbreviated axillary twigs, rather few-flowered, nigrescent in drying; peduncle and inflorescense-ramifications more or less pubescent, densely so toward the base; pedicels filiform, 1--2 mm. long, glabrous, nigrescent; bractlets linear, about 1 mm. long, nigrescent; calyx campanulate, about 3 mm. long and 2 mm. wide, its rim distinctly 5-toothed, the teeth triangular, about 1 mm. long, apically acute; corolla not known.

The type of this species was collected by I. R. Dale (*no. 3811*) near Marjorent, S. Digo, Kenya, in September of 1937, and is deposited in the Brussels herbarium. Thus far it is known to me only from the original collection.

Citations: KENYA: *Dale 3811* (Br--type, Ld--photo of type, N--fragment of type, N--photo of type).

CLERODENDRUM DAUPHINENSE Mold., Bull. Torrey Bot. Club 77: 395--396. 1950.

Bibliography: Mold., Bull. Torrey Bot. Club 77: 395--396. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 56. 1953; Mold. in Humbert, Fl. Madag. 174: 150, 183, 184, & 267, fig. 29 (10--12). 1956; Mold., Résumé 155 & 449. 1959; Mold., Fifth Summ. 1: 259 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 248 & 535. 1980; Mold., Phytologia 58: 186. 1985.

Illustrations: Mold. in Humbert, Fl. Madag, 174: 183, fig. 29 (10--12). 1956.

A shrub or subshrub; stems woody, apparently virgate and unbranched, rather slender, brownish, densely short-pubescent with widely divergent hair on the upper (younger) parts, less so below; nodes not annulate; principal internodes 1.5--4 cm. long; leaves regularly ternate; petioles very short, about 2 mm. long, densely short-pubescent with hirsutulous hairs; leaf-blades apparently very small and fragile, apparently uniformly green on both surfaces, apparently suborbicular-ovate or broadly elliptic, 1--1.5 cm. long and wide, apically apparently obtuse, marginally entire, basally rounded, densely short-pubescent on both surfaces; midrib slender, obscure above, prominulous beneath; secondaries and veinlets apparently obscure or indiscernible on both surfaces; inflorescence apparently very few-flowered; calyx campanulate, 2--3 mm. long, 1--2 mm. wide. externally hirsutulous, its rim very shortly toothed; corolla white, hypocrateriform, its tube very narrowly cylindric, 5--6 mm. long, externally glabrous; filaments exserted about 8 mm. from the corolla-mouth; fruiting-calyx and fruit not known.

This species is based on *R. Decary 4570* from granitic soil northeast of Vohitsiombe, in the province of Fort Dauphin, Madagascar, collected on August 3, 1926, and deposited in the Paris herbarium. Unfortunately the type specimen is very badly smashed so that the

exact characters of the species are difficult to ascertain. From what can be seen, however, the specimen does not seem to fit into any other known species of the genus. It is to be hoped that more and better material may soon become available.

To help distinguish this taxon from other Madagascar taxa in the genus, refer to the key given under *C. baronianum* Oliv. in the present series of notes.

Citations: MADAGASCAR: *Decary 4570* (N--fragmnet of type, P--type).

CLERODENDRUM DECARYI Mold., Amer. Journ. Bot. 38: 322. 1951.

Bibliography: Mold., Amer. Journ. Bot. 38: 322. 1951; Mold. in Humbert, Fl. Madag. 174: 152, 205--207, & 267, fig. 33 (3). 1956; Mold., Résumé 155 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Fifth Summ. 1: 259 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 248 & 535. 1980; Mold., Phytologia 58: 187. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 205, fog. 33 (3). 1956.

A shrub or tree; branchlets and twigs rather slender, light-gray, obtusely tetragonal or subterete, glabrate, lenticellate, the younger parts often sulcate; leaf-scars rather large, prominent on younger wood; nodes not annulate; principal internodes 1--5 cm. long; leaves decussate-opposite; petioles medium-stoutish, 2--6 mm. long, glabrous, canaliculate above; leaf-blades coriaceous, bright-green above, somewhat lighter beneath, elliptic, 3--5 cm. long, 1.4--2.2 cm. wide, apically acute, marginally entire or sometimes slightly subrevolute, basally acute or obtuse, glabrous and shiny on both surfaces; midrib slender, impressed above, prominent beneath; secondaries slender, 5 or 6 per side, divergent, not much ascending, arcuately joined near the margins, prominulous on both surfaces; vein and veinlet reticulation fine, prominulous on both surfaces; inflorescence terminal, cymose, small, few-flowered or sometimes only 1-flowered; peduncles stramineous, 4--7 mm. long or obsolete, glabrous; pedicels stramineous, slender or stout, 5--10 mm. long, glabrous; bracts absent; bractlets and prophylla linear-setaceous, 1--2 mm. long, strigillose; calyx subcoriaceous, obconic-campanulate, 1.6--1.8 cm. long, about 1 cm. wide, glabrous throughout, venose on the upper half, its rim irregularly split, deeply 5-lobed, the lobes ovate, erect, firm, 3--5 mm. long, apically acute or often subapiculate; corolla infundibular-hypocrateriform, rose-colored, its tube slender, 3.5--4 cm. long, apically ampliate in funnelform fashion, externally glabrous, the limb about 2 cm. wide, the lobes about 1 cm. long; stamens and style exserted; filaments glabrous; anthers oblong, about 3 mm. long; style glabrous, exserted about 1 cm. from the corolla-mouth; stigma deeply bifid, its branches about 2 mm. long.

This species is based on *Raymond Decary 18455* from the edge of a forest at Anosibé, south of Moramanga, Madagascar, collected on September 7, 1942, and deposited in the Paris herbarium. To distinguish from other Madagascar taxa in this genus, refer to the key under *C. baronianum* Oliv. in the present series of notes. Thus far it is known to me only from the original collection.

Citations: MADAGASCAR: *Decary 18455* (E--photo of type, F--photo of type, Ld--photo of type, N--fragment of type, N--photo of type,

P--type).

CLERODENDRUM DEFLEXUM Wall., Numer. List [49], no. 1808 hyponym [as "*Clerodendron*"]. 1829; Pl. Asiat. Rar. 3: 10, pl. 215. 1831.

Synonymy: *Clerodendron deflexum* Wall., Numer. List [49], no. 1808. 1829. *Clerodendron flexum* Twining, Illust. Nat. Ord. Pl. 2: 104 sphalm. 1855.

Bibliography: Wall., Numer. List [49], no. 1808. 1829; Wall., Pl. Asiat. Rar. 3: pl. 215. 1831; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Voigt, Hort. Suburb. Calcut. 466. 1845; Walp., Repert. Bot. Syst. 4: 104. 1845; Schau. in A. DC., Prodr. 11: 665. 1847; Twining, Illust. Nat. Ord. Pl. 2: 104. 1855; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Miq., Fl. Ned. Ind. 2: 875. 1858; Bocq., Adansonia, ser. 1 [Baill., Rec. Obs. Bot.], 3: 214. 1863; C. B. Clarke in Hook. f., Fl. Brit. India 4: 593. 1885; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; Gamble in King & Gamble, Journ. Roy. Asiat. Soc. Beng. 74 (2 extra): 826 & 828--829. 1908; Ridl., Journ. Roy. Asiat. Soc. Straits 57: 84. 1910; H. J. Lam, Verbenac. Malay. Arch. 263 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 74, 82--83, 108, & viii. 1921; Ridl., Fl. Malay Penins. 2: 624--625. 1923; Stapf, Ind. Lond. 2: 238. 1930; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1072. 1932; Fletcher, Kew Bull. Misc. Inf. 1938: 404, 407, 424, & 426. 1938; Mold., Suppl. List Comm. Vern. Names 2, 4--7, 9, 11, 13, 14, 17, 19, 20, & 24. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 61, 63, & 89. 1942; Mold., Phytologia 2: 98. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Cit. 4: 1102. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 137--139, 143, & 181. 1949; Corner, Wayside Trees, ed. 2, 700--701. 1952; Wycherley & Nair, Proc. Sympos. Humid Trop. Veg. 274 & 277. 1958; Anon., Kew Bull. Gen. Ind. 77. 1959; Mold., Résumé 177, 179, 186, 187, 197, & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Résumé Suppl. 3: 19 & 20. 1962; Mold., Dansk Bot. Arkiv 23: 88. 1960; Burkill, Dict. Econ. Prod. Malay Penins. 1: 590--591. 1966; Mold., Résumé Suppl. 17: 8. 1968; Corner & Watanabe, Illust. Guide Trop. Pl. 753. 1969; Mold., Fifth Summ. 1: 294, 299, 304, 307, 322, 329, & 444 (1971) and 2: 864, 970, & 971. 1971; Mold., Phytologia 33: 372 (1976) and 34: 265. 1976; Mold., Phytol. Mem. 2: 284, 291, 295, 298, 313, 320, 348, & 384. 1980; Mold., Phytologia 57: 36. 1985.

Illustrations: Wall., Pl. Asiat. Rar. 3: pl. 215. 1831; Corner & Watanabe, Illust. Guide Trop. Pl. 753. 1969.

A low, bushy shrub or undershrub, 1.5--3 m. tall, or small spindly tree to almost 7 m. tall, often flowering when only 30 cm. tall, upright, and only slightly woody; stems often myrmecophilous; branches pubescent; twigs finely or thickly velutinous-pubescent, with hollow slightly swollen internodes; leaves decussate-opposite; petioles 1.5--6.5 cm. long; leaf-blades mostly very thinly membranous, oblong or elliptic to narrowly or broadly obovate-elliptic or subpanduriform, mostly quite large, 12.5--40 cm. long, 3.2--15 cm. wide, api-

cally rather long-acuminate, marginally subentire or sinuate, occasionally obscurely dentate, basally cuneate or rounded, glabrous above when mature, softly pubescent on the venation beneath with sparse or dense velvety hairs; inflorescence in dense, many-flowered, lateral, deflexed, umbelliform or subcapitate heads or close pendulous panicles, mostly exclusively axillary in the axils of the upper leaves or sometimes a single pseudo-terminal one, 2.5--5 cm. wide, red-pubescent; peduncles 2.5--13 cm. long, bearing mostly 1 (rarely 3) heads; bracts red, narrow, often 1 or 2 pairs of rather larger foliaceous crimson ones persisting in the fruiting-heads; calyx deep-pink or red to purple, 6--8 mm. long, divided to below the middle or nearly to the base, the lobes lanceolate or linear-lanceolate, suberect, red or reddish to purple-pink or purple, narrow, apically subacuminate, sparingly pubescent; corolla white or greenish-white to cream-color or yellow, or white suffused with rose-purple, slightly pubescent, the tube 1.2--1.8 cm. long, the limb 1.2 cm. wide, the lobes elliptic, about 6 mm. long; fruiting-calyx fleshy, crimson, star-like, 1.2--1.8 cm. wide; fruit drupaceous, round, 6--8 mm. long and wide, succulent, at first purple, finally blackish or black.

This species is based on *Wallich 1808/1* from Penang and *1808/2* from Singapore, the former perhaps collected by Griffith and the latter collected in 1822, both deposited in the East India Company herbarium at Kew. The species is native from Thailand, Indochina, and Malaya to the Riou and Lingga Archipelagos in the Lesser and Greater Sunda Islands of Indonesia.

Collectors have encountered this plant in evergreen, secondary, and swamp forests, high jungles, along streams, and among rocks, from sealevel to 1300 m. altitude, in flower in February, March, August, September, November, and December, and in fruit in August, September, November, and December. The Abbes found it growing in thin humus over porous sand in areas with the watertable near the soil level in Johore. Burkill (1966) reports it as common in the forests throughout the Malay Peninsula; Smitinand found it common in the secondary forests in Vietnam. On the other hand, Phloenchit reports it "not common" in the deciduous forests of Thailand and Sinclair refers to it as "rare" along paths in swamp forests of Singapore. Voigt (1845) reports it cultivated in the Calcutta suburbs.

Corner (1952) tells us that "This is a very variable plant in the size and hairiness of the leaf. It is recognised at once from the down-turned heads of flowers reddened by the bushy sepals. The Malay names attributed to it are many but none is generally known. It is said to have haunting properties." He reports it "common in lowland and mountain forests to 4,000 feet" altitude in Sumatra and Malaya.

The corollas are described by Bakhuizen (1921) as "flesh-coloured" and as "cream-white" by Corner & Watanabe (1969), while they are said to have been "white" on *Charoenphol & al. 5099*, *Sinclair 5019*, and *Stone 6592*, "greenish-white" on *Abbe & Abbe 10139*, "white and greenish" on *Stone 12049*, and "yellow" on *Smitinand 6415*.

Wood specimens accompany *Hamel 1252* and *Toroes 1376* in the University of Michigan herbarium/museum.

Vernacular and common names recorded for the species are "balong

ayam" [=cock's comb], "cheret hutan" [=woodland plant for diarrhea], "chuchohgambar", "kajoe hariting", "kajoe kissil", "kajoe si panggil", "kajoe si panggil tombak", "kajoe si panggil tombok", "kayu sampu" [=decline wood], "kayu sampu kĕlau", "kelusam jantan", "lĕmak bĕrok" [=baboon's fat], "lidah kĕrbau" [=buffalo's tongue], "lidah kérbau bĕtina", "mata ajam", "mematje", "mĕrambong bukit" [=hill haunted plant], "nodding witch's tongue", "pĕchah périck hitam" [=black *Ixora*], "sĕkacha lima jantan", "sekati", "sĕkati lima", "sĕkati lima jantan", "sĕmbong hutan jantan" [=big wood *Blumea*], "sepanggil", "setawar bukit", "sĕtawar hutan" [=woodland sétawar], and "sumpu kuwang". According to Burkill (1966), the name "lĕmak bĕrok" is more usually applied to species of *Xanthophyllum*. He also notes that some of the vernacular names listed above actually indicate the plant's use in native magic. An extract of the roots is employed by the Malays in the treatment of fevers and of bowel complaints such as diarrhea.

Fletcher (1938) cites only *Kerr 7653* from Thailand.

Clarke (1885) comments that "Hardly any of Schauer's section of *axilliflorae* [sic] have the inflorescences so exclusively axillary as this, which he places in a section defined as having a terminal panicle."

Ridley (1910) notes the existence of "a glabrous form" of the species from Ulu Temengoh, Malaya. *Kassim s.n.* exhibits narrow and very thinly membranous leaf-blades; *Poore 1166* also has very thin-membranous leaf-blades and they are decidedly subpanduriform in shape. *Griffith 6049* has the leaves very pubescent beneath and may actually represent var. *villosulum* Mold.

Corner & Watanabe (1969) erroneously describe the fruits as berries, rather than drupes.

The *Maxwell 82-259*, *Poore 57*, and *Stone 6630*, distributed as typical C. *deflexum*, actually are its var. *villosulum* Mold.

Citations: THAILAND: *Charoenphol, Larsen, & Warncke 5099* (Ac); *Larsen & Larsen 32791* (Ac, Ld); *Phloenchit 52* [Herb. Roy. For. Dept. 10717] (Ld); *Sørensen, Larsen, & Hansen 4746* (Bm), *4822* (Cp), *5135* (Bm). VIETNAM: *Smitinand 541?* [Herb. Roy. For. Dept. 24402] (Ld). MALAYA: Johore: *Abbe & Abbe 10139* (N); *Herb. Bot. Bogor. 19155* (Bz). Kelantan: *Boey 274* (Kl--21709). Malacca: *Burkill 2162* (Bz--19163); *Griffith 49* (Pd), *6049* (L, Mu--780, Pd, S, Ut--11529), *s.n.* [Malacca 1845] (Br). Negri Sembilan; *Carrick 680* (Kl--3650); *Holttum 9546* (Bz--19160, Ca--346263). Pahang: *M. R. Henderson 11481* (Ca--360599); *Holttum 20954* (Bz--19157, Bz--19158, Ca--374301); *Kiah & Strugnell 23937* (N); *B. C. Stone 6592* (Kl--6763), *8918* (Ne--33492). Penang: *Collector undetermined s.n.* (Pd); *C. Curtis 81* (W--206462); *Nauen 37763* (Bz--19156); *Nikoul 3* (Bz--19162, Bz--19164); *Wallich 1808/1* (L--cotype, Mu--1693--cotype, Pd--cotype, Pd--cotype, T--cotype). Perak: *Seimund s.n.* [Dec. 1925] (Bz--19159). Selangor: *Abbe, Abbe, Chandapilla, & Tassim 9034a* (N); *Poore 307* (Kl--307); *B. C. Stone 12049* (Kl--20719). Singapore: *Sinclair 5019* (W--2912700); *Wallich 1808/2* (L--cotype). Trengganu: *Kassim s.n.* [29/8/64] (Kl--3850); *Poore 1166* (Kl--6166). MALAYAN ISLANDS: Lalang: *Seimund s.n.* [Pulau Lalang, Dec. 1925] (Ca--360412). GREATER SUNDA ISLANDS: Bintan:

Bünnemeijer 6495 (Bz--19145), *6513* (Bz--19144). Doerian: *Rachmat 39* (Bz--19142). Dompak: *Bünnemeijer 6412* (Bz--19148). Karimon: *Bünnemeijer 7867* (Bz--19150, Bz--25495). Lingga: *Bünnemeijer 6862* (Bz--19145); *Teijsmann s.n.* [Boek Sepientjang] (Bz--19151, Bz--19152). Papan: *Bünnemeijer 7786* (Bz--19149). Redjai: *Bünnemeijer 7626* (Bz--19146). Riouw: *Teijsmann s.n.* [Tandjoeng Pinang] (Bz--19153, Bz--19154). Sambo: *Buwalda 6223* (Bz--11279). Sumatra: *Boeea 6224* (Mi), *6409* (Mi, Mi), *6637* (Mi), *6734* (Mi), *6738* (Mi), *7043* (Mi, W--1681961), *7122* (Mi), *7239* (Mi); *Buwalda 6514* (Bz--72614, Bz--72615); *Hamel 1252* (Mi); *Krukoff 4232* (N), *4293* (N), *4296* (Mi, N); *Teijsmann s.n.* (Bz--19127); *Thorenaar T.61* (Bz--19126); *Toroes 1325a* (Mi), *1355* (Mi), *1362* (Mi), *1376* (Mi), *1386* (Mi, N); *Voogd 224* (Bz--19125). Temiang: *Bünnemeijer 7637* (Bz--19147). LESSER SUNDA ISLANDS: Banka: *Berkhout s.n.* [27 Aug. 1886] (Bz--19139), *s.n.* [28/8/1886] (Bz--19138); *Bünnemeijer 1496* (Bz--19130), *1855* (Bz--19129, Bz--25494), *2076* (Bz--19128); *Kobus s.n.* (Bz--19131); *Teijsmann s.n.* [Bakem] (Bz--19133), *s.n.* [Pemetjak] (Bz--19134, Bz--19135), *s.n.* [Pengkal Pinang] (Bz--19136, Bz--19137), *s.n.* [Toboalei] (Bz--19132). Mendanau: *Teijsmann s.r.* [Pra] (Bz--19140, Bz--19141). MOUNTED ILLUSTRATIONS: Corner & Watanabe, Illust. Guide Trop. Pl. 753. 1960 (Ld).

CLERODENDRUM DEFLEXUM var. *BRACTEATUM* Ridl., Fl. Malay Penins. 2: 625 [as "*Clerodendron*"]. 1923.

Synonymy: *Clerodendron deflexum* var. *bracteatum* Ridl., Fl. Malay Penins. 2: 625. 1923.

Bibliography: Ridl., Fl. Malay Penins. 2: 625. 1923; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1072. 1932.

This variety differs from the typical form of the species in having the heads surrounded by leafy bracts.

It is based on a Ridley collection from Reservoir Woods, Singapore, and a Kloss collection from Ginting Bidai, Selangor, Malaya. Ridley (1923) refers to it as "An odd form".

Nothing is known to me of this plant except what is stated in its very sparse bibliography. Possibly specimens with 1 or 2 pairs of foliaceous bracts persisting in the inflorescence, as referred to in the description of typical *C. deflexum* Wall., may actually represent this variety.

CLERODENDRUM DEFLEXUM var. *VILLOSULUM* Mold., Phytologia 33: 372. 1976.

Bibliography: Mold., Phytologia 33: 372 (1976) and 34: 265. 1976; Mold., Phytol. Mem. 2: 295 & 535. 1980; Mold., Phytologia 57: 36. 1985.

This variety differs from the typical form of the species in having the branches, branchlets, petioles, and lower leaf-surface densely velutinous-villosulous, the upper leaf-surface densely puberulous, and the nodding inflorescences more densely flowered and congested.

The variety is based on *M. E. D. Poore 57* from along a jungle path below the Gap on Fraser's Hill, Pahang, Malaya, collected on September 27, 1959, and deposited in the herbarium of the University of

Malaya at Kuala Lumpur.

Collectors describe this plant as a shrub, 1--3.5 m. tall, with a single erect stem, the leaf-blades green above, light-green and velvety beneath, the inflorescence conic-capitate, the flowers pedicellate, the bracts dark-red, the calyx and inflorescence-axes also dark-red, the corolla whitish-cream, the stamens white, and the fruit globose, at first green or dark-green but ripening black. They have found it growing in shaded areas of swamp forests and in regenerating logged forests, at 5--33 m. altitude, in both flower and fruit in September and in fruit alone in January. Material has previously been regarded as and distributed as typical *C. deflexum* Wall. The *Griffith 6049* collection, cited under *C. deflexum* may actually belong, instead, to the present variety (as therein noted).

Citations: MALAYA: Pahang: *Hons. Students KLU.11507* (Kl--15748, Ld); *Poore 57* (Ac--isotype, Kl--67--type, Ld--photo of type, N--photo of type); *B. C. Stone 6630* (Kl--6815). Singapore: *Maxwell 82-259* (Ac).

CLERODENDRUM DEKINDTII Gürke, Engl. Bot. Jahrb. 28: 301 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 46, 82, & 93. 1936.

Synonymy: *Clerodendron dekindtii* Gürke, Engl. Bot. Jahrb. 28: 301. 1900. *Clerodendrum cuneatum* Auct. ex Friedrich-Holzhammer in Merxmüller, Prodr. Fl. Südw. Afr. 13 (122): 5 in syn. 1967 [not *Clerodendron cuneatum* Gürke, 1900, nor Turcz., 1863].

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 519. 1900; Gürke, Engl. Bot. Jahrb. 28: 301. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; Dinter, Feddes Repert. Spec. Nov. 16: 168. 1919; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 7, 30, 46, 82, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 50, 52, & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 55. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 118, 121, & 181. 1949; Mold., Résumé 141, 145, 146, 148, 151, 426, & 449. 1959; Mold., Résumé Suppl. 1: 9 (1959), 9: 3 (1969), and 12: 6. 1965; Friedrich-Holzhammer in Merxmüller, Prodr. Fl. Südw. Afr. 13 (122): 4 & 5. 1967; Mold., Résumé Suppl. 16: 20. 1968; Mold., Fifth Summ. 1: 228, 235, 240, 242, 247, 253, 443, & 461 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218, 225, 230, 232, 236, 242, 244, & 535. 1980; Mold., Phytologia 59: 120 & 121. 1986.

A shrub or shrublet, 1--4 m. tall, densely short-pubescent throughout; bark gray; leaves decussate-opposite, numerous but mostly crowded on very short twigs, variable in size; petioles very slender, 1--1.5 cm. long; leaf-blades submembranous, obovate-lanceolate, 3--4 cm. long, 1--2 cm. wide, mostly 2--3 times as long as wide, apically acute, marginally entire, basally gradually attenuate into the petioles, appressed-pubescent on both surfaces, more densely so beneath; inflorescence terminal, the cymes very loose, few-flowered, 5--10 cm. long, the axis and branches softly pubescent; bracts lanceolate, short-stipitate, similar to the leaves in all respects but the lowest only 2--3 cm. long and hardly 1 cm. wide, the upper still smaller; bractlets also lanceolate but only 1 cm.

long at the most; pedicels 1.5 cm. long; calyx broadly campanulate, 5--6 mm. long, externally pubescent, 5-fid to about the middle, the lobes triangular-suborbicular, apically obtuse; corolla plainly zygomorphic, blue or pink and white, the tube 10--12 mm. long, curvate, basally swollen, about twice as long as the calyx, the limb 5-parted, the lobes unequal, the upper short and white, the lower arched and pink or bluish; stamens and style 3--3.5 cm. long, exserted.

This species is based on *Dekindt 366* from bushy meadows, at 1770 m. altitude, in Huíla, Angola, and *Antunes 366*, also from Huíla, both deposited in the Berlin herbarium, now destroyed. Of these Thomas (1936) has designated *Dekindt 366* as the type (lectotype).

Gürke (1900) notes that "Die zur Sect. *Cyclonema* gehörende Art hat habituell mit den kleinblättrigen Formen von *Cl. myricoides* R. Br. Ähnlichkeit, ist aber besonders durch die Kurzzweige und gedrängten Blätter so auffallend, dass sie sehr wohl als einige Art betrachtet werden kann."

Vernacular names reported for the plant are "ndimbuiria" and "omufilamapongo".

The leaves are employed in native medicine in Angola in the treatment of headaches.

Collectors have encountered the plant in bushy meadows, in mixed forests on deep white sand, and among rocks and granite boulders on sand flats, at 1180--2200 m. altitude, in flower in January, February, and November, and in fruit in February.

The corollas are described as having been "blue" on *Miller B.1226* and as "light-pink" on *Peter 34991*.

Thomas (1936) cites only *Dekindt 366* from Angola and *Dinter 65 & 1453* from Namibia; Baker (1900) cites only *Antunes 366* and *Dekindt 366* from Angola. Friedrich-Holzhammer (1967) cites *DeWinter 3681 & 3880, DeWinter & Hardy 8070, DeWinter & Leistner 5098, Dinter 5301 6860, Merxmüller & Giess 1713, Seydel 1251*, and *Walter 1418* from Namibia.

Material of this species has been misidentified and distributed in some herbaria as *C. dekindtii* var. *dinteri* Thomas, *C. discolor* (Klotzsch) Vatke, *C. myricoides* (Hochst.) R. Br., and *C. myricoides* var. *camporum* Gürke. As an example of how it has been treated by authorities: in 1920 DeWildeman annotated *Descamps 13* as *C. bequartii* var. *debeerstii*; in 1921 he called it *C. villosulum* var. *debeerstii*; in 1930 Gürke annotated it as *C. myricoides* var. *camporum*; in 1933 Robyns annotated it as *C. wildemannianum* var. *debeerstii*; and, finally, in 1935 Thomas identified it as *C. dekindtii*!

It may be noted that Friedrich-Holzhammer (1967) implies that Dinter's (1919) "*C. cuneatum* Gürke" is really *C. dekindtii* and therefore also the *Dinter 65, 741, & 2419* which Dinter cites from Namibia.

The *Giess 3483, Giess & Müller 13943, Rehm 1839, Seydel 125., Winter 5098*, and *Winter & Hardy 8070*, distributed as typical *C. dekindtii*, are better regarded as representing its var. *dinteri* Thomas.

Citations: ZAIRE: *Descamps 13* (Br, Ld--photo, N--photo). TANZANIA: Tanganyika: *Peter 34991* (B). KENYA: *C. W. Elliot 422* (Af). ZIMBABWE: *O. B. Miller B.1226* (Af). NAMIBIA: *Abner 63* (Mu); *Boss A.*

77 (Tm--34470); *Dinter 6860* (B, Mu); *Merxmüller & Giess 1713* (Mu); *Volk 2631* (Mu); *Walter & Walter 1418* (Mu); *Winter 3880* (Mu).

CLERODENDRUM DEKINDTII var. *DINTERI* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 83. 1936.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 83. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 50, 52, & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 56. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 118, 121, & 181. 1949; Mold., Résumé 146, 151, 152, & 449. 1959; Mold., Résumé Suppl. 12: 6. 1965; Mold., Fifth Summ. 1: 242, 247, 253, & 255 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 232, 236, 242, 244, & 535. 1980; Mold., Phytologia 59: 120. 1986.

This variety differs from the typical form of the species in having the leaf-blades marginally crenate, the calyx only 4 mm. long, and the corollas greenish-blue [fide Thomas].

It is based on *Dinter 741* from the Otavi Mountains in Namibia, collected on January 14, 1909, and deposited in the Berlin herbarium, now lamentably destroyed. Thomas (1936) cites also *Dinter 2419* from Namibia and *Baum 386a* & *386b* from southern Angola.

Collectors describe this plant as an erect bush or small shrub, 1.5--3 m. tall, of loose habit, the wood soft, the leaves also soft and mostly crowded at the ends of the branches, the flowers small and unpleasantly scented, the stamens long-protruding, and the ripe fruit jet-black or "almost black" and shiny.

They have found it growing on dolomitic mountains, on rocky kopjes consisting of weathered granite, and on granite mountains with pockets of gravel between rocks, at 1120--1400 m. altitude, in flower from December to March and in June, and in fruit from December to March. Schoenfelder reports it "mostly on the tops of hills" in Namibia, while Seydel found it "scattered and abundantly cropped by wild animals" in the same country.

The corollas are said to have been "clear-blue" on *Santos 780*, "white" on *Giess 3483* and *Giess & Müller 13943*, "whitish-blue" on *Schoenfelder 52*, "green and blue" on *Winter & Hardy 8070*, "dirty-white with a mauve lower petal" on *Winter 3681*, and "yellow-brown" or "yellowish" on *Seydel 969*.

Material of this variety has been misidentified and distributed in some herbaria as *C. cuneatum* Gürke, typical *C. dekindtii* Gürke, *C. discolor* var. *crenatum* Thomas, and *C. myricoides* (Hochst.) R. Br. On the other hand, the *Abner 63* and *Winter 3880*, distributed as *C. dekindtii* var. *dinteri*, actually are best regarded as representing typical *C. dekindtii* Gürke.

Citations: ZIMBABWE: *Olsson s.n.* [29.XI.1947] (S). ANGOLA: Huíla: *Baum 386* (Br, Ld--photo, N, N--photo, S); R. *Santos 780* (Ul). NAMIBIA: *Baum 386* (Mu); *Boss s.n.* (Tm--35647); *Dinter 5301* (Af, B, W--1374347); *Giess 3483* (Mu); *Giess & Müller 13943* (Mu); *Rehm 1839* (Mu); *Schoenfelder 52* (Af); *Seydel 969* (Mu, S, W--2671031), *1251* (Mu, N), *2939* (Ba); *Volk 2561* (Mu); *Winter 3681* (Mu), *5098* (Mu); *Winter & Hardy 8070* (Mu). SOUTH AFRICA: Transvaal: *Breyer s.n.* [Herb. Transvaal Mus. 18327] (Ld); *Pole-Evans 4493* (Ld), *415744* (Cb);

Pott 5651 (Cb); **F. A. *Rogers 21619*** (S), ***30464*** (S).

CLERODENDRUM DEMBIANENSE Chiov., Ann. Bot. Roma 9: 128 [as "*Clerodendron*"]. 1911; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 46, 82, & 93. 1936.

Synonymy: *Clerodendron dembianense* Chiov., Ann. Bot. Roma 9: 128. 1911.

Bibliography: Chiov., Ann. Bot. Roma 9: 128. 1911; Fedde & Schust., Justs Bot. Jahresber. 39 (2): 319. 1913; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 46, 82, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 45, 49, & 89 (1942) and ed. 2, 110, 116, & 181. 1949; Mold., Résumé 134, 143, & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 798. 1962; Mold., Fifth Summ. 1: 212 & 235 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 203, 235, & 535. 1980.

A shrub or small tree, to 4 m. tall, glabrous or subglabrous throughout except for the nodes and leaf-blade venation; leaves ternate; petioles 2--10 mm. long; leaf-blades ovate or ovate-oblong, 7--12 cm. long, 2--6 cm. wide, apically abruptly acuminate, marginally coarsely dentate or serrate, basally rounded or broadly cuneate, glabrous above, pilose on the venation beneath; inflorescence terminal, paniculate, oblong-pyramidal, the cymes dichotomous, rather dense, 3--8-flowered; bracts foliaceous, similar to the leaves but equaling to twice as long as the smaller ones; pedicels 2--3 mm. long, bibracteolate, arcuately reflexed; calyx campanulate-infundibular or patinaform, 2--3 mm. long, about 10 mm. wide, glabrous, the lobes 2--3 mm. long, apically rounded, recurved, separate by a rather deep and acute sinus; corolla glabrous, its tube blue, about 8 mm. long, 3.5 mm. wide, basally incurved, the limb 2--3 cm. wide, 5-lobed, oblique, flat or concave, the 4 upper lobes pale or white, about 1 cm. long, apically rounded, the fifth (lower) lobe larger, blue or violet, rounded-obovate, flattened-subunguiculate, 1.5--2 cm. long; stamens about 3 cm. long, arcuate, about 3--4 times as long as the upper corolla-lip; filaments basally pilosulous; fruit comprised of 1--4 spherical drupes, 7--9 mm. wide, at first green, finally black and juicy.

This member of the Subgenus *Cyclonema* is based on *Chiovenda 1060, 1279,* and *1490* from Dembia, Ethiopia, the first from Bambolô, collected July 16, 1909, the second from the Cococc Valley above Gondar, collected August 2, 1909, and the third from Gondar village, collected August 21, 1909; of these Thomas (1936) has designated *Chiovenda 1060* as the type (lectotype), deposited in the Florence herbarium. He cites *Chiovenda 1060* & *1090, Schimper 451,* and *Steudner 1308* & *1311* from Ethiopia and *Engler 437* from Tanzania.

Chiovenda (1911) remarks that the species is "Prox. *C. ugandense* quod differt foliis saepius oppositis, calyce majore minus profunde inciso, corollis majoribus, labio infero obovato-spatulato, longiore et angustiore, tube breviore."

Clerodendrum dembianense has been collected at 2000 m. altitude. Nothing is known to me of this species beyond what is stated in its

bibliography.

CLERODENDRUM DENSIFLORUM W. Griff., Notul. Pl. Asiat. [Posthum. Pap.] 4: 170. 1854.

Synonymy: *Clerodendron densiflorum* Griff. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893.

Bibliography: W. Griff., Notul. Pl. Asiat. [Posthum. Pap.] 4: 170 & 749. 1854; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; H. Hallier, Meded. Rijks Herb. Leid. 37: 72. 1918; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 87, 108, & viii. 1921; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561 (1946) and imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 282 (1971) and 2: 864 & 971. 1971; Mold., Phytol. Mem. 2: 272, 384, & 535. 1980.

Griffith's original (1854) description of this plant is "Basi suffruticosa, erecta ramosa 4,5 pedaLis. Foliis longe petiolatis infernis cordatis acuminatis subintegris basi 3-nervus, nervo medio ad basin utrinque 1-glanduloso (glandulo e 4 confertis callosis composito) sublente utrinque punctulat. subtus ad nervos tenuissime velutinis. Cymis axillaribus terminalibusque aggregatis corymbum densiflorum mentientibus, floribus albis. Cor. tubus rectus longissimus in laciniarum marginibus revolutis staminibus longiss. exsertis, stylum longe superant. Anth. caeruleo livide. Cal. glandulosis fructifer amplectus, ruber subcarnosusque. Capsula atrocaerulea, baccata 4-sperma. Sem. nigrescentia angulato. Albumine O. Radicula brevis infera. Hab. Frequent Mergui in Ruderat, florem, July to Nov. Mergue Herb. 79."

Bakhuizen (1921) reduces this species to synonymy under *C. bracteatum* Wall., but without giving any reason for so doing. He does not cite -- and apparently did not see -- the type collection from Tenasserim in southern Burma. *Clerodendrum bracteatum* is not known from Tenasserim, nor, for that matter, from anywhere else in Burma.

Nothing is known to me of Wallich's plant beyond what is stated in its meager bibliography (above).

CLERODENDRUM DENTICULATUM Mold., Geogr. Distrib. Avicenn. 5, nom. nud. 1939; Carib. Forester 2: 14. 1940.

Bibliography: Mold., Geogr. Distrib. Avicenn. 5. 1939; Mold., Carib. Forester 2: 14. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 24 & 89. 1942; Mold., Alph. List Cit. 1: 186. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 43 & 181. 1949; E. S. Salisb., Ind. Kew. Suppl. 11: 56. 1953; Alain in León & Alain, Fl. Cuba, imp. 1, 4: 319 & 322. 1957; Mold., Résumé 51 & 449. 1959; Mold., Fifth Summ. 1: 95 (1971) and 2: 864. 1971; Alain in León & Alain, Fl. Cuba, imp. 2, 2: 319 & 322. 1974; Mold., Phytol. Mem. 2: 88 & 535. 1980.

A tree; branchlets stout, subterete, flattened at the nodes, light-gray, corky, glabrous; twigs slender, angulate-striate, brown, glabrous, issuing from a tomentose felt around the basal leaf-scars of the adjacent branchlet; nodes not annulate; principal internodes 1--5 cm. long; leaves decussate-opposite (or only approximate on the younger twigs), often clustered; petioles very slender, 5--12

mm. long, brown, canaliculate above, glabrous; leaf-blades chartaceous or membranous, uniformly dull-green on both surfaces (the immature ones brunnescent in drying), elliptic or obovate, 2.3--5.5 cm. long, 1--2 cm. wide, apically obtuse or rounded (or rarely subacute), marginally denticulate with very minute apiculate teeth from the apex to the base, basally acute, glabrous on both surfaces and finely areolate; midrib very slender, impressed but distinct to the apex (!) above, prominulent beneath; secondaries 4--6 per side, very slender, lightly impressed or obscure above, lightly prominulent beneath; vein and veinlet reticulation indiscernible above, often obscure beneath; inflorescence axillary, apparently small and few-(2--4-?) flowered; peduncles obsolete or to 1 mm. long; fruiting pedicels slender, 4--11 mm. long, spreading, glabrate; flowers and fruit not known.

This problematic species is based on *E. L. Ekman 9176* from Mogote, in the limestone hills near Palma de Cauto, Oriente, Cuba, at 300 m. altitude, collected on April 10, 1918, and deposited in the Berlin herbarium, now doubtless destroyed. A note by the collector in the type sheet says "Closely allied to *Cler. anafensi* if not the same". Another notation, this one by Urban, says "spec. nov., si hujus generis".

A key to distinguish this species from other known Cuban taxa is given under *C. grandiflorum* (Hook.) Schau. in the present series of notes.

Citations: CUBA: Oriente: *Ekman 9176* (B--type, Ld--photo of type, Mi--photo of type, N--isotype, N--photo of type, S--isotype).

CLERODENDRUM DEPENDENS A. DC., Bull. Herb. Boiss., ser. 2, 1: 581 [as "*Clerodendron*"]. 1901; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89. 1942.

Synonymy: *?Clerodendron dependens* A. DC., Bull. Herb. Boiss., ser. 2, 1: 581. 1901.

Bibliography: A. DC., Bull. Herb. Boiss., ser. 2, 1: 581. 1901; Prain, Ind. Kew. Suppl. 3: 44. 1908; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89 (1942) and ed. 2, 123 & 181. 1949; Mold. in Humbert, Fl. Madag. 174: 147, 156, 266, & 267. 1956; Mold., Résumé 155 & 449. 1959; Mold., Fifth Summ. 1: 259 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 248 & 535. 1980; Mold., Phytologia 58: 184. 1985.

A glabrous shrub; branchlets slender, alternately flattened; leaves decussate-opposite, very short-petiolate; petioles 2--4 mm. long; leaf-blades rigid, ovate-lanceolate, about 7 cm. long and 2 cm. wide, apically obtusely acuminate, basally obtuse or subrotundate; secondaries about 8 per side, arcuately joined some distance from the margins; cymes axillary, bifid; peduncles very slender, 20 cm. or more in length, pendulous; flowers not known but the corollas said to be white; fruit "resembling an olive" (according to the collector).

This problematic species is based on *Mocquerys 225* from Maroa, in eastern Madagascar, deposited in the DeCandolle Herbarium at Geneva. Nothing is known to me of this plant except what is stated in its sparse bibliography (above).

CLERODENDRUM DEWITTEI Mold., Phytologia 4: 288. 1953.

Bibliography: Mold., Biol. Abstr. 27: 3121. 1953; Mold., Phytologia 4: 288. 1953; Hauman, Assoc. Étud. Tax. Fl. Afr. Trop. Ind. 1954; Mold., Résumé 141 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Fifth Summ. 1: 228 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218 & 536. 1980.

A woody vine; branches slender, light-grayish, glabrous; branchlets very slender, brownish, glabrous; nodes not annulate; principal internodes 2.5--6.5 cm. long; leaves decussate-opposite or subopposite-approximate, apparently confined to the young branchlets, borne on conspicuously elevated corky sterigmata; petioles slender, 5--8 mm. long, short-pubescent in lines on the flattened upper surface, otherwise glabrous; leaf-blades membranous, dark-green on both surfaces, brunnescent in drying, hardly lighter beneath, elliptic-lanceolate, 5--9 cm. long, 2.1--3.5 cm. wide, apically acuminate, marginally entire, basally rounded, glabrous and shiny on both surfaces; midrib very slender, flat above, prominulous beneath; secondaries filiform, 5 or 6 per side, arcuate-ascending, irregular, flattened or microscopically prominulous above, prominulous beneath, not conspicuously anastomosing; veinlet reticulation very abundant and fine, conspicuous but hardly prominulous on both surfaces; inflorescence borne on the leafless branches, on short supra-axillary or axillary twig-like peduncles 3--4 cm. long, bearing several linear bractlets, especially toward the base, glabrate or minutely and sparsely puberulous, densely many-flowered, umbelliform or capitate; pedicels filiform, 1--3 mm. long, glabrate or minutely puberulous; bractlets numerous, linear, 2--3 mm. long, often light-colored; calyx campanulate, about 7 mm. long and 5 mm. wide, glabrous, deeply 5-lobed, the lobes ovate, about 2 mm. long, apically apiculate; corolla hypocrateriform, its tube very slender, about 18 mm. long, glabrous, the limb about 1 cm. wide; stamens exserted about 1.5 cm. from the corolla-mouth.

This apparently endemic species is based on *G. F. DeWitte 291* from Lukulu, Katanga, Zaire, collected between April 30 and May 3, 1931, and deposited in the Brussels herbarium. Thus far it is known only from the original collection.

Citations: ZAIRE: *DeWitte 291* (Br--type, Br--isotype, Ld--photo of type, N--isotype, N--photo of type).

CLERODENDRUM DINKLAGEI Gürke, Engl. Bot. Jahrb. 18: 175 [as "*Clerodendron*"]. 1893; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 35, 61, & 93. 1936

Synonymy: *Clerodendron dinklagei* Gürke, Engl. Bot. Jahrb. 18: 175. 1893.

Bibliography: Gürke, Engl. Bot. Jahrb. 18: 175. 1893; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293 & 302. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 35, 61, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 56. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 113 & 181. 1949; Mold., Résumé 139 & 449. 1959; Mold., Fifth Summ. 1: 223 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 213 & 536. 1980;

Mold., Phytologia 58: 354. 1985.

A shrub; stems brown, narrowly hollow; branchlets densely clothed with reflexed articulated hairs which are only 1--2 mm. long; petioles 5--10 cm. long; leaf-blades oblong or elliptic-oblong, 8--10 cm. long, 4--6 cm. wide, apically long-acuminate, marginally entire, basally obtuse or rounded, sparsely clothed with appressed hairs on both surfaces; cymes axillary, few-flowered, corymbiform; peduncles 1--2 cm. long; bracts minute, subulate-filiform; calyx broadly campanulate, 5-parted nearly to the base, the lobes lanceolate or ovate-lanceolate, apically acuminate, 3-veined, pubescent; filaments to 3.5 cm. long; corolla, fruiting-calyx, and fruit not known.

This obscure species is based on *Dinklage 1008* from moist woods at Great Batanga, Cameroons, collected on February 2, 1891, and deposited in the Berlin herbarium, now doubtless destroyed. Gürke (1893) says of it: "Steht dem *C. Büttneri* sehr nahe, ist aber durch schwächere und kürzere Behaarung unterschieden; auch sind hier die Haare rückwärts gerichtet, bei *C. Büttneri* abstehend. Die Blätter sind am Grunde abgerundet und nicht herzförmig wie bei *C. Büttneri*, auch etwas länger zugespitzt. Die Kelchzipfel sind länger, schmäler und mehr zugespitzt als bei jener Art."

Baker (1900) cites only the type collection, but Thomas (1936) adds *Dinklage 1443*, also from the Cameroons.

Jackson (1893) cites Gürke's original publication of this taxon as "1894", the titlepage date, but it was actually published in 1893.

Baker's (1900) key to the tropical African species of this genus known to him with non-capitate inflorescences and large flowers may prove of some help in distinguishing this species from its close relatives (the key has been somewhat modified by me for the sake of clarity and the nomenclature brought up-to-date):

1. Leaf-blades oblong.
  2. Leaf-blades glabrous.
    3. Corollas bright-red.....*C. splendens.*
    3a. Corollas white.....*C. buchholzii.*
  2a. Leaf-blades pubescent.
    4. Leaf-blades narrowed to the base.....*C. harnierianum.*
    4a. Leaf-blades basally rounded.
      5. Petioles only 2--8 cm. long.....*C. umbellatum.*
      5a. Petioles usually longer, 5--10 cm. long.....*C. dinklagei.*
    4b. Leaf-blades basally cordate.....*C. buettneri.*
1a. Leaf-blades ovate.
  6. Leaf-blades glabrous.
    7. Calyx not inflated.
      8. Leaf-blades apically more or less acuminate..*C. buchholzii.*
      8a. Leaf-blades apically obtuse or rounded...*C. hildebrandtii.*
    7a. Calyx inflated.....*C. thomsonae.*
  6a. Leaf-blades more or less pubescent.
    9. Petioles short.
      10. Leaf-blades finely pubescent.....*C. acerbianum.*
      10a. Leaf-blades velvety on both surfaces.....*C. trichobotum.*
    9a. Petioles moderately long (1.2--2.5 cm.)....*C. pleiosciadium.*
    9b. Petioles very long (5--7 cm.).....*C. longipetiolatum.*

1b. Leaf-blades obcordate-ovate.
11. Calyx finely pubescent.
12. Calyx inflated.....*C. umbellatum* f. *scandens*.
12a. Calyx not inflated.....*C. cordifolium*.
11a. Calyx densely fuscous-pubescent.....*C. fuscum*.

Nothing is known to me of *Clerodendrum dinklagei* beyond what is stated in its sparse bibliography (above).

CLERODENDRUM DISCOLOR (Klotzsch) Vatke, Linnaea 43: 536 [as "*Clerodendron*"]. 1882; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84. 1936 [not *Clerodendrum discolor* Turcz., 1971, nor *Clerodendron discolor* Becc., 1902].

Synonymy: *Cyclonema discolor* Klotzsch in Peters, Naturwiss. Reise Mossamb. 66 (1): Bot. 262--263. 1861. *Clerodendron discolor* (Klotzsch) Vatke, Linnaea 43: 536. 1882. *Clerodendron discolor* Vatke apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893. *Clerodendron myricoides* var. *discolor* Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 310. 1900. *Clerodendron myricoides* var. *discolor* (Klotzsch) J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 310. 1900. *Cyclonema myricoides* var. *tomentosum* Almagia in Pirotta, Fl. Col. Erit. [Ann. Inst. Bot. Roma 8:] 34. 1903. *Clerodendron bequaerti* DeWild., Bull. Jard. Bot. Brux. 7: 185--186. 1920 [not *C. bequaerti* DeWild., 1914]. *Clerodendron bequaerti* var. *debeerstii* DeWild., Bull. Jard. Bot. Brux. 7: 185. 1920. *Clerodendron villosulum* De Wild., Contrib. Fl. Katanga 165. 1921. *Clerodendron villosulum* var. *debeerstii* DeWild., Contrib. Fl. Katanga 165. 1921. *Clerodendrum discolor* var. *eudiscolor* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84. *1936*. *Clerodendrum wildemannianum* Robyns ex B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936 [not *Clerodendron wildemannianum* Exell, 1930]. *Clerodendrum wildemannianum* var. *debeerstii* Robyns ex B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936. *Clerodendrum villosulum* DeWild. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936. *Clerodendrum villosulum* var. *debeerstii* DeWild. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936. *Clerodendrum bequaerti* DeWild. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936. *Clerodendrum bequaerti* var. *debeerstii* De Wild. apud B. ThomaS, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 84 in syn. 1936. *Clerodendrum myricoides* var. *discolor* (Klotzsch) J. G. Baker apud Mold., Prelim. Alph. List Inv. Names 23 in syn. 1940. *Cyclonema discolor* "Klotzsch in Peters" apud Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 798 in syn. 1962. *Clerodendrum myricoides* var. *discolor* (Kl. in Pet.) Baker apud Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 798 in syn. 1962. *Clerodendrum discolor* var. *discolor* [(Klotzsch) Vatke] ex Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: [230]. 1972. *Clerodendron discolor* Klotzsch ex Mold., Phytol. Mem. 2: 384 in syn. 1980.

Bibliography: Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.], 1: 262--263. 1861; Vatke, Linnaea 43: 536. 1882; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561 & 679. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. C: 341. 1895; J. G. Baker in Thiselt.-

Dyer, Fl. Trop. Afr. 5: 310. 1900; Becc., Nelle Foreste Borneo 203. 1902; Almagia in Pirotta, Fl. Col. Erit. [Ann. Inst. Bot. Roma 8:] 134. 1903; Prain, Ind. Kew. Suppl. 3: 44. 1908; R. E. Fries in Von Rosen, Wiss. Ergebn. Schwed. Rhod.-Kong.-Exped. Bot. 2 (2): 275. 1916; H. J. Lam, Verbenac. Malay. Arch. 320 & 363. 1919; DeWild., Bull. Jard. Bot. Brux. 7: 185--186. 1920; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94. 1921; DeWild., Contrib. Fl. Katanga 165. 1921; DeWild., Pl. Bequaert 2: 256--258. 1922; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497 (1927) and 53 (1): 1072. 1932; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 4, 10, 12, 13, 16, 47, 84--86, 92, 93, & 96. 1936; Mold., Prelim. Alph. List Inv. Names 23 & 24. 1940; Mold., Alph. List Inv. Names 16, 21, & 23. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 45, 49--51, 80, & 89. 1942; Mold., Alph. List Cit. 1: 74. 1946; W. Robyns, Fl. Sperm. Parc Nat. Albert 2: 142 & 146--147. 1947; H. N. & A. L. Mold., Pl. Life 2: 50, 55, & 57. 1948; Mold., Alph. List Cit. 2: 558 (1948), 3: 723 & 762 (1949), and 4: 1097, 1123, & 1140. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 110, 115--120, & 181. 1949; J. K. Jacks., Journ. Ecol. 44: 363. 1956; Mold., Résumé 134, 141, 143, 145, 150, 260, 267, 267, 271, 273, 276, & 449. 1959; Mold., Résumé Suppl. 1: 9, 16, & 25. 1959; Mold., Biol. Abstr. 35: 1688. 1960; Dale & Greenway, Kenya Trees 583. 1961; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 798--799. 1962; Hocking, Excerpt. Bot. A.4: 592. 1962; Mold., Résumé Suppl. 3: 15. 1962; F. White, For. Fl. North. Rhodes. 365 & 366. 1962; Mold., Résumé Suppl. 12: 6. 1965; Wild, Kirkia 5: 4. 1965; Mold., Résumé Suppl. 13: 4 & 6 (1966) and 15: 19. 1967; Glover, Gloss. Bot. Kipsig. Names Kenya 158. 1967; Mold., Résumé Suppl. 16: 7 & 8. 1968; Glover, Stewart, Fumerton, Marindany, & Anderson, Gloss. Botan.-Kipsig. Names 232 & 259. 1969; Gillett, Numb. Check-list Trees Kenya 46. 1970; J. K. Jacks. in Eyre, World Veget. Types 94. 1971; Mold., Fifth Summ. 1: 212, 221, 228, 232--235, 240, 242, 247, 249, 250, 255, 358, 440, 443, 451, 459--461, 464, & 473 (1971) and 2: 864. 1971; Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: [230]. 1972; Mold., Phytologia 28: 441 (1974), 31: 350 & 351 (1975), and 34: 261 & 262. 1976; Mold., Phytol. Mem. 2: 201--203, 218, 222, 223, 225, 229, 230, 240, 249, 384, 391, & 536. 1980; Reis & Lipp, New Pl. Sources Drugs 251. 1982; Mold., Phytologia 58: 332 & 441. 1985.

A large bush, subshrub, or even tall shrub, 0.5--4 m. tall, usually much-branched; stems often herbaceous, often single; sap colorless; bark rough; branches more or less polygonal in cross-section, especially the young ones very densely short-pubescent or velutinous to tomentose; leaves whorled, unpleasantly aromatic, the upper ones gradually passing into bracts; petioles very slender, to 1.8 cm. long but often very short, basally articulate; leaf-blades elliptic or obovate-elliptic, 3.5--16 cm. long, 1.2--7 cm. wide, apically rounded-acute or cuneiform, marginally coarsely dentate (or the lowest sometimes entire), basally attenuate or cuneiform, pubescent on both surfaces, more densely so or subtomentose and paler beneath, with grayish hairs, especially on the venation; secondaries 6--9 per side, quite visible on both surfaces; inflorescence axillary and terminating the stem and branches, paniculate, pedunculate, branched,

the axis and cyme-branches villous; flowers zygomorphic, pleasantly scented, pedicellate; pedicels very slender, to 4 mm. long, villous, basally bibracteolate; bracts foliaceous; bractlets linear, marginally ciliate; calyx more or less campanulate, 4--5 mm. long, green flushed with purple, more or less densely pubescent with violet hairs that often turn gray in drying, the 5 lobes triangular-rounded, erect, apically obtuse and purplish; corolla infundubular or hypocrateriform, in various shades of blue, lavender, or violet to mauve or purple, the lower lip usually darker or varicolored, the tube 6--7 mm. long, apically ampliate, curvate, the limb oblique, bilabiate, 5-lobed, the lobes 10--11 m. long, dorsally pubescent; filaments blue or pale purplish-violet, exserted; anthers blue or pale-blue to brown; style blue; fruit drupaceous, fleshy, juicy, at first green, then red, finally black, about 7 mm. long and 10--12 mm. wide, sometimes insect-galled to the size of a small marble.

This very variable polymorphic species is based on an unnumbered Peters collection from Rios de Sena, Mozambique.

The corolla is described by collectors as "blue" on *Bequaert 2754, 3454, 3989, 5021,* & *5544, Lebrun 5039, Peter 3019,* and *Schlieben 7294,* "pale-blue" on *Bequaert 4213* & *4907* and *Roechoudt 13* and by Gürke (1895), "deep-blue" on *Stone 7937,* "lavender-blue" on *Greenway & Doughty 8526,* "blue-violet" on *Ash 2947,* "blue-mauve" on *Germain 4113* and *Lucas 191,* "light-blue" on *Peter 42178,* "lilac-blue" on *Tanner R.T.3291,* "royal- and pale-blue" on *Tanner R.T. 3831,* "violet" on *DeWitte 1290* and *Lebrun 9139,* "mauve" on *Reekmans 1388* and *Roechoudt 7,* "claret, not blue" on *Ullmmer 2572,* "rather dark mauve" on *Faulkner 1496,* "blue to violet" on *Reekmans 1988,* "bluish-gray" on *Peter 9730,* "clear-blue, whitish on the outside" on *Lewalle 129,* "pale-mauve, the lobes violet" on *Germain 2897,* "pale-violet, one petal dark-violet" on *Germain 1117,* "green except for the pale-blue lower petal" on *Robinson 2935,* "pale-blue, the lower petal dark-blue" on *Strid 4095,* and "purplish-violet, the lower lip with a paler mid-petal band bounded on either side by a rich-purple zone" on *Maas Geesteranus 5203;* "the inferior lip blue" on *Bequaert 3989.*

Collectors have encountered this plant on herbaceous and wooded savannas, *Andropogon* steppes and grasslands, in pastures and along roadsides, in thickets and coppices, among sclerophyllous vegetation on lava flows, among volcanic boulders, along the borders of streams, on lava plains and cultivated steppes, in *Erythrina lapilli* thickets, in light forests on heavy brown loam, among rocks and in hollows on hillsides, on savannas with *Entada* and *Combretum* or with *Acacia,* in grass and *Bauhinia* scrub on hillsides, and among riverside rocks, from 800 to 2660 m. altitude, in flower in every month of the year, and in fruit in March, April, and September to December. Greenway & Doughty describe it as "common but scattered in grasslands with *Combretum, Terminalia, Vitex, Entada, Acacia stenocarpa,* and native cultivations of maize and sorghum" in Kenya; in the same country Maas Geesteranus found it growing "in open savanna woodland along edge of forest with scattered *Acacia lahai, Erythrina tomentosa, Syzygium cordatum,* and clumps of shrubs in boulder-strewn country sloping to the south". Also in Kenya Lucas refers to it as "common but well scattered bush to 5 feet tall on escarpment roadsides" at 4000 feet

altitude.

Vernacular names reported for this plant are "achwimpodo", "chesamisok", "chesamisyet", [=bad odor], "esyapot", "mokosamama", "n'angho ngol yako". "masufi", "obetik" [=easy to lose or not easy to find], "obetyot", "umukanyama", "umukuzaniama", "umukuzaniana", and "umukusanyana".

In Zaire an extract of the roots is used as a remedy for blennorhagia, while in Tanzania it is used as an antidote for venomous snakebites.

Baker (1900) cites for this species *Wilson 138* from Uganda, *Welwitsch 5700* from Angola, *Holst 2571, Johnston 95,* and *Volkens 226* from Tanganyika, *Peters s.n.* from Mozambique, *Buchanan 33, Kirk s.n.,* and *Whyte s.n.* from Malawi, and *Holub s.n.* from Zimbabwe.

Almagia (1903) cites *Ragazzi 195, "P. 3399",* and *"T. P. 782"* for his proposed *Cyclonema myricoides* var. *tomentosum* and comments that "Ho creduto di poter distinguere gli esemplari sopra citati come una varietà del *Cyclonema myricoides* (R. Br.) perchè le foglie, a differenza di quelle del tipo, si presentano tutte piu o meno tomentose".

Fries (1916) cites his *no. 1593* from the Vulkan Mountains and gives the overall distribution of the species, as regarded by him, as tropical eastern and central Africa from Uganda to Nyasaland, Zimbabwe and Angola. He comments that "In der Gebirgen am Südende des Kiwu-Sees (ca. 1500 m ü. M.) wurde noch eine mannshohe, strauchartige *Clerodendron*-Art mit eirunden Blättern gesammelt (*n. 1509*), die ich in den Herbarien nicht gefunden habe. Da sie nur im Fruchtstadium vorliegt, ist ihre Identifizierung gegenwärtig nicht möglich."

DeWildeman (1920) cites and bases his *C. bequaerti* on *Bequaert 2754, 3454, 3989, 4213, 4907, 5021, 5544,* & *5828* from Zaire. He comments that "La vilosité du calice est plus ou moins accentué, elle passe du gris au violacé, couleur qui se conserve parfois à l'état sec. Toutes les feuilles supérieures des rameaux florifères sont dentées, parfois on trouve à la base des rameaux des feuilles presque entières, ce qui forme le passage vers la forme que nous avons rattachée à cette espèce le nom de *Debeerstii* (plante recueille par R. P. Debeerst, à Pala [Katanga])." The proposed binomial, *C. bequaerti,* being a homonym of his *C. bequaerti* published in 1914, is the basis of the later binomials, *C. villosulum* DeWild. and *C. wildemannianum* Robyns. DeWildeman, in his 1922 work, cites the same *Bequaert 2754, 3454, 3989, 4213, 4907, 5021, 5544,* & *5828* from Zaire.

Thomas (1936) cites *Peters s.n.* from Mozambique (the type collection); *Busse 873, Merker 312, Meyer 30, Mildbraed 1123, Stuhlmann 1693, 1741,* & *8787,* and *Uhlig 396* from Tanganyika; *Bequaert 3454, 3989, 4213, 4907, 5021,* & *5544, Debeerst 13, Linder 2039,* and *Witte 1290* from Zaire; *Neumann 158* from Ethiopia; and *Troll 5935* from Kenya.

Robyns (1947) cites *Bequaert 3454, 3989,* & *4213, DeWitte 1290, Fries 1593, Lebrun 5039,* and *Roechoudt 7* & *13* from Zaire and comments: "Arbuste tropophile et fort variable, habitant les savanes de l'Afrique tropicale central et orientale, s'étendant vers l'Abyssinia au Nord et vers l'Angola et le Mozambique au Sud. Au Congo Belge.

il se rencontre dans le Sud du District du Lac Albert, dans le District des Lacs Edouard et Kivu et dans le Ruanda occidental...Cette espèce est très voisine du *Cl. myricoides* (Hochst.) Vatke, dont elle n'est peut-être qu'une forme tomenteuse."

Dale & Greenway (1961) cite *Fries 274a, Hildebrandt 2729, Jex Blake 2559, Johnston s.n., Klässner 683,* and *Whyte s.n.* from Kenya, where they found it in the Rift Valley, Central and Southern Provinces, commenting that "Greenway considers that this plant is unworthy of specific rank and should revert to a variety of *C. myricoides.*" Glover (1967) cites *Kerfoot 2139* from Kenya, while Lewalle (1972) cites *Lewalle 129* from Burundi.

Vatke (1882) comments that the remainder of the taxa placed by Klotzsch in *Cyclonema* actually belong, instead, to the very distinct genus *Holmskioldia.*

It may well be found helpful to reproduce here the key to the species known to Dale & Greenway (1961) from Kenya. somewhat modified by me for the sake of clarity:

1. Flowers actinomorphic.
  2. Inflorescence capitate, rarely in closed cymes.
    3. Corolla-tube to 12.5 cm. long.....*C. fischeri.*
    3a. Corolla-tube less than 12 cm. long.
      4. Corolla-tube to 7.5 cm. long; leaves opposite or ternate.....*C. rotundifolium.*
      4a. Corolla-tube only to 2.5 cm. long or less; leaves opposite, ternate, or quaternate.
        5. Corolla-tube about 2.5 cm. long; leaves opposite, ternate, or quaternate, the blades not punctate.....*C. acerbianum.*
        5a. Corolla-tube only about 1.2 cm. long; leaves opposite or ternate, the blades glandular-punctate beneath.....*C. eriophyllum.*
  2a. Inflorescence of closed cymes, rarely capitate.
    6. Corolla-tube to about 7.5 cm. long; calyx to 1.2 cm. long....*C. rotundifolium.*
    6a. Corolla-tube only to 1.2 cm. long; calyx to 3 mm. long.
      7. Leaf-blades glabrous or glabrescent.....*C. glabrum.*
      7a. Leaf-blades always pubescent.
        8. Inflorescence dense, in many-flowered terminal and axillary cymes; leaf-blades ovate, to 6.5 cm. long, apically acute, glandular punctate beneath.....*C. glabrum* var. *vagum.*
        8a. Inflorescence a terminal corymbose panicle, sometimes also with cymes in the upper leaf-axils; leaf-blades ovate or ovate-elliptic, to 12.5 cm. long, apically rounded or cuspidate.....*C. johnstoni.*
  2b. Inflorescence of open cymes, usually paniculate.....*C. hildebrandtii.*

1a. Flowers zygomorphic.
  9. Plant leafless when in flower; corolla-tube short, the lobes declinate.....*C. makanjanum.*
  9a. Plant leafy when in flower; corolla-tube enlarged, saccate on one side above, cleft on the other side, the anterior lobe

arched and much larger than the others.
10. Leaves opposite or ternate, glabrous, not bicolored; corollas in shades of blue and white.
11. Leaves opposite, distinctly petiolate, the blades not glandular-punctate; calyx-lobes apically obtuse and reflexed.....C. *schefflerí*.
11a. Leaves opposite or ternate, subsessile, the blades glandular-punctate beneath; calyx-lobes apically broadly acute, not reflexed.....C. *ugandense*.
10a. Leaves verticillate, the blades pubescent or glabrous, often bicolored; corollas blue or purple.
12. Branches densely pubescent or tomentose; leaf-blades elliptic or obovate-elliptic, to 7.5 cm. long, more or less densely pubescent or subtomentose beneath; calyx more or less densely pubescent.....C. *discolor*.
12a. Branches glabrous or only lightly pubescent; leaf-blades ovate-elliptic to oblong, to 12.5 cm. long, glabrous above and only very sparsely pubescent or subglabrous and glandular-punctate beneath; calyx glabrous or only very sparsely puberulent.....C. *myricoides*.

The subspecific taxa of *Clerodendrum discolor* may be distinguished as follows, in a key taken, with modifications, from Thomas (1936):
1. Branches few-flowered, not 6-angled nor ridged, more or less pubescent; leaf-blades marginally more or less dentate.
2. Calyx only to 2 or 3 mm. long, subglabrous; leaf-blades marginally sharply serrate, only sparsely pubescent above..... var. *dümmeri*.
2a. Calyx about 4 mm. long, pubescent.
3. Leaves often whorled on abbreviated branchlets.
4. Calyx red.....var. *rubricalyx*.
4a. Calyx green.....typical C. *discolor*.
3a. Leaves regularly opposite; branches tetragonal.
5. Individual cymes many-flowered.....var. *oppositifolium*.
5a. Individual cymes only 1- or 2-flowered and very long-stipitate.....var. *crenatum*.
2b. Calyx more than 4 mm. long, usually about 6 mm. long; calyx and corolla-tube very pubescent; branches more or less round in cross-section.....var. *kilimandscharense*.
1a. Branches many-flowered, 6-angled and with longitudinal ridges, subglabrous; leaf-blades marginally subentire..var. *pluriflorum*.

It may be worth noting here that the Klotzsch (1861) reference in the synonymy and bibliography of this species is often cited as "1862"; Jackson (1893) cites it to page "260" -- he also cites the Vatke (1882) reference by the titlepage date "1880--1882". Cufodontis (1962) cites the Almagia trinomial to "1904" instead of 1903.

Material of what appears to be typical C. *discolor* has been misidentified and distributed in some herbaria as C. *discolor* var. *dümmeri* Thomas, C. *incisum* Klotzsch, C. *myricoides* (Hochst.) R. Br., "C. *myricoides* sens. lat.", and C. *ugandense* Prain. On the other hand, the *Daviess 23248* and *Tanner 668*, distributed as typical C.

discolor, actually are *C. discolor* var. *crenatum* Thomas, while *Buchanan 1383* and *Mearns 1223* are *C. discolor* var. *dümmeri* Thomas; *Germain 6520* is *C. discolor* var. *kilimandscharense* Thomas; *Fries, Norlindh, & Weimarck 2456, Hildebrandt 2729, Honey 807, Mearns 1051, 1111, 1177, 1938, & 2539, F. A. Mendonça 147, 1374, 1418, 1426, 2510, & 3612, Robinson 2935, Stolz 317, Torre 588, 3156, 3206, 3759, 5977. & 6213,* and *Whyte s.n.* [Zomba] are *C. discolor* var. *oppositifolium* Thomas; *Gomes & Sousa 4334, Stolz 470, Torre 4741,* and *Torre & Paiva 9426* are *C. discolor* var. *pluriflorum* Thomas; *Lemos & Balsinhas 272, Torre & Paiva 9747,* and *Troupin 5551* are *C. myricoides* var. *camporum* Gürke; *Lewalle 4049* is *C. myricoides* var. *niansanum* Thomas; *Barbosa 1018, 1059, & 1582, Garcia 323,* and *Torre & Paiva 9884* are *C. reflexum* H. H. W. Pearson; and *Reekmans 1627* is *C. ugandense* Prain; *Descamps 13* seems definitely to be *C. dekindtii* Gürke.

Citations: SUDAN: *Michaiel 728* [99] (Gz). ERITREA: *Schweinfurth & Riva 1055* (W--829447). ETHIOPIA: *C. C. Albers 62242* (Au--223603); *Ash 2947* (Mu). ZAIRE: *Becquet 327* (Br, Br, Br), *400* (Br); *Bequaert 1290* (Br), *2754* (Br, N, W--1270180), *3454* (Br), *3989* (Br), *4213* (Br), *4907* (Br), *5021* (Br), *5544* (Br, Ld--photo, N--photo), *5828* (Br), *s.n.* [25.XI.14] (Br); *Craton 89* (W--2168589); *Germain 1117* (Br), *2897* (Af, Br), *4113* (Br); *Ghesquiere 3830* (Br), *5680* (Br, Br, Br); *Humbert 7344* (Br); *Lebrun 4193* (Br, Br, N); *8243* (Br), *9189* (Br); *Luja 76* (Br, Br, N); *Robert 19* (Br, Br); *Roechoudt 7* (Br), *13* (Br). BURUNDI: *Lewalle 129* (Mu), *2535* (Gz, Ld, Ld); *Reekmans 1388* (E--2209173), *1988* (E--2209183), *6546* (N). RWANDA: *Tropin 6011* (W--2375315). UGANDA: *Dümmer 2572* (W--634882); *Dyson-Hudson 233* (W--2568351); *A. Holm 29* (S). TANZANIA: Tanganyika: *E. M. Bruce 36* (Br); *Busse 912* [Peter 51869] (B); *Faulkner 1496* (B, S); *Peter 702* [O.I.19] (B, B), *1492* [O.I.37] (B), *1751* [O.I.43] (B), *3019* [O.I.74] (B, B), *9177* [O.III.56] (B, B), *9730* [O.III.66] (B), *14236* [O.III.206] (B), *14351* [O.III.209] (B), *42178* [V.280] (B), *51786* [O.I.129] (B); *Schlieben 4294* (B), *7294* (Mu); *Tanner R.T.3291* (Ba), *3831* (Ba), *4806* (Ba); *Volkens 226* (L). KENYA: *Greenway & Doughty 8526* (Af); *Lindblom s.n.* [1911-1912] (S); *Lucas 191* (S); *Maas Geesteranus 5203* (Go); *Mearns 61* (W--630061), *162* (W--630169), *981* (W--631016), *1037* (W--631073), *1223* (N, N, W--631267), *1230* (W--631274), *1808* (W--631769), *1926* (W--631882); *Newbould 3523* (S); *Piemeisel & Kephart 78* (W--1373183); *B. C. Stone 7937* (Kl--10571, W--2584493A); *Strid 4095* (Go). ZAMBIA: *Robinson 2935* (Ba). MOZAMBIQUE: Manica e Sofala: *F. A. Mendonça 3874* (Ul). CULTIVATED: Sudan: *Kassas 632* (Gz).

CLERODENDRUM DISCOLOR var. *CRENATUM* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1936.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49 & 89 (1942) and ed. 2, 116 & 181. 1949; Mold., Résumé 143, 148, & 449. 1959; Mold., Fifth Summ. 1: 233, 234, & 247 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 223, 225, 236, 242, 244, & 536. 1980.

This variety differs from the typical form of the species in its decussate-opposite leaves, long-pedunculate 1- or 2-flowered cymes, and (presumably) crenate-margined leaf-blades.

The variety is based on *Conrads 8* from Bukumbi, at 1190 m. altitude, Uganda, deposited in the Berlin herbarium, now doubtless destroyed.

Collectors describe this plant as a pleasantly aromatic shrub, 2-3 m. tall, or a small tree, the bark smooth, and the sap colorless. Tanner refers to the corollas as "mauve", while Schlieben describes them as "yellowish-white". It has been found in thick cover on bouldered hills at altitudes of 3500--4650 feet, in flower in January, February, April, and December, and in fruit in February.

Tanner reports its occurrence in Tanganyika as "many bushes but flowers very infrequently"; Schlieben refers to it as "scattered" in the Transvaal.

Material of this taxon has been misidentified and distributed in some herbaria as typical *C. discolor* (Klotzsch) Vatke and its variety *oppositifolium* Thomas and *C. myricoides* (Hochst.) R. Br. On the other hand, the *Dinter 5301*, distributed as *C. discolor* var. *crenatum*, actually is *C. dekindtii* var. *dinteri* Thomas.

Citations: ZIMBABWE: *Daviess 23248* (N); *G. M. McGregor M.13/51* [Govt. Herb. Salisbury 32448] (N). TANZANIA: Tanganyika: *Burtt 5105* (Br, Ld--photo, N--photo); *Tanner 668* (Ca--178139, Mi, N). SOUTH AFRICA: Transvaal: *Schlieben 7709* (W--2272492).

CLERODENDRUM DISCOLOR var. *DÜMMERI* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1936

Synonymy: *Clerodendrum discolor* var. *dummeri* Thomas apud Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49 & 89. 1936.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 57. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 116 & 181. 1949; Mold., Résumé 141, 143, 145, & 449. 1959; Mold., Fifth Summ. 1: 228, 233, 235, & 240 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 223, 225, 230, 238, & 536. 1980.

This variety differs from the typical form of the species in its mostly smaller calyx, which is only 2--3 mm. long during anthesis and is externally subglabrate. The leaf-blades are marginally sharply serrate and only sparsely pubescent on the upper surface.

The variety is based on *Dümmer 94* from Kipayo, Uganda, deposited in the Berlin herbarium, now doubtless destroyed. Thomas (1936) cites also *Schlieben 2818* from Tanganyika.

Collectors describe the plant as a small or tall bush, erect or straggly shrub, 0.7--3.5 m. tall, or even a small tree, the stems several from a woody rootstock, the inflorescence as a whole purplish, and the drupes yellow to finally black and shiny. They have encountered it on savannas and in swamps, at 1200--2500 m. altitude, in both flower and fruit in February and June and also in flower in October and in fruit in December.

Mrs. Forbes mistakenly refers to the fruit as "berries" and refers to the plants as "occasional shrubs on open savannas" in Uganda, while in Kenya Leippert describes the plant as "common" along roadsides.

Almost every collector describes the flowers (corollas) differently: they are said to have been "blue" on *Bullock 2377*, "pale-blue" on *Ullmer 94*, "dark-blue" on *Robinson M.R.23749*, "blue-violet" on *Rauh Ke.343*, "violet" on *Leippert 5228*, and "blue in effect but the keel deep-violet and the other petals fawn" on *Forbes 198*, the *Collector undetermined 71* bears a label describing the corollas as "lilac to violet".

A vernacular name reported for the plant in Zaire is "achwinpodo".

Material of this variety has mostly been identified and distributed in herbaria as typical *C. discolor* (Klotzsch) Vatke or as *C. myricoides* (Hochst.) R. Br. Thomas (1936) regarded the *Buchanan 1383*, cited below, as var. *oppositifolium* Thomas.

Citations: ZAIRE: *Bredo 1243* (Br), *1324* (Br), *1365* (Br, N), *1556* (Br), *1674* (Br); *Casteels 15* (Br); *Claessens 1390* (Br, N), *1461* (Br); *Collector undetermined 71* (Br); *Craene 119bis* (Br, Br, Br, Br); *Delpien s.n.* [Uele 1904] (Br); *Germain 4102* (Br, Br); *Henager 75* (Br); *Jurion 72* (Br, N), *194* (Br, Br, Br); *Lathouwers 1/7* (Br, Br), *III.5* (Br, Br, N); *Lebrun 3980* (Br, Br), *5039* (Br); *Scops 109* (Br), *190* (Br); *Steyaert M.19* (Br, N); *Taton 89* (Br, Br). UGANDA: *Ullmer 94* (W--633434--isotype); *Mrs. M. Forbes 198* (Af); *Mearns 1223* (N), *2539* (Br); *Rogers & Gardner 374* (Br). TANZANIA: Tanganyika: *Bullock 2377* (B); *Leedal 3163* (Ld); *Richards M.R.23749* (Mu); *Schlieben 2818* (Br, Ld--photo, N--photo). KENYA: *R. M. Graham 1031* (Br); *Leippert 5228* (Mu); *Rauh Ke.343* (Mu). MALAWI: *J. Buchanan 1383* (W--807416).

CLERODENDRUM DISCOLOR var. *KILIMANDSCHARENSE* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85. 1936.

Synonymy: *Clerodendrum discolor* var. *kilimadscharense* Thomas ex Mold., Résumé Suppl. 15: 19 in syn. 1967.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49, 50, & 89 (1942) and ed. 2, 116, 117, & 181. 1949; Mold., Résumé 138, 141, 143, 145, 148, & 449. 1959; Mold., Résumé Suppl. 15: 19. 1967; Mold., Fifth Summ. 1: 221, 228, 235, 240, 247, & 461 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 212, 218, 225, 230, 237, 396, & 536. 1980.

This variety differs from the typical form of the species in having the calyx about 6 mm. long at time of anthesis, externally densely pubescent, the corolla-tube densely pubescent, and the branches more or less round in cross-section.

The variety is based on *Volkens 252*, from Marangu, at 1500 m. altitude, on Mt. Kilimandjaro, Tanganyika, collected in April of 1893 and deposited in the Berlin herbarium, now lamentably destroyed. Thomas (1936) cites also *Endlich 75*, *Holst 2571*, *Petzholz 25*, and *Volkens 226* from Tanganyika and *Fries 74a* and *Kassner 683* from Kenya.

Collectors describe this plant as an erect, woody perennial, a 2--3-foot tall bush, or a "medium-sized tree", and have found it growing on burned-over ground in the open veld, at 350--1500 m. altitude, in flower in January, August, October, and December. The corollas are said to have been "blue" on *Endlich 75* and *Robinson 4805*, "light-blue" on *Germain 6520*, "pink" on *Borle s.n.*, and "lower petal blue,

the rest pale-green" on *Wild 2068*.

Material of this variety has been distributed in herbaria as typical *C. discolor* (Klotzsch) Vatke, *C. myricoides* (Hochst.) R. Br., *Bouchea hederacea* Sond., and *Holmskioldia* sp. On the other hand, the *Goldsmith 101/61*, distributed as *C. discolor* var. *kilimandscharense*, actually is better regarded as var. *oppositifolium* Thomas and *Milne-Redhead 625* is *C. lumbuense* DeWild.

Citations: ZAIRE: *Germain 6520* (Mu); *Quarré 4810* (Br, Br, Br, N). TANZANIA: Tanganyika: *Endlich 75* (Mu); *E. A. Robinson 4805* (Mu); *Volkens 226* (Br, Ld--photo, N, N--photo). KENYA: *Fries & Fries 274a* (Br, S); *Lindblom s.n.* [1911-1912] (S). ZIMBABWE: *Borle s.n.* (Af); *Hack 14* (Rh--12610); *Lanjouw 1348* (Ut--46287a); *Wild 2068* (Rh--17952).

CLERODENDRUM DISCOLOR var. *MACROCALYX* Mold., Phytologia 4: 47. 1952.

Bibliography: Mold., Phytologia 4: 47. 1952; Mold., Résumé 141 & 449. 1959; Mold., Fifth Summ. 1: 228 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218 & 536. 1980.

This variety differs from the typical form of the species in having the calyx at time of anthesis broadly campanulate, 7--9 mm. long and wide, decidedly red-tinged on the lobes, and externally pubescent, and the leaves decussate-opposite.

The variety is based on *P. Quarré 1872* from Mimanua, Zaire, collected in August of 1929 and deposited in the Brussels herbarium. Thus far it is known only from the original collection.

Citations: ZAIRE: *Quarré 1872* (Br--type, Br--isotype, Br--isotype, Ld--photo of type, N--isotype, N--photo of isotype).

CLERODENDRUM DISCOLOR var. *OPPOSITIFOLIUM* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1939.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85 & 86. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 51 & 89. 1942; Mold., Alph. List Cit. 1: 74 (1946), 2: 558 (1948), 3: 762 & 952 (1949), and 4: 1123. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 119, 120, & 181. 1949; Wild, Vict. Falls Handb. 158. 1953; Mold., Résumé 141, 143, 148--150, 153, 215, & 449. 1959; Mold., Résumé Suppl. 3: 15 (1962), 12: 6 (1965), 13: 4 (1966), and 16: 7 & 8. 1968; Mold., Fifth Summ. 1: 224, 232, 235, 242, 247, 249, 250, 255, & 358 (1971) and 2: 864. 1971; Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Dujumb. Fac. Sci. C.20]: [230]. 1972; Mold., Phytologia 34: 261 & 262. 1976; Mold., Phytol. Mem. 2: 218, 222, 223, 225, 230, 232, 235, 237, 238, 240, & 536. 1980; Reis & Lipp, New Pl. Sources Drugs 251. 1982; Mold., Phytologia 58: 332. 1985.

This variety differs from the typical form of the species in having the cymes many-flowered and the leaves decussate-opposite.

The variety is based on *Buchanan 6982* from Blantyre, Malawi, collected in 1895, and deposited in the Berlin herbarium, now doubtless destroyed. Thomas (1936) cites also *Buchanan 1383* (regarded by me as var. *dümmeri*) and *Whyte s.n.* from Malawi.

Collectors have described this plant as a much-branched "shrubby herb", a small bush, or a low, erect, woody, pubescent shrub or sub-

shrub, 0.5--3 m. tall, sometimes scandent, branched from the base, single- or many-stemmed, growing in groups, or even as a tree, 4--6.5 m. tall, the bark rough and fissured, the branches tetragonal, the sap colorless, the leaves unpleasantly aromatic or odorless, somewhat fleshy, the blades to 15 cm. long, the upper side drying darker, the lower side slightly lighter green and softly pubescent, the inflorescence to 30 cm. long, flowers very dainty, handsome, pleasantly aromatic, pollinated by large bees, the calyx 4 mm. long, the filaments elongate, curved, delicately pale-mauve, the anthers black, the style delicately pale-mauve, and the fruit drupaceous, at first green, then red-tinged, finally dark-brown or black, fleshy.

The corollas are described as having been "blue" on *Goldsmith 101/61*, *Jack s.n.*, *Peter 38013* & *42444*, *Pole-Evans & Erens 912*, and *Quarré 1376*,"light-blue" on *Peter 18649*, "pale-blue" on *Benson 964* and *Greenway 6282*, "bluish" on *Peter 45742*, "bright-blue" on *Benson 992*, "lilac-blue" on *Tanner 3291*, "lavender-blue" on *Shantz & Turner 4115*, "clear-blue" on *Lawalle 2365* and *Santos 674*,"lilac" on *Torre & Paiva 11082*, "blue-green" on *Munch 345*, "greenish" on *Peters 34294*, "mauve" on *Faulkner Kew.104* and *Panton s.n.*, "delicate pale-mauve" on *Norman S.17*, "grayish-blue" on *Peter 9657*, "mauve to violet" on *Reekmans 2047*, "blue and white" on *Peter 33718*, "greeny-purple" on *Faulkner 137*, "greenish-yellow" on *Torre & Paiva 11007*, "white" on *Shabani 884*, "white with 1 petal blue" on *Gomes Pedro 407*, "with violet lip" on *Torre 3156*, "with the lower petal violet" on *Torre 588*, "blue, the center petal deeper blue" on *Richards 27074*, "lower petal blue, the remainder green" on *Wild 2027* & *2988*, "lip bright-blue, the remainder green" on *Bullock 2228*, "greenish-cream with 1 large blue petal" on *Leach 11286*, "green except for the pale-blue lower petal" on *Robinson 2935*, and "4 lobes white, the 5th bright-blue" on *Miller B.1140*. On *Eyles 458* the label states "corolla-tube green, 2 lateral pairs of lobes greenish and at right angles to the axis, the 5th lobe narrow, blue, and parallel with the axis".

Collectors have found this plant growing on savannas and shrubby savannas, herbaceous savannas with grasses growing to 3 m. tall, *Acacia albida* grasslands, tree-grass and sand veld, grassy campos, secondary steppes, primeval forests and *Brachystegia* woodlands, shortgrass open downlands, and roadside scrub, along roadsides and brooks, on rocky hillsides, in thin sandy soil of pastures, at the edges of pine plantations, in the substrate of deciduous forests, on rocky granitic deserts, among rocks on hill slopes and riversides, in red soil of bushland, and on the inner slopes of volcano craters, at 65--2300 m. altitude, in flower in every month of the year, and in fruit in February, May, and September to November. Faulkner refers to it as "fairly common in plantations and light forests" in Mozambique, where there is an average annual rainfall of 32 inches; Greenway found it "local in *Hyparrhena* grasslands" in Malawi.

Vernacular names recorded for this plant are "n'amgho ngoi yako", "nghuwambu wa matongo", "omufilamapongo", and "umukuzanyana".

In Tanganyika a decoction of the roots is used as an enema to treat constipation. The roots are also pounded in cold water and the resulting decoction used to treat stomach-ache. The leaves are

thrown into campfires to ward off mosquitoes.

The *Bullock 2228a* collection, cited below, is said by the collector to have been taken "from a young plant with larger leaves and relatively fewer flowers, the latter larger and the green portion almost white".

Wild (1953) cites *Allen 102* from Victoria Falls, while Lewalle (1972) cites *Lewalle 2365* from Burundi.

Material of *C. discolor* var. *oppositifolium* has been distributed in many herbaria as typical *C. discolor* (Klotzsch) Vatke or as *C. myricoides* (Hochst.) R. Br. and in some herbaria as *C. bukobense* Gürke, *C. cuneatum* Gürke, *C. discolor* var. *kilimandscharense* Thomas, *C. tanganyikense* J. G. Baker, and *Cyclonema sylvaticum* Hochst.

On the other hand, the *Dehn 558*, distributed as *C. discolor* var. *oppositifolium*, seems better placed as *C. cuneiforme* Mold., while *Davies 23248* is *C. discolor* var. *crenatum* Thomas and *Dehn 558/53* seems to be *C. discolor* var. *pluriflorum* Gürke.

Citations: ZAIRE: *Bequaert 252* (Br); *Bredo 3472* (Br), *3495* (Br); *Cabu 137* (Br); *Giorgi 42* (Br), *56* (Br); *Homblé 733* (Br); *Quarré 1376* (Af, Br, Br, Br), *6076* (Br), *7058* (Br), *7156* (Br), *7600* (Br, N); *Risopoulos 201* (E--2168590); *F. A. Rogers 10174* (Tm). BURUNDI: *Lewalle 2365* (Ac), *2484* (Gz, Ld), *2933* (Gz); *Reekmans 2047* (E-2209182); *Troupin 8653* (Hi--206784). RWANDA: *Troupin 5635* (N), *8535* (N). UGANDA: *Norman S.17* (W--2071996). TANZANIA: Tanganyika: *Bullock 2228* (B); *Koritschoner 1855* (Af); *Peter 382* [O.I.15] (B), *7849* [O. III.12] (B), *9567* [O.III.69] (B), *9657* [O.III.70] (B), *17744* [O.IV. 101] (B), *18385* [O.IV.120] (B), *18649* [O.IV.130] (B), *21339* [O.IV. 208] (B), *22664* [O.IV.264] (B), *23492* [O.IV.303] (B), *33718* [V.109] (B), *34294* [V.116] (B), *34542* [V.122] (B), *38013* [V.170] (B), *42383* [V.286] (B), *42444* [V.287] (B), *43595* [V.315] (B), *45742* [V.110] (B, B), *51785* [O.I.117] (B), *51793* [O.IV.120] (B), *51796* [O.IV.327] (B), *O.I,18* (B, B); *Pole-Evans & Erens 912* (Af); *M. Richards 27074* (N); *Shabani 884* (Mu); *Tanner 1208* (Mi, N), *3291* (Mi, N); *J. H. Vaughan 2654*(W--2963763). KENYA: *Hildebrandt 2729* (Mu--1612); *Mearns 1051* (W--631087), *1111* (W--631148), *1177* (W--631220), *1938* (W--631895), *2539* (W--632498). ANGOLA: Huíla: "*Antunes* or *Dekindt*" *366* (Ul), *s.n.* (Ul, Ul); *Barbosa & Moreno 9986* (Ul); *Gossweiler 13440* (Ul); *E. J. Mendes 437* (Ul), *608* (Ul), *846* (Ul); *F. A. Mendonça 4621* (Ul); *R. Santos 107* (Ul), *674* (Ul). Mossamedes: *Henriques & Moreno 79* (Ul). ZAMBIA: *E. A. Robinson 2935* (Mu). ZIMBABWE: *C. E. F. Allen 102* (Rh); *N. C. Chase 3648* [Govt. Herb. Salisb. 33832] (N), *3649* [Govt. Herb. Salisb. 33831] (N), *4156* [Govt. Herb. Salisb. 35474] (N); *Corby 228* [Govt. Herb. Salisb. 22380] (N); *Crook M.130* [Govt. Herb. Salisb. 31664] (N); *R. M. Davies D.255* [Govt. Herb. Salisb. 23248] (N); *Eyles 458* (Rh), *5067* (Rh); *Fries, Norlindh, & Weimarck 2456* (Mu); *B. Goldsmith 101/61* (S); *Gomes Pedro 407* [Herb. Moç. Cent. Invest. Cient. 497] (Af); *Hack s.n.* (Rh--12979); *J. C. Hopkins s.n.* [Govt. Herb. Salisb. 7865] (N), *s.n.* [Govt. Herb. Salisb. 7783] (N); *R. W. Jack s.n.* [Govt. Herb. Salisb. 7478] (N, Rh); *Leach 11286* (Mu); *Lovemore 177* [Govt. Herb. Salisb. 35143] (N); "*H. G. M.*" *2634* (Rh); *G. M. McGregor M.14/51* [Govt. Herb. Salisb. 32449] (N); *O. B. Miller B.1140* (Af); *Panton s.n.* [Govt. Herb. Salisb. 30810] (Af, Bm, N); *Peter 51164* [S.66] (B); *Wild 2027* [Govt. Herb.

Salisb. 18175] (K, N), *2988* (Rh--25185). MALAWI: *F. M. Benson 964* (Af--28114), *992* (Af-28109); *J. Buchanan s.n.* [J. M. Wood 6982; Natal Herb. 14288] (Na); *Greenway 6282* (Af); *E. Lawrence 234* (Br); *Stolz 317* (Mu--4222); *Whyte s.n.* [Dec. 1896] (N), *s.n.* [Zomba] (W--550810). MOZAMBIQUE: Huíla: *Mendes 608* (Ld). Manica e Sofala: *Torre 2156* (Ul), *3759* (Ld). Niassa: *Torre 588* (Ul, Ul); *Torre & Paiva 11007* (Ul). Quelimane: *Faulkner Kew.104* (N). Tete: *Torre & Paiva 11082* (Ul). Zambezia: *F. A. Mendonça 1426* (Ld). Province undetermined: *Cedro 433* (Af); *Faulkner 137* (Af); *Honey 807* (Af, N--photo); *Hornby 2826* (Af); *Munch 345* [Govt. Herb. Salisb. 30568] (N). SOUTH AFRICA: Natal: *Krauss s.n.* [Oct. '39] (Mu--873). Transvaal: *Roberts s.n.* [Herb. Transv. Mus. 15844] (Tm); *Schlieben 7709* (N); *Shantz & Turner 4115* (Au--123209, Tu--129118). CULTIVATED: New York: *Borin s.n.* [N. Y. Bot. Gard. Cult. Pl. 78465] (N).

CLERODENDRUM DISCOLOR var. *PLURIFLORUM* Gürke, Engl. Bot. Jahrb. 30: 391 [as "*Clerodendron*"]. 1901; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85. 1936.

Synonymy: *Clerodendron discolor* var. *pluriflorum* Gürke, Engl. Bot. Jahrb. 30: 391. 1901. *Clerodendrum discolor* var. *pluriflorum* Thomas ex Mold., Alph. List Inv. Names 21 in syn. 1942.

Bibliography: Gürke, Engl. Bot. Jahrb. 30: 391. 1901; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 85--86. 1936; Mold., Alph. List Inv. Names 21. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 45, 49--51, 80, & 89 (1942) and ed. 2, 110, 116, 118, 120, 181, & 214. 1949; Mold., Résumé 134, 141, 143, 146, 149, 150, 272, & 449. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 799. 1962; Mold., Résumé Suppl. 13: 4. 1966; Mold., Fifth Summ. 1: 212, 228, 235, 242, 249, 250, & 461 (1971) and 2: 864. 1971; Mold., Phytologia 34: 261. 1976; Mold., Phytol. Mem. 2: 203, 218, 225, 230, 232, 237, 238, 240, 244, 249, & 536. 1980.

This variety differs from the typical form of the species in having many-flowered branches which are 6-angular, with longitudinal ridges, and subglabrate, the leaf-blades marginally subentire.

The variety is based on *Goetze 1437* from Kananda in Unyika, Tanganyika, collected on November 14, 1899, and deposited in the Berlin herbarium, now doubtless destroyed.

Collectors describe this plant as a small, mostly sarmentose shrub, 1.5--5 m. tall, usually many-stemmed, sometimes 1-stemmed, the stems when single to 2 cm. in diameter at the base, the leaf-blades paler beneath, and the flowers profuse. They have found it on hilly plateaus, in thick bushland on black soil, among volcanic boulders on "cultivation steppes", and in forests of tall trees and dense shrubs with *Chlorophora excelsa*, *Sterculia appendiculata*, and *Cusonia arborea*, at 200--1700 m. altitude, in flower in January, February, May, and November. Gomes & Sousa refer to it as "frequent in red loamy soil of open forests" in Mozambique.

The corollas are said to have been "blue" on *Gomes & Sousa 4334*, *Perdue & Kituwa 8136*, and *Torre 707*, "blue-lilac" on *Barbosa & Moreno 10142*, "blue-violet" on *Ash 2947*, and "violet" on *Torre 4741*.

Thomas (1936) cites *Steudner 1309* from Ethiopia, *Busse 912*, *Goetze*

Schlieben 213 & *238* and *Stolz 470* from Tanganyika, *Tiesler 29* from Mozambique, and *Fritzsche 282* and *Hundt 68* from Angola. Cufodontis (1962) cites only *Goetze 1437* and *Steudner 1309*.

The *Torre 4741* collection, cited below, is said (in an annotation on the mounted sheet) to match *Goetze 1437* and *Hundt 68* in the British Museum herbarium.

Material of this variety has been distributed in some herbaria as typical *C. discolor* (Klotzsch) Vatke and as its var. *oppositifolium* Thomas.

Citations: ETHIOPIA: *Ash 2947* (W--2837028). ZAIRE: *Quarré 2629* (Br, Br), *2836* (Br, Br, Br, Br, Br, N). TANZANIA: Tanganyika: *Goetze 1437* (Br--isotype, Ld--photo of isotype, N--fragment of isotype, N--photo of isotype); *Schlieben 238* (Br, Ld--photo, N, N--photo). KENYA: *Perdue & Kibuwa 8136* (Mu). ANGOLA: Huíla: *Barbosa & Moreno 10142* (Ul); *Mendes 609* (Ul), *635* (Ul), *637* (Ld, Ul). Mossamedes: *Fritzsche 282* (S). ZIMBABWE: *Dehn 558/53* (Mu). MALAWI: *Stolz 470* (B, Mu--4223, S). MOZAMBIQUE: Niassa: *Torre 707* (Ul). Province undetermined: *Gomes & Sousa 4334* (Ul); *Torre 4741* (Ul); *Torre & Paiva 9426* (Ul).

CLERODENDRUM DISCOLOR var. *RUBRICALYX* Mold., Phytologia 4: 47. 1952.

Bibliography: Mold., Phytologia 4: 47. 1952; Mold., Résumé 141, 142, & 449. 1959; Mold., Fifth Summ. 1: 228 & 235 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 218, 225, & 536. 1980.

This variety differs from the typical form of the species in its decidedly red calyxes during and after anthesis; these are 3--4 mm. long, 4--6 mm. wide, and externally glabrous; the leaves are ternate.

The variety is based on *Rossignol 218* from 2000 m. altitude at Iurala, Zaire, collected on November 25, 1939, and deposited in the Brussels herbarium.

Collectors have encountered this plant "en savane serbeuse mais très seche", at 1100--2000 m. altitude, in flower in April and November, describing it as a "petit arbuste 66--95 cm." tall.

Citations: ZAIRE: *Quarré 7970* (Br); *Rossignol 218* (Br--type, Ld--photo of type, N--photo of type); *RRPP. Salesiens S.976* (Br). TANZANIA: Tanganyika: *Schlieben 4294* (Br, N).

CLERODENDRUM DISCOLOR var. *VERBASCIFOLIUM* Mold., Phytologia 7: 79. 1959.

Synonymy: *Clerodendron verbascifolium* Wall. ex Mold., Résumé Suppl. 1: 6 in syn. 1959. *Clerodendron discolor* var. *verbascifolium* Mold. apud Hocking, Excerpt. Bot. A.4: 592. 1962.

Bibliography: Mold., Phytologia 7: 79. 1959; Mold., Résumé Suppl. 1: 9, 16, & 25. 1959; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1959: 53. 1960; Mold., Biol. Abstr. 35: 1688. 1960; Hocking, Excerpt. Bot. A.4: 592. 1962; Mold., Résumé Suppl. 13: 6. 1966; Mold., Fifth Summ. 1: 235, 443, & 459 (1971) and 2: 868. 1971; Mold., Phytol. Mem. 2: 225 & 536. 1980.

This variety differs from the typical form of the species in its very large leaves, which are to 17.5 cm. long and 10 cm. wide and very densely long-pubescent on both surfaces.

[to be continued]

AN UNDERVIEW OF THE GENUS SCHISTOCARPHA (ASTERACEAE-HELIANTHEAE)

B. L. Turner

Department of Botany, Univ. of Texas, Austin TX 78713-7640

INTRODUCTION

Robinson (1979) presented a study of Schistocarpha which is revisionary in nature, albeit based almost entirely upon herbarium sheets at the U. S. National Herbarium (US). None of the 16 species which he recognized was observed in the field, nor did he avail himself of the large suite of specimens to be found in yet other herbaria. Because of this I have felt the need to provide an "underview" (as opposed to overview) of the genus, a view from the bottom-up, looking at relationships from the populational level, and with a much broader survey of materials from institutions other than those at US.

Robinson (1979) provides a reliable introduction to the history of the group and correctly notes that the genus is properly positioned in the subtribe Galinsoginae of the Heliantheae, and that what was long thought to be its nearest generic relative, Neurolaena, is not especially close. He fails to note, however, that the most compelling evidence for a more remote relationship is the relatively small chromosomes on a base of $x=11$ in Neurolaena, versus the relatively large chromosomes on a base of $x=8$ in Schistocarpha (Turner, 1982). It would appear that the latter genus is most closely related to Oteiza, as noted by Robinson (1979); indeed, so much so that the latter worker "unnecessarily redescribed" O. raucophila (J. D. Smith) Fay, naming this Schistocarpha steyermarkii H. Robs. Oteiza, with only two disparate species, predated Schistocarpha so, as noted by Robinson, it would be unseemly to unite the two genera. Fay (1977; pers. correspondence) has noted that his Oteiza raucophila "obviously has close affinities with S. seleri and probably should be placed in Schistocarpha." But Robinson (1979), while noting the relationship suggested by Fay, states that "the species of Oteiza seem clearly outside of Schistocarpha and more closely related to each other, but differences between the two species are greater than any seen within the larger genus Schistocarpha." This would appear to be an accurate analysis. All of this is complicated by generic relationships in the subtribe Galinsoginae generally, and relates to such well known taxa as Galinsoga and Sabazia, as attested to by Robinson (1979). Even Fay (pers. comm.) notes that Oteiza might be included "in a further expanded Sabazia" or its relatives (i.e., those elements separated from Calea and placed in Sabazia by Urbatsch and Turner, 1975).

An accurate generic boundary of Schistocarpha is difficult to draw, largely because no one has undertaken a broad inclusive study of the subtribe Galinsoginae. Such a study among the 10 or more genera which relate to Schistocarpha is much-needed. Until this is undertaken it would seem prudent to accept Oteiza as recommended by Fay (1975), Urbatsch and Turner (1975) and Robinson (1979). However, transfer of O. raucophila to Schistocarpha might seem appropriate, leaving Oteiza itself monotypic; yet such a transfer ought await newly assembled information, namely chromosomal and chemical data.

SPECIES RELATIONSHIPS

In the abbreviated account that follows I saw little reason to describe again the various taxa or species-groups treated by Robinson. Rather, where judgement and field work suggest concordance with his views I have merely noted that fact. Where I have placed into synonymy one or more of Robinson's "recognized" species it will be understood that the older name to which they are appended includes the description of those taxa rendered by Robinson, and the deliniations should be expanded accordingly. In most instances the descriptions so emended would be trivial. Indeed, Strother (pers. comm.) would go much further than I and include nearly all of Robinson's segregate taxa, and several of my own, in a wide-spread, variable, Schistocarpha bicolor.

Strother's view is essentially that derived from a limited sample largely without accompaning field studies. Which is, coincidentally, the same kind of background for Robinson's study. But oh the difference!

My study culminates some 10 years of interest in the genus. It was largely piqued by my observations of taxa in the wild, especially from field work in northcentral Oaxaca where putative hybrids between Schistocarpha liebmannii and S. bicolor were detected. As a consequence of my field observations I believe that the present study has a sound biological focus and that the specific taxa recognized are populational entities with cohering characters reflective of integrated gene pools which are largely confined to specific habitat types which extend over reasonably large regions.

I freely admit that my treatment of the Schistocarpha longiligula complex is based upon inferences from my field experience with yet other species of Schistocarpha elsewhere than in Chiapas and Guatemala, and that my recognition of but two regionally intergrading varieties is largely arbitrary. Clearly the extremes would be worthy of recognition were there not a plethera of intermediates. I do believe, however, that competent field observations will show that the local populations are probably fairly homogeneous but variable from population to population, with occasional hybridization and gene flow between

these. Which is perhaps the rule for many species of the montane cloud forests in Central America where spatial isolation and small populations has permitted the localization and subsequent divergence of this or that founder group. To include all such variant populations under a single specific name, as envisioned by Strother is perhaps defensible on pragmatic grounds, but it obscures useful information; to recognize the numerous intergrading local populational units as "good" taxa is equally misleading in a biological or "species" sense. All we can hope for at the present time is a "balanced" treatment of Schistocarpha with the knowledge that some field-oriented, quasi-experimentalist, will, in due course, unravel the more intractible species-knots.

CHROMOSOME NUMBERS

Robinson (1979) failed to provide an account of the chromosome numbers which have been reported for the various species of the genus, consequently such is provided here. The first counts for the genus were obtained by Turner et al. (1961) from Schistocarpha bicolor. It proved to be n=8 pairs. Subsequent counts for 8 of the 10 species have been diploid with 2n=16, confirming a base number of x=8.

Species	Voucher and/or reference
S. bicolor	Turner et al. (1961)
S. bicolor	Turner et al. (1962)
S. eupatorioides	Turner and King (1964)
S. eupatorioides	Kiel and Stuessy (1975)
S. eupatorioides	Jansen and Stuessy (1980)
S. eupatorioides	Jansen et al. (1984). Reported as S. paniculata.
S. eupatorioides	Robinson et al. (1981)
S. liebmannii	Poole & McDonald 2238 (TEX)
S. longiligula var. longiligula	Robinson et al. (1981)
S. longiligula var. seleri	Strother (1983).
S. matudae	Strother (1983)
S. paniculata	Robinson et al. (1981)
S. platyphylla	Strother (1983)
S. sinforosii	Escobar & Uribe 398 (LL)
S. sinforosii	Jansen et al. (1984)
S. sinforosii	Wurdack 796 (TEX)

Jansen et al. (1984) report a chromosome count of n=8 for Schistocarpha paniculata from Colombia but examination of their voucher (Stuessy & Funk 5667, OSU) shows the plant to be rather typical S. eupatorioides. Schistocarpha paniculata has well-developed ligules and is known only from Costa Rica.

ACKNOWLEDGEMENTS

Elizabeth Lawson (currently a doctoral candidate at Cornell University) stimulated my interest in Schistocarpha while engaged in a study of the group during 1977-78. She provided a fairly conservative overview of the genus based upon material from most of the major herbaria in North America except that at US. Her brief written report to me (as part of a graduate research problem in advanced systematics), before Robinsons publication and without access to his material, recognized but 7 or 8 species. I subsequently examined collections from DUKE, MSC, OSU, UC, US and XAL. Collectively this material serves as the basis for the present study. I am grateful to the Directors of the following herbaria for the loan of materials (CAS, DS, DUKE, ENCB, F, GH, LL, MICH, MO, MSC, NY, OSU, TEX, UL, US, XAL). John Strother provided tart but friendly comments regarding this or that taxon as represented in Chiapas, which provoked me to put all this down on paper.

KEY TO SPECIES OF SCHISTOCARPHA

1. Ray florets (21)30-80 in 2-4 series [2]
1. Ray florets (3)5-21 in a single series [4]

2. Rays yellow; ligule of ray floret 1/5 the length of the tube or less (or absent).....1. S. eupatorioides
2. Rays white; ligule of ray floret 1/3 the length of the tube or longer [3]

3. Ray florets mostly 40-60, their ligules 5-10 mm long.....2. S. paniculata
3. Ray florets mostly 21-34(39), their ligules mostly 3-5 mm long [3a]

3a. Ligules of ray florets 5-10 mm long; N. Am. plants.....3. S. croatii
3a. Ligules of ray florets 2-4 mm long; S. Am. plants.....(hybrids, S. eupatorioides x S. sinforosii).

4. Petioles conspicuously winged throughout, often expanded at the base and extending across the node; ray florets mostly 11-15 (hybridizes with S. liebmannii, in which case F_1 and backcrosses may not readily key to either taxon).....4. S. bicolor
4. Plants without the above combination of characters [5]

5. Capitulescence lax, containing 8-12 heads on pedicels 20-50 mm long at maturity; heads (excluding rays) broader than long.....5. S. pedicellata
5. Capitulescence strict, congested, containing 30 or more heads on pedicels mostly 15(20) mm

long or less; heads (excluding rays) as long as broad or longer[6]

6. Involucres mostly 6-8 mm long; South American species.....6. S. sinforosii
6. Involucres mostly 5-6 mm long; North American species[7]

7. Ligules of the ray florets 2/3 or less the length of the tube (or absent) [8]
7. Ligules of the ray florets 2/3 or more the length of the tube [9]

8. Florets ca. 20 per head; involucral bracts 14-18, mostly 2-3 seriate, glabrous or nearly so, straminous, not spreading at maturity.....7. S. platyphylla
8. Florets ca. 30 per head; involucral bracts dirty brown or blackish, mostly 3-4 seriate, variously pubescent, usually spreading at maturity...10. S. longiligula

9. Stems, at maturity, glabrate or nearly so; lower surfaces of the blade (except for veins) glabrous, the upper surface somewhat darker than the lower; disc florets 10-12, their corollas sparsely pubescent; populations of montane cloud forests of northcentral Oaxaca and adjacent Veracruz.....8. S. liebmannii
9. Plants without the above combination of characters and distribution [9]

10. Ray florets 12-21, their ligules 1-4 mm long....9. S. matudae
10. Ray florets 5-12(16), their ligules (3)4-8 mm long.....10. S. longiligula

1. SCHISTOCARPHA EUPATORIOIDES (Fenzl) O. Kuntze (1898)

S. margaritensis Cuatr. (1954) - a putative hybrid, discussed below.

In spite of H. Robinson's acceptance of this taxon as a widespread, highly variable, tropical or subtropical, species (Fig. 1) ranging from Argentina to northeastern Mexico, he saw fit to retain the segregate, S. margaritensis, which "is more than just an extreme form of that species. The corymbose inflorescence with longer pedicels differs from the more thysoid [sic] form with densely corymbose branches in S. eupatorioides. The smaller number of ray florets with longer limbs and the larger number of disk flowers provide additional significant distinctions".

In his key to species, S. margaritensis is said to be distinguished by its 25-30 rays, their limbs being near 3 mm; disk flowers 25-40 and pedicels 10-20 mm long. In his description of S.

eupatorioides he notes the rays to range from 40-70, the limbs 1 mm or less; disk flowers 5-11, rarely 18 and pedicels mostly 2-10 mm.

These are of course, highly variable characters and isolated exceptions for nearly all of these can be found in S. eupatorioides (e. g., pedicels up to 20 mm long in Nicaraguan plants; Stevens 3217, TEX; and 15-20 mm long in Ecuadoran plants, Harling & Andersson 11984, US; ligules vary from 0.1-1.5 mm over a large range of the species, e.g. 1.0-1.5 mm long in Colombian plants, Stuessy & Funk 5735, US; etc.)

Nevertheless, the two known collections of S. margaritensis are distinctive in several characters, the most notable being the fewer, longer, white rays which, in combination, distinguish these from S. eupatorioides. In my opinion, however, both sheets are probably hybrids or hybrid derivatives from occasionally crosses between S. eupatorioides and S. sinforosii. The best evidence for this is the fact that the characters that mark S. margaritensis are pretty much what one might expect in any putative hybrid between the taxa involved. Further, both of the putative parents are sympatric over a broad region of Colombia and both occur within the vicinity of the only two known collections of S. margaritensis (e.g., Killip & Hazen 9037, Dept. of Caldas, Rio Quindio, 1500-1700 m, 27-30 Jul 1922, is S. eupatorioides; Killip & Hazen 9159, Dept. of Caldas, "Old Quindio Trail", 3200-3500 m, 2 Aug 1922, is S. sinforosii; the putative hybrid between these, Pennell, Killip & Hazen 8694, Dept. of Caldas, Rio Quindio, 1300-1500 m, 25 Jul 1922, is cited by Robinson as S. margaritensis).

Occasional natural hybrids between yet other disparate species of Schistocarpha are known from Mexico (e.g., S. liebmannii x S. bicolor) consequently those proposed here seem reasonable.

2. SCHISTOCARPHA PANICULATA Klatt (1892)

Schistocarpha wilburii H. Robinson (1979)

This species is seemingly confined to Costa Rica where it occurs in cloud forest communities at elevations of 1800-2800 meters, mostly on volcanic slopes. In spite of its restricted distribution, the species is exceedingly variable, both in number of ray florets (21-39) and the length of the limbs (5-10 mm). Robinson notes the number of ray florets as 20-25 in his description but I counted up to 39 on at least 1 sheet (Utley 3805, DUKE), although the number of ray florets typically varies from 21-34, even on the same specimen. Nevertheless, Robinson segregated two sheets from Panama with more numerous ray florets (40-60) and smaller limbs (2-3 mm) and somewhat smaller involucres as S. croatii. The latter species is retained here, primarily because more recent collections from Panama (D'Arcy 11089, US; Utley 5671, DUKE; Wilbur 24286, 24305, DUKE) show that the characters concerned are presumably populational in nature. Nevertheless, the plants

concerned are so nearly like S. paniculata that one must suspect that relatively few genes are involved in the expression of the diagnostic characters concerned and that additional collection of montane populations between Costa Rica and Panama might yield intergrading populations.

Schistocarpha wilburii was distinguished from S. paniculata by its coriaceous involucral bracts which recurve at the apices and more indurated central awn of the receptacular bracts, characters which are highly variable and these are nearly matched in recent indubitable collections of S. paniculata from Provincia de Cartago, Costa Rica (e.g., Wilbur 24719, 25478, DUKE). In short, the present author can find little or no justification for the recognition of S. wilburii.

3. SCHISTOCARPHA CROATII H. Robinson (1975)

When first described by its author, this species was compared to Schistocarpha oppositifolia (=S. eupatorioides) but, as noted above, it is most closely related to S. paniculata. Robinson (1978) subsequently perceived this relationship, retracting his initial comparisons, noting that its "closest relationship is actually to S. paniculata of Costa Rica, though the latter differs clearly by the smaller numbers of rays with larger limbs."

4. SCHISTOCARPHA BICOLOR Less. (1831)

My understanding of this species is essentially the same as that of Robinson. The latter author did not provide a map of its distribution but records at TEX show the plant to occur, as noted by Robinson, along the eastern Gulf-ward, escarpments of Mexico. Robinson, however, did not examine specimens from its northernmost state, Tamaulipas or its southernmost state, Oaxaca. General sites from which collections were examined by the present author are shown in Fig. 2.

As noted under the discussion of Schistocarpha liebmannii, the weedy S. bicolor apparently hybridizes with other species of Schistocarpha where they grow in close proximity.

5. SCHITOCARPHA PEDICELLATA Klatt (1887)

Other than fragments of the type, Robinson examined only 2 specimens of this taxon, both from the slopes of Mount Orizaba and both with gland-tipped hairs on their pedicels. The species, however, possesses forms both with and without glandular trichomes (e.g., the following collections, cited below, lack glandular hairs: Ventura 2393, 4666), thus the major key-lead employed by Robinson to identify the taxon fails on this point. Further, glandular trichomes also occur occasionally upon the pedicels of S. longiligula, consequently his key-leads to these taxa will not always suffice. The best characters to distinguish S. pedicellata

from yet other species are its relatively few, large, heads with conspicuous rays which are borne upon elongate pedicels.

The distribution in the present treatment (Fig.) is based upon 12 collections; those not examined by Robinson are: OAXACA: Warnock 2505 (TEX). VERACRUZ: Cosson 563 (GH); Dorantes & Acosta 2200 (ENCB); Nee & Taylor 26256 (TEX); Ventura 57 (ENCB); Ventura 57 (ENCB); Ventura 2393 (ENCB, MICH, TEX); Ventura 3465 (ENCB, MICH, TEX); Ventura 4666 (ENCB, LL, TEX); Ventura 5125 (DUKE, ENCB, MICH, NY); Ventura 7729 (ENCB).

6. SCHISTOCARPHA SINFOROSII Cautrecasas (1935)

My understanding of this species is essentially the same as that of Robinson (1979). It is obviously closely related to S. longiligula and S. platyphylla of Central America but, as noted by Robinson, it is for the most part readily distinguished by its somewhat larger heads and longer ray corollas.

Nevertheless there is considerable variation in Schistocarpha sinforosii, especially in Colombia. Thus Cuatrecasas et al. 27598 (US) and Todzia et al. 2458 (TEX) have involucres 5-6 mm long and ray ligules 4-5 mm long (much resembling collections of S. longiligula from Guatemala) while Cuatrecasas et al. 26830 (US), has involucres 7-8 mm long and ray ligules 8-9 mm long; occasional collections have rays 9-11 mm long (e.g., Dept. Caldas, Nevada del Ruiz, King et al. 5964, US). Relatively small-headed, short-rayed plants, superficially resembling S. longiligula, also occur in Peru (e.g., Macbride 4080, 4915, US). In fact the late S. F. Blake has appended a note to Macbride 4080 commenting that the specimen is so close to the Mexican and Guatemalan S. bicolor (including S. longiligula) that he would "hesitate to separate it ... were it not for the great gap in range." Schistocarpha bicolor of northeastern Mexico, as noted by Robinson (1979), is readily distinguished by its broadly winged, often perfoliate petioles and smaller heads with more numerous ray florets, but S. longiligula of Guatemala and adjacent Chiapas might readily encompass S. sinforosii. Lawson (pers. corr.) proposed just that in her preliminary study of the group. Both taxa are relatively wide-ranging and both show similar kinds of variation in the size of their heads and the number and length of their ray florets. Perhaps much of this seemingly homologous variation is due to recurrent hybridization with one or more sympatric species, as noted under S. eupatorioides (which apparently hybridizes upon occasion with S. sinforosii). In any case both S. longiligula and S. sinforosii are maintained here largely because of their continental isolation; certainly the characters that mark them are weak, variable and loosely cohering, not too unlike the variables associated with the several intergrading races of Homo sapiens.

It should be added that Robinson (1979) notes that collections of S. sinforosii were not known from Ecuador thus making the

Peruvian populations appear as disjunctional elements; relatively recent collections from southern Colombia (Dept. Huila, Olsen & Escobar 531, LL) and adjacent Ecuador (Prov. Pichincha, Boeke 2242, US; Harling et al. 10459, US) have vitiated this observation.

7. SCHISTOCARPHA PLATYPHYLLA Greenm. (1907)

Schistocarpha kellermanii Greenm. (1927)

My understanding of this species is essentially the same as that of Robinson. However, a few of his annotations apparently apply to eligulate forms of S. longiligula (e.g. discussion under that species, below).

8. SCHISTOCARPHA LIEBMANNII Klatt (1887)

Other than fragments of the type, Robinson examined only 3 specimens of this taxon, all from Veracruz. I have examined 12 additional collections from Veracruz (excepting 0-44), as follows: Paray 3465 (ENCB); Poole et al. 1262, 2237, 2238 (TEX); Turner 0-44 (TEX); Turner 15101 (TEX); Vazquez 1907 (ENCB); Ventura 894 (ENCB, MSC), 3140 (ENCB); Ventura 4875 (CAS, ENCB, MICH, TEX); Ventura 5041 (DS, DUKE, ENCB, LL, MICH); Ventura 9479, 11096 (ENCB).

Along highway 175 in Oaxaca (Tuxtepec-Oaxaca), 24 mi S of Valle Nacional, Schistocarpha liebmannii grows in close proximity to S. bicolor, which is a weed along the roadside, while the former is largely confined to damp cliff sides associated with tree ferns, Selaginella, etc. The species grows in similar habitats in Veracruz (Turner 15101). Turner 0-44 (cited above) is a putative F_1 between these taxa while Poole 2238 is a putative backcross to one or the other. Poole 2237 is typical S. liebmannii.

Since Strother (pers. comm.) has questioned whether or not S. liebmannii is distinct from S. bicolor I list below some of the many characters that distinguish between them.

Schistocarpha bicolor	Schistocarpha liebmannii
1. Robust annual 1-3 m tall	1. Perennial shrublet 1.5-3.0 m tall
2. Foliage clearly pubescent on both surfaces	2. Foliage glabrous or nearly so (pubescent along veins)
3. Petioles broadly winged throughout on the mid-stem and usually connate across the node	3. Petioles tapering above but essentially unwinged below and never connate across the node
4. Heads hemispheric, 7-9 mm wide	4. Heads narrowly campanulate 3-6 mm wide
5. Involucral bracts 20-25, variously pubescent	5. Involucral bracts 16-20, glabrous or nearly so
6. Ray florets 12-16	6. Ray florets 8(10)

7. Ray tube very pubescent	7. Ray tube nearly glabrous (rarely moderately pubescent)
8. Anthers 1.3-1.6 mm long	8. Anthers 1.6-2.0 mm long
9. Pappus of 30-35 setae	9. Pappus of 20-30 setae
10. Plants of lower, drier, habitats	10. Plants of cloud forest dominated by tree ferns
11. Widespread weed in disturbed areas	11. Localized wet areas with other localized endemics

The two species form uniform populations but when growing together they hybridize - cf. Turner 0-44 (LL), etc.

9. SCHISTOCARPHA MATUDAE H. Robinson (1979)

This species was known to its author by a single specimen from Mt. Ovando, Chiapas. It is a weakly differentiated taxon, closely related to S. longiligula but distinguished by its relatively numerous short ray florets. Robinson related the species to S. bicolor, but on leaf, involucral and floral characters, as well as geographic position, it appears closer to the former.

In addition to an isotype, I have examined 7 other sheets (cited below) which I take to be this taxon. The rays may vary from 12 to 21 and seem to occur in 1 or 2 series, although Robinson describes the rays as 12-15 in a single series. The additional sheets, all from Chiapas, are: Breedlove 34573, 41959 (CAS) Ton 3574 (DS, ENCB, MICH), 3860 (CAS, LL).

10. SCHISTOCARPHA LONGILIGULA Rydb. (1927)

This is a variable widespread species of Central America and adjacent Mexico. H. Robinson recognized 5 species from among this variation, 2 of these concocted by him, the latter each represented by but a single sheet. Both are within the geographical range of S. longiligula as treated here. Within the S. longiligula complex I am able to recognize but 2 intergrading infraspecific taxa as follows:

Ray florets predominantly 11-18; disc corollas usually densely hispidulous; stems variously hirsute to appressed-puberulent to glabrate (rarely with glandular trichomes).....var. longiligula

Ray florets predominantly 8-12(16); disc corollas usually sparsely hispidulous; stems appressed-puberulent to glabrate (rarely with glandular trichomes).....var. seleri

Robinson included S. longiligula in his "bicolor group" (including also S. bicolor, S. matudae and S. seleri) while S. hondurensis, S. chiapensis and S. pseudoseleri were included (along with S. platyphylla, S. liebmannii and S. sinforosii) in his "platyphylla group". These allocations are apparently arbitrary, inclusion in the latter depending primarily upon ray-floret number (8-10, rarely 12, vs. 11-18) and involucral bract number (16-20 vs.

20-40), meristic characters which are highly variable both within and between populations, especially in southern Mexico, to judge from the suite of specimens examined in the present study. As noted below, considering the seemingly homologous character-variations found in both S. pedicellata and S. longiligula var. seleri (e.g., glandular trichomes) and the fact that the latter taxon intergrades with the var. longiligula (e.g., in ray floret number, mostly 12-18 in the former, 5-11 in the latter), it would appear more reasonable to include both S. pedicellata and S. longiligula within the "bicolor" group. This is especially suggestive since S. bicolor apparently hybridizes with S. liebmannii in Oaxaca forming both putative F_1 and backcrosses (discussed under the latter taxon). Altogether its pattern of geographic variation, and capacity to exchange genes under sympatric situations, strongly suggests that the species delineated by Robinson are artificially conceived and arbitrarily clustered into species groups.

Finally, it should be noted that Strother (pers. comm.) would include nearly all of the species with well-developed rays (including S. paniculata, S. platyphylla and S. liebmannii) in synonymy under Schistocarpha bicolor. While such a treatment makes easy the recognition and annotation of herbarium sheets it belies the assortment of correlated morphological characters found in populational form in nature; indeed, my field experience in the states of Veracruz and Oaxaca show that populations of S. paniculata, S. liebmannii and S. pedicellata are quite distinct, occupying montane habitats mostly isolated from the widespread, more lowland, weedy, S. bicolor. But where the latter occasionally enters in or near the range of yet other species, hybridization can be expected (c.f. comments under S. liebmannii).

10a. SCHISTOCARPHA LONGILIGULA Rydb. var. LONGILIGULA

S. hondurensis Standl. & L. Wms. (1952)

S. chiapensis H. Robinson (1979)

S. pseudoseleri H. Robinson (1979)

The var. longiligula is exceedingly variable. Unfortunately Robinson, in his study, did not avail himself of the abundant material of this taxon housed as CAS, DS, LL, MSC, TEX, or UC. In the present study I have examined over 15 different Chiapan collections from 9 or more municipa lities, none of which was examined by Robinson. At the type locality and vicinity (Dept. of Quiche, Guatemala) the taxon possesses hirsute stems and 11-13 rays, however, populations to the west become progressively less pubescent and the rays become reduced in number (8-12). A single depauperate plant from among the latter (with 8 ray florets and 8-10 disc florets) was designated S. pseudoseleri by H. Robinson. He also recognized an additional plant from Chiapas with more numerous

florets but with puberulous or glabrate stems as S. chiapensis. Thus, his recognition of S. hondurensis, after initially sinking this into synonymy with S. longiligula (Robinson, 1974), is not surprising, since to single out 2 weakly differentiated individuals as "new species" in his 1979 study almost mandated such reconsideration. According to Robinson, S. hondurensis can be recognized by its eight ray florets "and by the unique, uniformly scabrid surface of the disk corollas." The uniformly scabrid disk corollas are not unique to those populations designated as S. hondurensis. Rather this is a variable character found in several other taxa within Schistocarpha; indeed, it occurs in plants of S. longiligula from southeastern Chiapas, Mexico (Matuda 5046, LL; 5080 LL) near and about the type locality of Robinson's S. chiapensis which, as noted above, I take to be synonymous with var. longiligula (although it grades toward var. seleri). In addition, it would appear that characters which mark populations of the latter variety intergrade with populations about Municipio Tenejapa; the latter belong to the var. seleri, c.f. below. Another intermediate appears to be the Breedlove 9487 (LL) from Municipio Zinacantan.

Finally, it should be noted that occasional plants may possess relatively few ray florets (ca 8) which appear eligulate (e.g., El Salvador: Tucker 1280; UC, US). Robinson cites the latter collection as belonging to S. platyphylla, although, except for their eligulate condition, they more readily relate to S. longiligula (as noted in my key to species).

10b. SCHISTOCARPHA LONGILIGULA var. SELERI (Rybd.) Turner, comb nov. - based upon Schistocarpha seleri Rydb., N. Amer. FL. 34: 305. 1927.

Lawson (unpubl.) included this taxon in her broad concept of S. longiligula. Sufficient collections from the region about Ococingo and Tenejapa, Chiapas, exist so as to suggest that the suite of characters used to recognize the taxon are diagnostic. Nevertheless, the characters which distinguish var. seleri from var. longiligula appear to intergrade and occasional plants from both their range may possess pedicellate glands. This strongly suggests that the taxa are largely allopatric, intergrading, units deserving of varietal status at most. It is likely that the pedicellate glands and more numerous ray florets link these western populations of S. longiligula with the Veracruz-Oaxacan species, S. pedicellata, which is largely distinguished by its fewer-headed capitulescence and generally longer pedicels and ray ligules.

Other than the type, Robinson examined only two sheets of the var. seleri. In addition, I have examined the following, all from the Municipio of Tenejapa in central Chiapas (Fig.): Breedlove 9290 (DS, LL) 15283 (DS); Ton 695 (LL), 699 (MSC), 2107 (LL, MSC), 2249 (LL, MSC). Ton 695 and 2107 approach the var. longiligula.

LITERATURE CITED

Fay, J. J. 1975. New combinations in Perymenium and Oteiza (Asteraceae-Heliantheae). Phytologia 31: 16-17.

Jansen, R. K. and T. F. Stuessy. 1980. Chromosome counts of Compositae from Latin America. Amer. J. Bot. 67: 585-594.

Jansen, R. K., T. F. Stuessy, S. Diaz-Piedrahita and V. A. Funk. 1984. Recuentos chromosomicos en Compositae de Colombia. Caldasia 14: 7-20.

Keil, D. J. and T. F. Stuessy. 1975. Chromosome counts of Compositae from the United States, Mexico, and Guatemala. Rhodora 77: 171-195.

Robinson, H. 1974. Studies in the Heliantheae (Asteraceae), III: A new species of Schistocarpha. Phytologia 29: 247-250.

Robinson, H. 1979. A study of the genus Schistocarpha (Heliantheae: Asteraceae). Smithsonian Contrib. Bot. 42: 1-20.

Robinson, H., et al. 1981. Chromosome numbers in Compositae, XII: Heliantheae. Smithsonian Contr. Bot. 52: 1-28.

Strother, J. L. 1983. More chromosome studies in Compositae. Amer. J. Bot. 70: 1217-1224.

Turner, B. L. 1982. Taxonomy of Neurolaena (Asteraceae-Heliantheae). Pl. Syst. Evol. 140: 119-139.

Turner, B. L., W. L. Ellison and R. M. King. 1961. Chromosome numbers in the Compo sitae. IV. North American species, with phyletic interpretations. Amer. J. Bot. 48: 216-223.

Turner, B. L. and R. M. King. 1964. Chromosome numbers in the Compositae. VIII. Mexican and Central American species. Southwestern Natural. 9: 27-39.

Turner, B. L., M. Powell and R. M. King, 1962. Chromsome numbers in the Compositae. VI. Additional Mexian and Guatemalan species. Rhodora 64: 251-271.

Urbatsch, L. E. and B. L. Turner. 1975. New species and combinations in Sabazia (Heliantheae, Galinsoginae). Brittonia 27: 348-354.

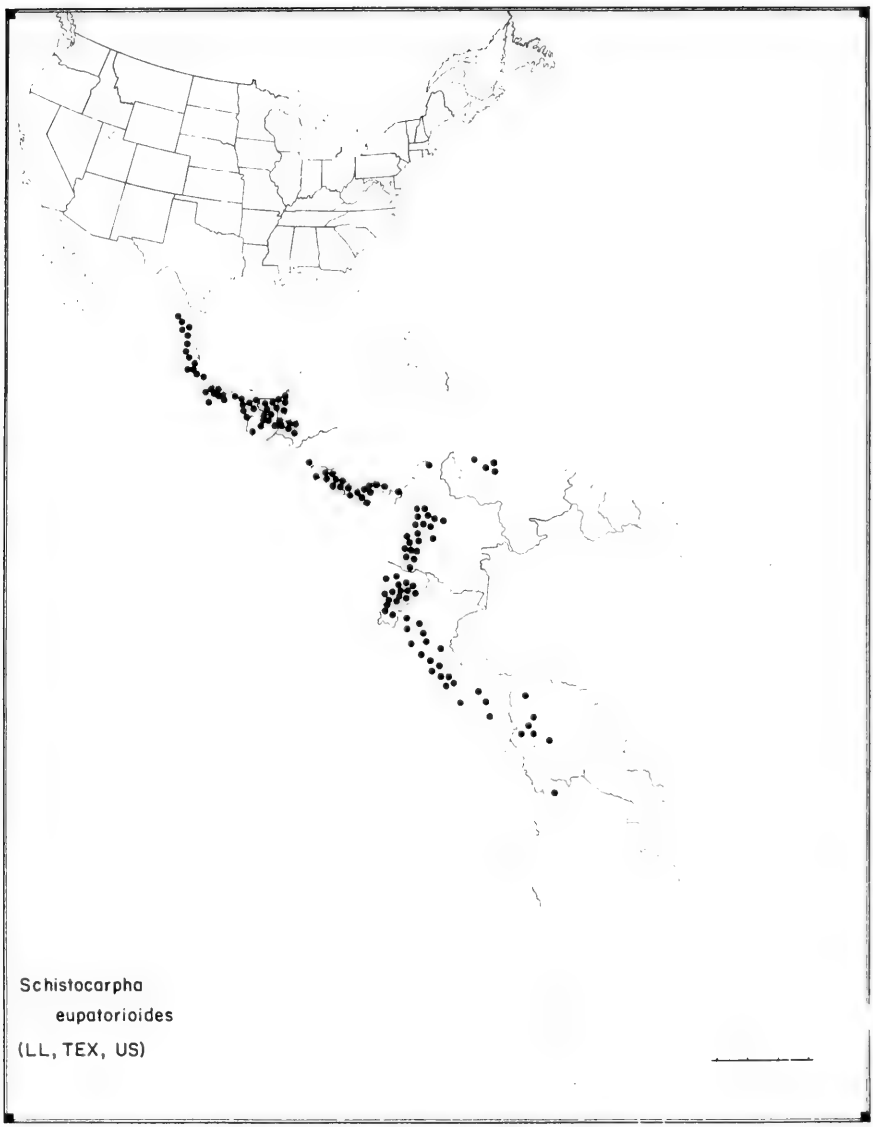


Fig. I. Schistocarpha eupatorioides

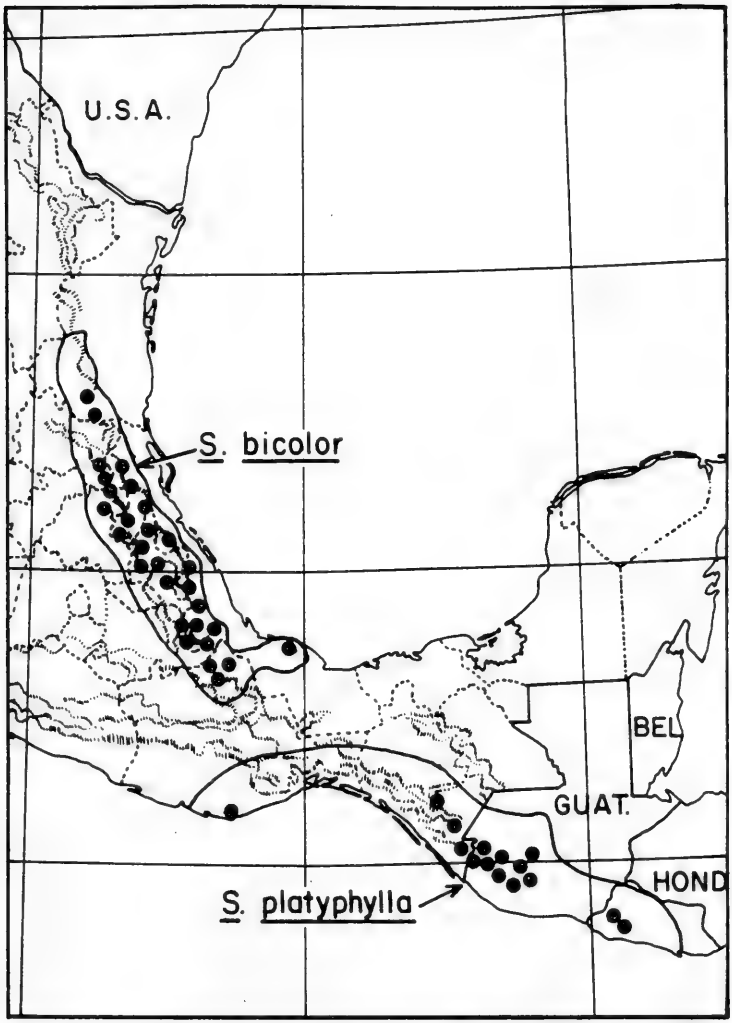


Fig. 2. Schistocarpha bicolor; S. platyphylla.

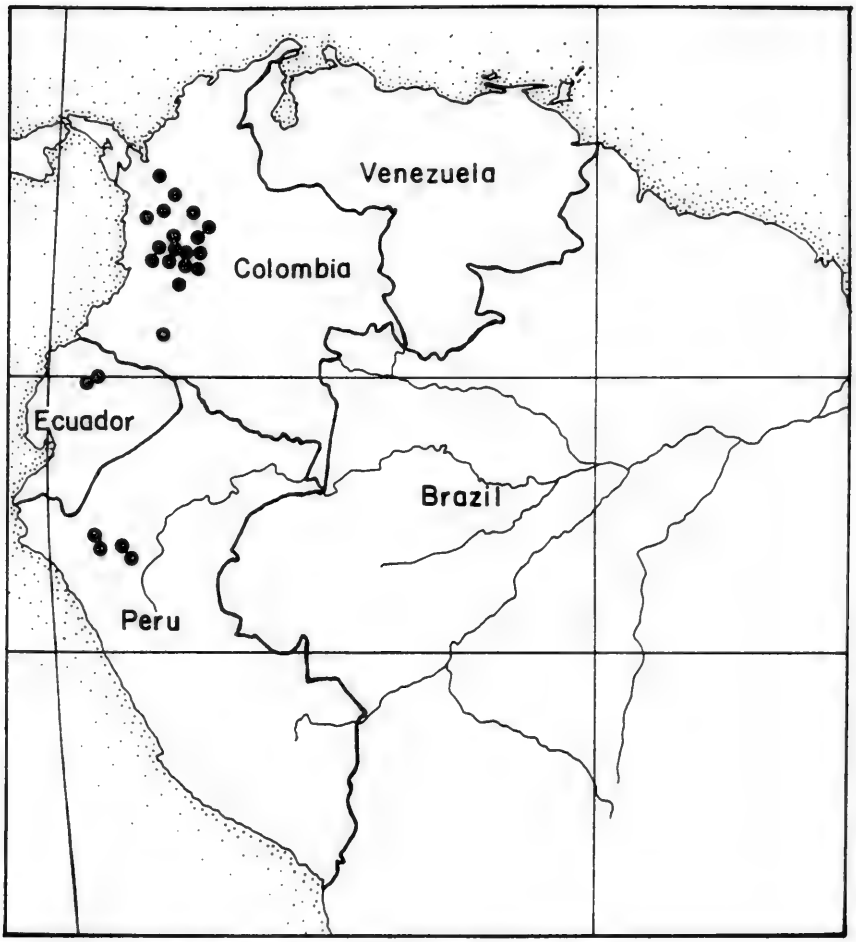


Fig. 3. Schistocarpha sinforosii.

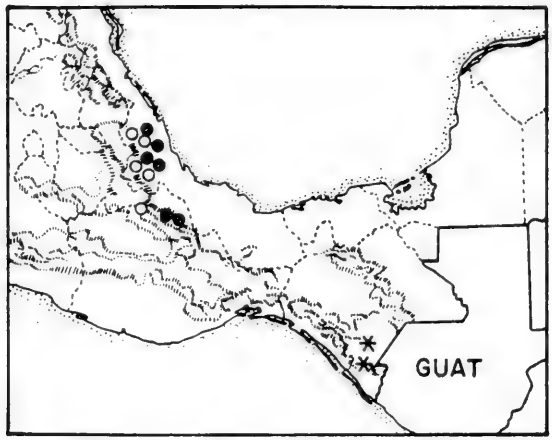


Fig. 4. Schistocarpha liebmanii (•); S. pedicellata (○); S. matudae (*).

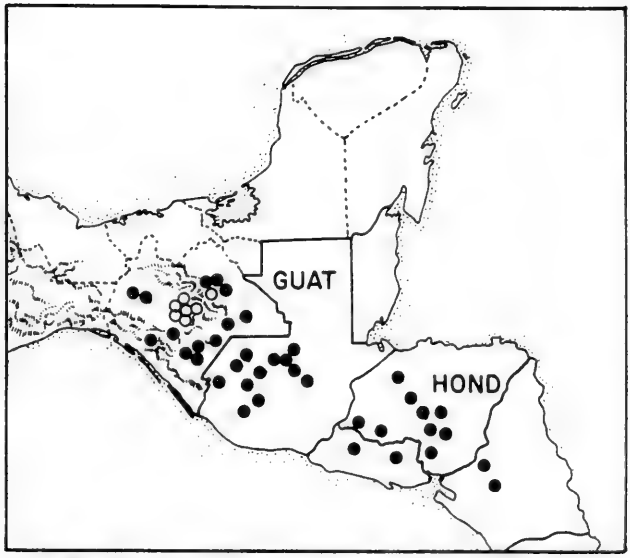


Fig. 5. Schistocarpha longiligula var. longiligula (•); var. seleri (○).

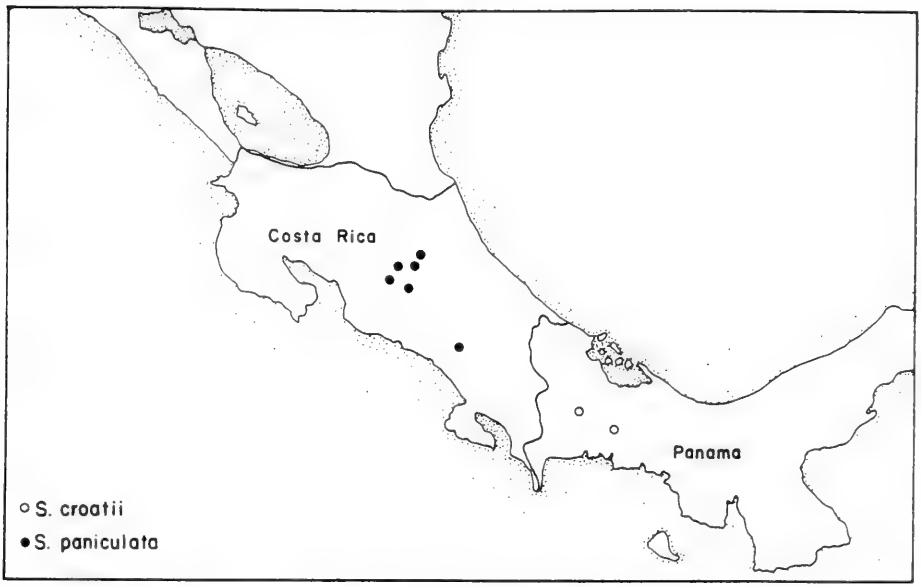


Fig. 6. Schistocarpha croatii(○); S. paniculata (●).

NOTEWORTHY GRASSES FROM MEXICO XII.

Alan A. Beetle, APDO Postal 284.
Hermosillo, Sonora, Mexico

These are results from continuing studies sponsored by the Comision Tecnico Consultiva para la determinacion Regional de los coeficientes de Agostadero, fundada en 1966, under the Secretaria de Agricultura y recursos hidraulicos.

For previous papers see Phytologia 27:1974; 28:1974; 30:1975; 35:1977; 38:1978; 47:1981; 49:33-43; and 52-11-17, 1981; 54:1-5, 1983.

MEMORANDUM 3 DEL HERBARIO DE COTECOCA
A LA BRIGADA No. 1, SONORA.

ASUNTO: ESPECIE NUEVA DE *Bouteloua* NOVIEMBRE DE 1985.

Bouteloua quiriegoensis sp. nov.

"Navajita pelona"

Annua; indigena, con rami de la basis; culmos usque ad 50 cm de altos; laminae in longitudinem de culmos et glabros praeter papilloso-pilosa pilis circa monile; laminas 1 - 2 dm longis, planis, 1 - 2 mm latis; ligula ad lineam ciliatas circiter 0.5 mm longam; spiculis disposito in universum parae, rare uno aut tres, 1.5 - 2 cm longa; rhachi extendentibus in aristae 10 - 12 mm longiores; spiculis circiter 4 mm longis; glumae subaequalae, cum pilis papillosae; lemmati dentati; floscula rudimentaria triaristata circiter 2 mm longa.

ANUAL NATIVA, ESCASAMENTE RAMIFICADA DESDE LA BASE; CULMOS HASTA 50 CM. DE ALTO; HOJAS DISTRIBUÍDAS A LO LARGO DE LOS CULMOS, GLABRAS EXCEPTO POR UNOS POCOS PELOS BLANCOS CON BASE PAPILOSA EN EL ÁREA DEL CUELLO; LÁMINAS PLANAS, HASTA 2 DM. DE LARGO POR 1-2 MM. DE ANCHO; LÍGULA - UNA HILERA DE PELOS MENORES DE 1 MM. DE LARGO.

ESPIGAS DISPUESTAS POR PARES, RARA VEZ UNA SOLA Ó TRES,- 1.5-2 CM. DE LARGO, LA PROLONGACIÓN DEL RAQUIS 10-12 MM. DE LARGO; ESPIGUILLAS CERCA DE 4 MM. DE LARGO; GLUMAS - SUBIGUALES, ARISTO-PUNTADAS, CON PELOS DE BASE PAPILOSA SOBRE EL DORSO; LEMA SUPERFICIALMENTE DENTADA; PALEA -- BIEN DESARROLLADA, IGUALANDO A LA LEMA EN TAMAÑO; FLÓSCULO RUDIMENTARIO INFERIOR CON TRES ARISTAS DE CERCA DE 2 MM. DE LARGO; ANTERAS COLOR AMARILLO - LIMÓN; CARIÓPSIS 1 MM. DE LARGO.

COLECCIÓN DEL TIPO: RAFAEL AGUIRRE MURRIETA Y RENÉ CUADRA GARCÍA, 25 DE OCTUBRE DE 1985, DE MÉXICO, SONORA, - MUNICIPIO DE QUIRIEGO, RANCHO "LOS VARILLEROS" Y EJIDO-NOGALES GANADEROS. RARA, SUELOS ARENO-GRAVOSOS, ARCILLO ARENOSOS Y FRANCO-ARENOSOS EN EL MATORRAL ARBORESCENTE-OCURRIENDO EN ORILLAS DE ARROYOS TEMPORALES; ENDÉMICA - DEL SUR DE SONORA Y NOMBRADA POR EL MUNICIPIO DE QUIRIEGO QUE PARECE SER ES SU CENTRO DE DISTRIBUCIÓN.

Bouteloua hirsuta LAG. OBVIAMENTE RELACIONADA CON *B. Quiriegoensis*, ES DIFERENTE EN CUANTO A SU DURACIÓN, SIENDO-FUERTEMENTE PERENNE; Y TAMBIÉN POR LAS HOJAS BASALES, ALGUNAS DE LAS CUALES SON MAYORES DE 2 MM. DE ANCHO Y CON - UN GRADO MAYOR DE PUBESCENCIA.

LAS ESPIGAS DE LA INFLORESCENCIA SON FRECUENTEMENTE DE -- 2.5-4 CM. DE LARGO; LAS GLUMAS ARISTADAS Y ADEMÁS SU HABITAT ES PASTIZAL ABIERTO, PASTIZAL ARBOFRUTESCENTE Y BOSQUE ESCLERÓFILO.

Bouteloua quiriegoensis FUÉ RECOLECTADA POR PRIMERA VEZ - POR A. A. BEETLE (#6085), EL 13 DE NOVIEMBRE DE 1980 EN-EL RANCHO "LOS AMOLES" A 35 KM. AL ESTE POR EL CAMINO -- HORNOS-TESOPACO.

TRES AÑOS DESPUÉS (1983) FUÉ RECOLECTADO DE NUEVO EN EL - VECINO MUNICIPIO DE ALAMOS, AL SUR DE LA CIUDAD DE ALAMOS EN EL ARROYO "CUCHUJAQUI" POR A.A. BEETLE (#9145) ACOMPAÑADO POR ROGELIO ALCARAZ FLORES Y RENÉ CUADRA GARCÍA.

AL AÑO SIGUIENTE (1984) ROGELIO ALCARAZ FLORES COLECTÓ LA PLANTA A 25 KM. AL ESTE DE CIUDAD OBREGÓN EN EL RANCHO -- "EL JÚCHUCU".

FUÉ ENTONCES CUANDO SE SENTÍA QUE SE TRATABA DE UNA ESPECIE NUEVA. SE MANDÓ MATERIAL AL DR. JOHN REEDER, QUIÉN -- CONTESTÓ "QUIZÁS" Y "NECESITO VER MÁS MATERIAL". EL AÑO - SIGUIENTE (1985) SE HIZO UNA BÚSQUEDA EXITOSA RECOLECTANDO MATERIAL ADECUADO PARA CONFIRMAR QUE UNA ESPECIE NO -- DESCRITA DEVERAS OCURRE EN LA PARTE SUR DEL ESTADO MEXICANO DE SONORA.

TYPIFICATIONS AND A NEW COMBINATION IN HETERANTHERA (PONTEDERIACEAE)

Charles N. Horn
Biology Department, Box 1927
University of Alabama
University, AL 35486 USA

The following new combination and typifications for Heteranthera (Pontederiaceae) are presented so that they may be validly used in the Generic Flora of the Southeast without creating nomenclatural confusion.

Heteranthera multiflora (Grisebach) Horn, comb. et stat. nov. -- Heteranthera reniformis var. multiflora Grisebach, Abh. Königl. Ges. Wess. Göttingen 24: 323. 1879. -- TYPE: [Argentina], Salta pr[opre] Yacone, III 1873, Lorentz & Hieronymus 310 (Lectotype [here designated]: GOET!; photograph of lectotype: UNA!; isolectotypes: BR!, BAF!, LG!, NY!, PRC!, UNA!).

Heteranthera sect. Schollera Solms-Laubach in A. de Candolle, Monogr. Phan. 4: 517. 1883. -- Schollera Schreber, Gen. Pl. 2: 785. 1791. -- LECTOTYPE SPECIES [here designated]: Heteranthera graminea (Michaux) Vahl [= Zosterella dubia (Jacquin) Small]. Solms-Laubach apparently took the sectional name from Willdenow's Schollera graminifolia (Ges. Naturf. Frende Berlin Neue Schriften 3: 438. 1801., nomen nudum), since it is listed in the synonomy of Heteranthera graminea. It is speculated that Willdenow saw the publication and specimens of Schreber and added a specific epithet to the generic name Schollera when comparing it (Zosterella dubia) to taxa of Heteranthera. -- I consider this section to be in synonomy under the genus Zosterella Small.

Heteranthera sect. Leptanthus (Michaux) Solms-Laubach in A. de Candolle, Monogr. Phan. 518. 1883. -- Leptanthus Michaux, Fl. Bor. Amer. 1: 24. 1803. -- LECTOTYPE SPECIES [here designated]: L. ovalis Michaux [= Heteranthera limosa (Swartz) Willdenow]. Of the three species described by Michaux, L. ovalis closest fits his generic description by being monoflorous and having subequal, oblong perianth lobes.

AN ARTIFICIAL KEY TO THE GRASSES OF ERAVIKULAM NATIONAL PARK (KERALA, INDIA), BASED ON VEGETATIVE CHARACTERISTICS

Clifford G. Rice* and Greg Edblom**

* Wildlife Conservation International, New York Zoological Society, Bronx, NY, 10460, U.S.A.
** 3015 Charnelton, Eugene, OR, 97405, U.S.A.

ABSTRACT

A key is presented for the grasses of Eravikulam National Park, Kerala, India. The key is designed for use by non-botanists. Only a 10X eyepiece and a scale are needed to identify the grasses.

INTRODUCTION

The purpose of this key to provide a means by which non-botanists can identify grasses from Eravikulam National Park, Kerala, India. The advantages of this key over more traditional keys based on floral characteristics are as follows:

1. All characteristics utilized in the key can be distinguished by the naked eye or with the aid of a 10X eyepiece, making it possible to make the identifications in the field without the aid of more sophisticated optical equipment. The only other equipment required is a millimeter and centimeter scale.
2. Grass specimens can be collected at any time of the year, whether the species is flowering or not.
3. All terms used in the key are defined or illustrated, making it possible for a wildlife manager, zoologist, ecologist, or complete novice to correctly identify any grass.

This key was derived from characteristics recorded from grasses collected from Eravikulam National Park. Rice compiled the original key, which was then tested by Edblom and appropriate revisions were made. Specimens of the included grasses are on deposit at both Kew Botanic Gardens and the Kerala Forest Research Institute.

DESCRIPTION OF GRASS CHARACTERISTICS

The terms used in this key are described below. Most of the terminology follows that of Harrington 1957, 1977, and Achariyar and Mudaliyar 1921.

The Grass Plant: Fig. la illustrates a grass plant. The **culm** refers to the main central stem. **Joints** or **nodes** occur along the stem. **Proximal** refers to the portion of the structure closest to the stem, whereas **distal** refers to the part most distant from it. The **angle of exit** refers to the angle between the proximal section of the blade and the stem. Parts of the plant which are old, ageing, or dying are termed **senescent**.

The bases of the leaves are arranged in either of two ways. **Conduplicate** leaves are folded along their mid-lines, with the result that the base of the grass plant is compressed or flattened along the axis of the stem. **Convolute** leaves wrap around the stem, and the base of the plant is round.

Grass plants are either **annual** or **perennial**. Annual grasses grow for one year, and survive from year to year only by reseeding. Perennial grass plants grow for two or more years. Perennial grasses may be distinguished from annuals by any of the following:

(1) Woody plants are always perennials.
(2) Plants with tubers, bulbs, corms, or rhizomes are perennials.
(3) Living plants with dead remains of last year's growth are perennials.

The leaf: Together, the **sheath** and **blade** comprise the grass leaf. The sheath wraps around the stem, and changes from overlapping or closed to open just below where the blade starts. The distance below the start of the blade to where the sheath becomes overlapping or closed is a characteristic used in this key. On the blade, the **top** or **upper surface** refers to the side of the blade facing upwards as the blade leaves the stem (equals adaxial surface). The **lower** or **bottom** surface of the blade is that opposite the top (equals abaxial surface). The **margin** or lateral edge of the blade may be **serrate** or **barbed**, that is with sharp teeth, or **entire**, meaning without serrations. Sometimes the blade has a **hyaline** (thin and translucent) margin. The surfaces or margins of the leaf may have **hairs**, and these hairs may arise from small bumps or pimple-like structures called **tubercles**. A **glabrous** surface is one without hairs.

At the juncture of the sheath and blade there is a light colored band of tissue known as the **collar**. The **ligule** is a projection of hairs or membranous tissue on the inside at the most distal point on the sheath. The collar and ligule are shown in Fig. lb. A ligule which wraps around the stem is termed **clasping**.

The blades of all grasses in this key are either **lanceolate**, **lanceolate-linear**, or **linear**. These shapes are illustrated in Fig. 2. The distal "constriction" seen in many blades of

Eragrostis nigra is also shown in Fig. 2. Grass leaves have numerous longitudinal parallel **veins**. The median vein is often more conspicuous and prominent than the others, in which case it is termed a **median rib**. Sometimes the median rib forms a long ridge or **keel** along the bottom surface of the blade or on the outside of the sheath. A **cross-section** refers to the shape a blade would have if it were cut across its width, with the cut viewed end-on. Cross-sections 1 cm distal from the collar vary from **flat**, to being in the shape of a **"U"** or a **"V"**, or a **winged rib**. A winged rib consists of a prominent median rib with much reduced blade surfaces on either side. A winged rib is illustrated in Fig. 1c.

The Inflorescence. The inflorescence is the flowering part of the plant. In this key characteristics of the inflorescence are provided occasionally as additional characteristics to aid in confirming an identification. The inflorescences of grasses consist of numerous **spiklets**, which in turn are made up of **florets**. Some grasses have bristle-like **awns** arising from the florets.

When using these characteristics, bear the following in mind:

Serrations may be very minute, are often more fully developed near the distal end of the blade, and may be more fully developed or apparent on one margin than on the other. Unless stated otherwise, the presence or absence of serrations was determined on the margins at the blade's midpoint.

Sometimes a blade will have a few hairs within a few centimeters of the collar, or very few hairs scattered elsewhere on the blade. Such blades should be considered glabrous.

Ligules with jagged tips should not be mistaken for ligules tipped with hairs.

The sheath below the collar often opens more widely as the plant matures. Never consider senescent leaves when determining the distance from the collar at which the sheath overlaps or closes.

Dimensions are given for large, mature blades on non-flowering stems. Remember that the examination of more than one specimen will lessen the likelihood of keying an individual with exceptional characteristics.

HOW TO USE THE KEY

If need be, the reader should first become familiar with the terms and definitions in the preceeding section. The text of the key should then be read, comparing the characteristics of the grass with the description given. Choose the line (a or b) with the description which matches the grass (use the 10X eyepiece!), and proceed to the next indented line. Continue in this manner until there are no further choices, and a dotted line leads to a

number at the right margin. For example, a grass with a ligule which is a membrane, entire blade margins, tubercle based hairs, and a ligule tipped with hairs would lead one through the following sequence: 1b--ligule present, 8a--ligule a membrane, 9a--blade margin entire, 10a--blade margins with tubercle based hairs, 11a--ligule tipped with hairs, which leads to grass number 6.

The next step is to find the resulting number in the section on species characteristics. This section gives a number of characteristics of each grass species, along with its name. Identification should not be considered complete until the characteristics listed are checked against those of the grass being identified. If the characteristics accurately describe the grass keyed as No. 6, one would conclude that the grass is Arundinella mesophylla.

If the listed characteristics do not match that of the unknown grass, it is necessary to start over with the key, making sure that each step to the final grass number has been made correctly.

Several grass numbers occur more than once in the key, as it was our judgment that the reader might reasonably key that species in more than one way. In addition, we strove to avoid continuous variables (e.g. length and width), but we did include them when they were very different, or in combination with other characteristics.

KEY TO THE GRASSES OF ERAVIKULAM NATIONAL PARK

1a Ligule absent
  2a Blade margins entire
    3a Blade width 15 mm or more.....No.1
    3b Blade width 6 mm or less
      4a Blades linear, less than 2 mm wide, about 25-30 cm long No.2
      4b Blades lanceolate-linear, 3-6 mm wide, about 5-14 cm long No.3
  2b Blade margins serrate or barbed (if even minutely)
    5a Blades 1.5-5 cm long, lanceolate No.4
    5b Blades 5 cm or longer, linear or lanceolate-linear
      6a Leaves convolute, shoots circular at base No.1
      6b Leaves conduplicate, shoots compressed at base
        7a Blades linear, 20-50 cm long No.5
        7b Blades lanceolate-linear, 5-14 cm long No.3
1b Ligule present as a membrane or ring of hairs
  8a Ligule a membrane
    9a Blade margin entire (not serrate or barbed)
      10a Blade margins with tubercle based hairs
        11a Ligule is a membrane tipped with hairs No.6

11b Ligule is a membrane not tipped with hairs
12a Blade length 30-45 cm, lower surface densely haired No.7
12b Blade length 5-15 cm, lower surface haired
13a A perennial, blades 7-14 mm wide, 8-15 cm long No.8
13b An annual, blades 5-8 mm wide, 5-10 cm long .No.9
10b Blade margins without tubercle based hairs
14a Blade tightly folded concealing upper surface when fresh No.10
14b Blade not tightly folded
15a Upper surface of blade glabrous
16a Sheath overlapping or closing less than 1 cm below collar
17a Ligule clasping stem
18a Blade margins with a thin hyaline membranous edge No.11
18b Blade margins without a thin hyaline membranous edge
19a Median rib prominent with light keel ..No.12
19b Median rib present, indistinct No.13
17b Ligule not clasping stem
20a Median rib absent, annual No.14
20b Median rib present, perennial
21a Median rib keeled, ligule 2mm long No.11
21b Median rib without keel, ligule minute No.3
16b Sheath open 1 cm or more below collar
22a Ligule minute, blade lower surface sparsely haired No.3
22b Ligule 2 mm long, blade lower surface glabrous
23a Median rib prominent and keeled No.11
23b Median rib inconspicuous No.15
15b Upper surface of blade haired
24a Median rib absent No.16
24b Median rib present
25a Median rib present, but not prominent
26a Blade lower surface furry, blades up to 60 cm high No.7
26b Blade lower surface sparsely haired, up to 15 cm high No.3
25b Median rib conspicuous, usually keeled
27a Plants covered with dense rust colored hairs at very base No.17
27b Plants not covered with dense rust colored hairs at very base
28a Upper surface of blade sparsely haired, blade length 5-11 cm, ligule 3-4 mm long No.18

28b Upper surface of blade hairy. Blade length 25 to 65 cm, ligule 0-2 mm
29a Hairs on blade surfaces tubercle based No.19
29b Hairs on blade surfaces not tubercle based No.1

9b Blade margins serrate, barbed (even minutely)
30a Blade margins with hairs arising from tubercles
31a Leaves convolute, plants circular at base
32a Blade lower surface sparsely haired or glabrous, blades 8-15 cm long, hairs 1 mm No.8
32b Blade lower surface densely haired (furry), blades 30-45 cm long, hairs 2-6 mm on blades and margins No.7
31b Leaves conduplicate, plants compressed at base
33a Lower surface of blade haired No.20
33b Lower surface of blade glabrous No.21
30b Blade margins without hairs arising from tubercles
34a Blade cross section 1 cm from collar a winged rib
35a Lower surface of blade glabrous
36a Blade length 10-17 cm, blade width 4-6 mm ...No.22
36b Blade length 75-105 cm, blade width 7-14 mm .No.23
35b Lower surface of blade hairy
37a Upper blade surface glabrous No.24
37b Upper blade surface haired
38a Upper blade surface sparsely haired, blade length 5-11 cm, ligule 3-4 mm No.18
38b Upper blade surface hairy, blade length 35-65 cm, ligule 0-2 mm
39a Hairs on blade surfaces tubercle based ..No.19
39b Hairs on blade surfaces not tubercle based No.1
34b Blade cross section 1 cm from collar a "V", "U", or flat
40a Ligule membrane tipped with small hairs
41a Lower surface of blade glabrous
42a Blades 10-13 cm long, 4-7 mm wide, purplish-brown in senescence, lower surface not shiny No.21
42b Blades 10-45 cm long, 5-19 mm wide, not purplish-brown in senescence, lower surface shiny
43a Upper surface of collar glabrous, blade width 8-19 mm No.25
43b Upper surface of collar haired, blade width 5-9 mm No.26
41b Lower surface of blade haired
44a Lower surface of blade sparsely haired, width 2-3 mm No.20
44b Lower surface of blade densely haired, width 5-7 mm No.7

40b Ligule membrane not tipped with small hairs
45a Upper surface of blade haired or sparsely haired
46a Lower surface of blade haired
47a Hairs on upper surface of blade tubercle based No.27
47b Hairs on upper surface of blade not tubercle based
48a Blade length 3-5 cm, annual No.28
48b Blade length 5-14 cm, perennial No.3
46b Lower surface of blade glabrous or nearly so
49a Blades 7-10 cm long, ligule 2 mm long ...No.12
49b Blades 18-50 cm long, ligule minute
50a Median rib prominent above and below, barbed on distinct keel No.5
50b Median rib inconspicuous above, keeled at collar, not barbed No.26
45b Upper surface of blade glabrous
51a Blades lanceolate, 1-3 cm long No.14
51b Blades linear or lanceolate-linear, 5-35 cm long
52a Single indentation on blade as if previously constricted (see Fig. 2) No.26
52b Blade without indendation
53a Median rib not keeled
54a Ligule minute No.3
54b Ligule 2-3 mm No.13
53b Median rib keeled
55a Blade lower surface with hairs increasing distally No.29
55b Blade lower surface glabrous
56a Blades linear, 7-10 cm long No.30
56b Blades lanceolate or lanceolate-linear, 30-35 cm long No.11

8b Ligule a ring of hairs
57a Blade margins entire and hairless
58a Plants covered with dense rust colored hairs at very base No.17
58b Plants not covered with dense rust colored hairs at very base
59a Blades 5-11 cm long, leaves conduplicate No.31
59b Blades 2-3 cm long, leaves convolute No.32
57b Blade margins haired or serrate or barbed
60a Blade margins hairless or with tubercle based hairs
61a Blade length 0.5-4 cm
62a Blade width 4-9 mm No.33
62b Blade width 1.5-3 mm
63a Blade lower surface sparsely very finely haired No.34
63b Blade lower surface glabrous

64a Terrestrial, blade margins serrate No.35
64b Aquatic, growing submerged in ponds or streams, blade margins usually entire No.32
61b Blade length at least 5 cm
65a Sheath (outside) without tubercle based hairs
66a Upper surface of blade haired
67a Leaves conduplicate No.5
67b Leaves convolute
68a Blade length 5-10 cm, upper surfaces often beet purple No.36
68b Blade length 15-45 cm, upper surfaces not beet purple
69a Blade width 5-9 mm. Single indentation on blade as if previously constricted (see Fig. 2) No.26
69b Blade width 9-21 mm. without indentation on blade No.37
66b Upper surface of blade glabrous
70a Lower surface of blade with hairs increasing distally No.29
70b Lower surface of blade glabrous
71a Leaves convolute, plants circular at base No.26
71b Leaves conduplicate, plants compressed at base No.31
65b Sheath (outside) with tubercle based hairs
72a Blade length 5-10 cm, width 3-4 mm, margins turn dark reddish-brown when approaching senescence No.6
72b Blade length 30-45 cm, width 5-7 mm, margins do not turn dark reddish-brown when approaching senescence No.7
60b Blade margins with hairs, not tubercle based
73a Blade lower surface glabrous
74a Blade length 20-50 cm, width 2-4 mm No.5
74b Blade length 10-14 cm, width 12-20 mm No.38
73b Blade lower surface haired
75a Sheath overlapping or closing in less than 1 cm, blades 1.5-5 cm long No.4
75b Sheath open more than 1 cm, blades 30-45 cm long No.7

SPECIES CHARACTERISTICS

Characteristics for each species in the key are given below. The abbreviation a.k. means "also keyed" and refers to alternate ways of arriving at the particular species from the key.

No.1 Garnotia exaristata Gould
Blade characteristics: Blades lanceolate-linear, 25 to 35 cm long, 16-21 mm wide. Margins very minutely serrate (a.k.

entire). Blade top surface is finely haired. Bottom surface is glabrous near base, haired near tip. Median rib is prominent and keeled. Blade exit 25 deg.
Additional characteristics: Perennial to 75 cm high with flowering stem to 130 cm. Ligule absent (a.k membrane) but 2 lateral tufts of hair present. Sheath is open for several cm. Leaves convolute.

No.2 Tripogon ananthaswamianus Sreekumar et al.
Blade characteristics: Blades linear, 25-30 cm long, less than 2 mm wide. Blade margins smooth and entire. Blade top surface very finely haired (seen only with 10x). Median rib with 2 lateral and 2 sub-marginal veins (1 on each side).
Additional characteristics: Perennial to 25 cm high, with drooping flowering stems to 50 cm. No ligule. Sheath is glabrous, compressed, variable in opening. Blade exit 40 deg or less.

No.3 Eragrostis unioloides (Retz.) Nees ex Steudel
Blade characteristics: Blades lanceolate-linear, 5-14 cm long, 3-6 mm wide. Margins entire or serrate (midpoint to tip), hairless. Blade top surface is glabrous or sparsely haired (ca 2 mm long). Bottom surface very sparsely haired. Median rib without a keel, absent distally and indistinct above. Blade exit 30 deg.
Additional characteristics: Perennial to 15 cm high with flowering stems to 23 cm. Ligule absent or a minute membrane. Sheath closure variable. Leaves conduplicate.

No.4 Garnotia courtallensis (Arn. & Nees) Thwaites
Blade characteristics: Blades lanceolate, 1.5-5 cm long, 2-5 mm wide. Margins serrate (midpoint). Blade top and bottom surfaces with a few long silky hairs. Young blades are glabrous. Median rib prominent. Blade exit 45 deg.
Additional characteristics: Perennial to 12 cm high, flowering stem to 50 cm. Ligule a ring of hairs (a.k. absent), 2 thin hyaline internal tissue projections present. Sheath overlapping or closing is less than 1 cm, and ribbed. Nodes at base hairy.

No.5 Chrysopogon zeylanicus (Nees) Thwaites
Blade characteristics: Blades linear, 20-50 cm long, 2-4 mm wide, minutely barbed or serrate. Blade surface top sparsely, minutely haired, blade bottom glabrous. Median rib prominent, keeled, and barbed, with 4-5 lateral veins.
Additional characteristics: Perennial 50-70 cm high with flowering stems to 80 cm. Ligule a ring of hairs (a.k. absent, a minute membrane). Margins moderately hairy. Blades exit at 30 deg, either straight or drooping. Sheath open for more than 1 cm, compressed, keeled, and with a row

of keel hairs. Usually in conspicuous clumps, leaves conduplicate.

No.6 Arundinella mesophylla Nees ex Steudel
Blade characteristics: Blade lanceolate, 5-10 cm long, 3-4 mm wide. Margins entire with some tubercles at base of hairs. Blade top and bottom surfaces are moderately hairy with hairs arising from tubercles. Median rib is faint, evident only on the proximal half of the blade.
Additional characteristics: Perennial 20-25 cm high, flowering stems 40-45 cm. Ligule is a very short membrane tipped with short hairs (<2 mm, a.k. a ring of hairs). Sheath overlaps or closes in ca 1 cm. Margins turn dark reddish-brown before senescence.

No.7 Arundinella vaginata Bor
Blade characteristics: Blades lanceolate-linear, 30-45 cm long, 5-7 mm wide. Margins are densely hairy, tubercles more readily visible on less densely haired senescent blades (up to 6 mm long, a.k. without tubercle based hairs). Margins very minutely serrate (a.k. entire). Blade top surface is haired, 2-3 mm long. Bottom surface is densely haired or furry. Median rib is present but inconspicuous. Blade exit 20 deg.
Additional characteristics: Perennial to 60 cm high, with flowering stems to 100 cm. Ligule is a row of hairs, 2 mm, above a 0.5 mm membrane. Sheath is open 1 cm or more. Leaf sheath very hairy (tubercle based). Grass is furry and light green in appearance.

No.8 Arundinella purpurea Hochst. ex Steudel
Blade characteristics: Blades lanceolate-linear, 8-15 cm long, 7-14 mm wide. Margins with regularly spaced tubercle-based hairs, pointing distally. Margins are entire centrally, minutely serrate distally. Blade top and bottom surfaces are sparsely haired (hairs with tubercles at base), or glabrous. Median rib is present and keeled. Blade exit 20-30 deg.
Additional characteristics: Perennial to ca 30 cm high, with flowering stems 35-50 cm high. Ligule is level (even lengthed) membrane. Sheath overlaps or closes in less than 1 cm except in senescence. Leaves convolute.

No.9 Arundinella ciliata (Roxb.) Nees ex Miq.
Blade characteristics: Blades lanceolate, 5-10 cm long, up to 5-8 mm wide. Margins entire with numerous hairs arising from tubercles. Blade top and bottom surfaces also have numerous hairs arising from tubercles. Median rib is present. Blade exit 20 deg.

Additional characteristics: Annual about 10 cm high, but up to 25 cm, with flowering stems 25-50 cm high. Ligule is a membrane. Sheath closure variable.

No.10 Aira elegantissima Schur.

Blade characteristics: Blades lanceolate-linear. Two forms:

Blade length	(a) 4-8 mm	(b) 15-25 cm
Blade width	(a) 1 mm folded	(b) to 6 mm
Margins	(a) entire	(b) entire
Top surface	(a) hidden	(b) glabrous
Bottom surface	(a) glabrous	(b) glabrous
Median rib	(a) absent	(b) absent
Blade exit	(a) 5 deg	(b) 0 deg

Additional characteristics: Annual to 10 cm high with flowering stems 15-22 cm high. Ligule is a thin hyaline membrane (4 mm). Sheath open for more than 1 cm. Two types of blades: (a) thin inrolled (folded), and (b) broad, enclosing inflorescence and extending past it. Leaves conduplicate.

No.11 Bothriochloa sp. x Dichanthium sp. (Bothriochloa foulkesii (Hook. f.) Henrard)

Blade characteristics: Blades lanceolate or lanceolate-linear, 30-35 cm long, 4-7 mm wide. Margins entire or serrate, with a hyaline membranous edge. Blade top and bottom surfaces are glabrous. Median rib is present and keeled. Blade exit 10-30 deg.

Additional characteristics: Perennial to 45 cm high with flowering stems to 95 cm. Ligule is a clasping (a.k. not clasping) hyaline membrane, ca 2 mm, with a few hairs. Sheath overlapping or closing within 1 cm (a.k. open). Stem nodes are glabrous.

No.12 Digitaria wallichiana (Wight & Arn.) Stapf

Blade characteristics: Blades lanceolate-linear, 7-10 cm long, 3-5 mm wide. Margins serrate (midpoint, a.k. entire). Blade top and bottom surfaces are glabrous or with a few hairs near margin. Median rib is prominent and lightly keeled. Blade exit 20 deg.

Additional characteristics: Perennial with trailing runners. Ligule is a membrane (2 mm), clasping the stem. Sheath overlapping or closed within 1 cm.

No.13 Agrostis peninsularis Hook. f.

Blade characteristics: Blades linear, 10-20 cm long, 2-3 mm wide. Margins very finely serrate and can only be felt and seen with difficulty at the midpoint and tip (10x, a.k. entire). Blade top and bottom surfaces are glabrous. Bottom surface has small hairs, pointing forward, and difficult to see. Median rib is present but difficult to distinguish from others (about 14, both sides).

Additional characteristics: Perennial 25-40 cm high with flowering stems 40-70 cm. Ligule is a prominent clasping membrane (2-3 mm), glabrous throughout. Sheath usually closes within 1 cm, but some are open for 2-3 cm. Sheath is glabrous. Leaves convolute.

No.14 Jansenella griffithiana (C. Muell.) Bor
Blade characteristics: Blades lanceolate, 1-3 cm long, 2-3 mm wide. Margins with a few hairs at base of blade and serrate (midpoint, a.k. entire). Blade top and bottom surfaces are glabrous. Median rib absent.
Additional characteristics: Annual to 15 cm high with flowering stems to 25 cm. Ligule is a membrane. Sheath overlapping or closing within 1 cm.

No.15 Helictotrichon asperum (Munro ex Thw.) Bor
Blade characteristics: Blades lanceolate-linear, 25-35 cm long, 3-5 mm wide. Blade top and bottom surfaces are glabrous. Margins are smooth and entire. Median rib is indistinct below. Blade exit variable.
Additional characteristics: Perennial to 65 cm high with flowering stems to 120 cm. Ligule is a membrane (2 mm). Sheath is haired and open more than 1 cm.

No.16 Tripogon bromoides Roemer & Schultes
Blade Characteristics: Blades linear, 10-20 cm long, 2-3 mm wide. Blade margins hairy and minute serrations are often visible at tip (but not at midpoint). Blade top surface densely hairy (ca 2 mm long), bottom surface with few fine hairs. Median rib absent, about 2 dozen veins.
Additional characteristics: Perennial 10-15 cm high with flowering stem ca 20 cm (drooping). Blade exit about 60 deg. Sheath overlaps or closes in 2 mm and is hairy. Ligule is a fine membrane, tipped with hairs, laterally hairs sometimes appearing as pointed tufts. Leaves convolute.

No.17 Eulalia phaeothrix (Hackel) Kuntze
Blade characteristics: Blades lanceolate-linear, 10 to 25 cm long, 4 to 8 mm wide. Blade margins entire and smooth, somewhat inrolled, and serrate near distal end. Blade top surface usually hairy (ca 4 mm), hairs erect, sometimes sparsely haired or glabrous. Bottom surface usually hairy (ca 2 mm), often leaves from flowering stalks have few or no hairs. Median rib present, sometimes lightly keeled. Blade exit 20-30 deg.
Additional characteristics: Perennial to 25 cm high, flowering stems 40-55 cm. Ligule a membrane with 2 lateral "horns" of hair (a.k. ring of hairs). Sheath glabrous or hairy, closing or overlapping in 3 mm. Joints on flowering stems

glabrous, sometimes bent at 10-15 deg. Base of plants with dense rust-colored hairs.

No.18 Ischaemum hirtum Hackel
Blade characteristics: Blades lanceolate-linear, 5-11 cm long (rarely 18 cm), 7-12 mm wide. Margins vary: some haired, some serrate (a.k. entire), serrations often end abruptly about midpoint. Blade top surface has a few hairs, tubercle based. Bottom surface is hairy. Median rib is evident, keeled. Blade exit variable.
Additional characteristics: Perennial, 10-15 cm high with flowering stems to 40 cm. Ligule is a prominent membrane, clasping 3-4 mm (rarely 5 mm). Sheath is open for more than 1 cm. Often one side of blade is serrate, the other haired. Many blades with a constriction at the base, leaving the median rib to form a 1-2 cm "petiole".

No.19 Andropogon polyptichus Steudel var. polypitchus
Blade characteristics: Blades lanceolate-linear, 35-45 cm long, 7-9 mm wide. Margins entire, smooth, or serrate. Blade top surface is hairy, lightly furred, tubercle based. Bottom surface is also hairy, especially along median rib and near margins. Median rib is keeled, conspicuous below. Blade exit 20 deg.
Additional characteristics: Perennial to 70 cm high with flowering stems to 110 cm. Ligule a membrane, 1-2 mm, surrounded by dense hairs. Sheath overlapping or closing before 1 cm. Stem nodes with rings of dense hairs, blades widest at about 2/3 length.

No.20 Themeda triandra Forsskal
Blade characteristics: Blades linear, 30-35 cm long, 2-3 mm wide. Margins minutely serrate, some with sparse 3-5 mm hairs arising from tubercles (a.k. without hairs arising from tubercles). Blade top and bottom surfaces sparsely haired. Median rib lightly keeled with 4 lateral veins. Blade exit 20 deg or less.
Additional characteristics: Perennial 20-50 cm high with flowering stems to 65 cm. Ligule is a membrane tipped with small hairs. Sheath is open for 3 cm or more. Leaves conduplicate.

No.21 Themeda tremula (Nees ex Steudel) Hackel
Blade characteristics: Blades lanceolate-linear, 10-13 cm long, 4-7 mm wide. Margins finely serrate (midpoint and end), with or without a few tubercle based hairs (3-7 mm long, nearly perpendicular to surface, more numerous proximally). Blade top and bottom surfaces are glabrous. Median rib is evident. Blade exit 30 deg. Purplish brown in senescence.
Additional characteristics: Perennial. Ligule is a hyaline membrane, 1 mm, tipped with short hairs. Sheath is

overlapping or closing in less than 1 cm. Stem with numerous joints. This species found trailing or "leaning" on other grasses. Leaves conduplicate.

No.22 Andropogon lividus Thwaites
Blade characteristics: Blades lanceolate-linear, 10-17 cm long, 4-6 mm wide. Margins serrate (midpoint and tip). Blade top and bottom surfaces are glabrous. Median rib evident in a slight keel. Blade exit 20 deg.
Additional characteristics: Perennial up to 30 cm high with flowering stems to 45 cm. Ligule a prominent membrane, clasping stem 3-4 mm. Sheath opening variable, usually closing within 1 cm. Purplish tinge to leaves and inflorescence.

No.23 Cymbopogon flexuosus (Nees ex Steudel) Watson
Blade characteristics: Blades lanceolate-linear, 75-105 cm long, 7-14 mm wide. Margins serrate. Blade top and bottom surfaces are glabrous. Median rib is prominent and keeled. Blade exit 20 deg.
Additional characteristics: Perennial to 100 cm high with flowering stems to 200 cm. Ligule is a membrane, 2-7 mm. Sheath is open for more than 1 cm. A large grass. Leaves conduplicate.

No.24 Andropogon polyptichus var. deccanensis Bor
Blade characteristics: Blades lanceolate-linear, 25-40 cm long, 2-3 mm wide. Margins serrate (midpoint and tip). Blade top surface is glabrous. Bottom surface with many fine hairs pointing distally. Median rib is prominent, keeled. Blade exit 30 deg.
Additional characteristics: Perennial to 30 cm high. Ligule is a membrane surrounded by hairs. Sheath is open for more than 1 cm. Distinctive in having blades with an inverted "w" cross section distally, margins inrolled on bottom.

No.25 Anthoxanthum horsefieldii (Bennett) Reeder
Blade characteristics: Blades lanceolate-linear, 10-30 cm long, 8-19 mm wide. Margins haired or glabrous with minute serrations. Margins are sometimes wavy and inrolled. Blade top surface is very sparsely haired or glabrous. Bottom surface is glabrous and shiny. Median rib is present but hard to distinguish from 24 or so other veins on top surface. Median rib is keeled on bottom. Blade exit 20-30 deg.
Additional characteristics: Perennial 60 cm high with flowering stalks to 80 cm. Ligule is a membrane tipped with very small hairs. Sheath varies--closing in 0-3 cm. A conspicuous light yellow-green color in fall. Leaves convolute.

No.26 Eragrostis nigra Nees ex Steudel
Blade characteristics: Blades lanceolate-linear, 18-43 cm long, 5-9 mm wide. Margins serrate (midpoint and distal end), hairless. Blade top surface is glabrous or with scattered hairs, ca. 3 mm in length (more numerous near collar and margins). Bottom surface is glabrous and shiny. Median rib is keeled at the collar to almost inconspicuous at blade tip, indistinct on upper surface.
Additional characteristics: Perennial to 20 cm high with flowering stems to 35 cm. Ligule is a minute hairlike membrane below a thin ring of 3-4 mm hairs (clasping, a.k. membrane tipped with hairs, ring of hairs). Sheath closure is variable. A single indentation occurs, usually in the upper half of the blade, as if previously constricted (Fig 2). Leaves convolute.

No.27 Ischaemum indicum (Houtt.) Merrill
Blade characteristics: Blades lanceolate-linear, 5-15 cm long, 8-12 mm wide. Blade margins serrate. Blade top surface has numerous, erect (2-3 mm) hairs, tubercle based. Bottom surface also hairy. Median rib present and keeled (not heavy). Blade exit 20-30 deg.
Additional characteristics: Perennial to 25 cm high, flowering stems 30-50 cm. Ligule a membrane (2 mm). Sheath is compressed and keeled, glabrous or somewhat hairy near distal end, and open 2-3 cm. Nodes are bearded.

No.28 Dichanthium oliganthum (Hochst. ex Steudel) Cope
Blade characteristics: Blades lanceolate-linear, 3-5 cm long, 2-4 mm wide. Margins finely serrate. Blade top and bottom surfaces are haired. Median rib is evident below, inconspicuous from above. Blade exit 20 deg.
Additional characteristics: Annual to 30 cm high with flowering stems to 35 cm (often less). Ligule is a hyaline membrane. Sheath overlaps or closes within 1 cm.

No.29 Eulalia thwaitesii (Hackel) Kuntze
Blade characteristics: Blades lanceolate-linear, 7-13 cm long, 3-6 mm wide. Margins minutely serrate throughout. Blade top surface is glabrous. Bottom surface haired (few or none proximally, increasing distally). Median rib is present and keeled. Blade exit 30 deg.
Additional characteristics: Perennial to 25 cm high with flowering stems to 50 cm. Ligule of hairs, irregular and variable, with small membrane below hairs (a.k. membrane). Sheath overlapping or closing within 1 cm.

No.30 Poa annua L.
Blade characteristics: Blades linear, 7-10 cm long (shorter on flowering stems), rarely to 14 cm, 2-4 mm wide. Margins hairless, serrate (midpoint and tip), serrations widely spaced at midpoint. Blade top and bottom surfaces are glabrous. Median rib lightly keeled, visible but not prominent on upper surface.
Additional characteristics: Annual to ca 15 cm high with flowering stems to ca 25-30 cm (supported by other vegetation). Ligule is a membrane not tipped with hairs, ca 2 mm (ca 3 mm on flowering stem). Sheath overlapping or closing within 1 cm on new growth, but opening to more than 1 cm with age. Leaves conduplicate.

No.31 Heteropogon contortus (L.) P. Beauv. ex Roemer & Schultes
Blade characteristics: Blades linear, 5-11 cm long, 4-5 mm wide. Margins serrate (tip to midpoint, a.k. entire). Blade top and bottom surfaces are glabrous. Median rib is present and keeled. Other veins are also present, ca 5 per side. Blade exit 25 deg.
Additional characteristics: Perennial. Ligule is a brushy row of hairs with margins having long silky hairs. Sheath is variable, overlapping or closing 0-2 mm. Leaves conduplicate, glabrous. Blades often fold together to a "closed" V exit after leaving stem. Florets with long awns that twist around each other. Some blades end abruptly at collar.

No.32 Coelachne simpliciusceula (Wight & Arn.) Munro ex Benth.
Blade characteristics: Blades lanceolate, 2-3 cm long, 1.5-2.5 mm wide. Margins entire (a few margins with minute serrations distal of midpoint), hairless. Blade top and bottom surfaces are glabrous. Median rib is inconspicuous, but faintly visible below, absent above.
Additional characteristics: Grass is variable in height. Ligule is a ring of hairs. Sheath closure variable. Aquatic, leaves convolute.

No.33 Isachne bourneorum C. E. C. Fischer
Blade characteristics: Blades lanceolate, 2-4 cm long, 4-9 mm wide. Margins minutely serrate, with a few tubercle hairs (variable). Blade top and bottom surfaces are glabrous, or with a few tubercle based hairs. Median rib is indistinct or absent. Blade exit 90 deg.
Additional characteristics: Perennial to 25 cm high with flowering stems to 40 cm. Ligule is a ring of hairs just under 1 cm. Sheath overlaps or closes within 1 cm. Sheaths are hairy, from tubercles. Grass has trailing runners.

No.34 Isachne setosa C. E. C. Fischer
Blade characteristics: Blades broadly lanceolate, 0.5-0.9 cm long, 2-3 mm wide. Margins minutely serrate. Blade top surface glabrous or nearly so. Bottom surface sparsely very finely haired. Median rib is absent on blade but present on sheath. Blade exit 45 deg.
Additional characteristics: Perennial to 4 cm high, with flowering stems 4-7 cm high. Ligule is of a few hairs. Sheath is overlapping or closed within 1 cm. Veins are prominent on upper blade surface, absent below. Nodes hairy.

No.35 Coelachne perpusilla (Arn. ex Steudel) Thwaites
Blade characteristics: Blades lanceolate, 1-2.3 cm long, 2-3 mm wide. Margins serrate (midpoint and distal end) and hairless. Blade top and bottom surfaces are glabrous. Median rib absent or nearly so.
Additional characteristics: Annual to 15 cm high with flowering stems to 17 cm. Ligule is a ring of hairs, 0.5 mm. Sheath overlapping or closed (less than 1 cm). Leaves convolute. Nodes hairy.

No.36 Setaria pumila (Poiret) Roemer & Schultes
Blade characteristics: Blades lanceolate, 5-10 cm long, 5-7 mm wide. Margins are hairless and serrate (midpoint and tip). Blade top surface has a few long silky hairs (3-4 mm). Bottom surface is glabrous. Median rib is prominent and keeled. Blade exit 30 deg.
Additional characteristics: Perennial. Ligule of hairs. Sheath overlaps or closes in less than 1 cm. Upper surfaces are often beet-purplish. Bottom surfaces green. Leaves convolute.

No.37 Zenkeria sp.
Blade characteristics: Blades lanceolate-linear, 35-45 cm long, 9-21 mm wide. Margins hairless, serrate on hyaline margins (midpoint and tip). Blade top surface is sparsely haired. Bottom surface is glabrous and shiny. Median rib absent on upper surface, but roundly keeled on proximal half of lower surface. Blade exit 20 deg.
Additional characteristics: Perennial to 40 cm high with flowering stems to 65 cm. Ligule is of hairs (1 mm). Sheath is open for more than 1 cm. Grows in clumps on rock outcrops, usually precariously placed. Leaves convolute. One margin especially prone to roll in, giving appearance and hyaline characteristic only on opposite margin.

No.38 Garnotia arundinacea Hook. f.
Blade characteristics: Blades lanceolate, 10-14 cm long, 12-20 mm wide. Margins finely serrate with hairs. Blade top and

bottom surfaces are glabrous. Median rib is prominent and keeled.

Additional characteristics: Perennial to 150 cm high with flowering stems to 200 cm. Ligule is of hairs. Sheath overlaps or closes within 1 cm.

ACKNOWLEDGEMENTS

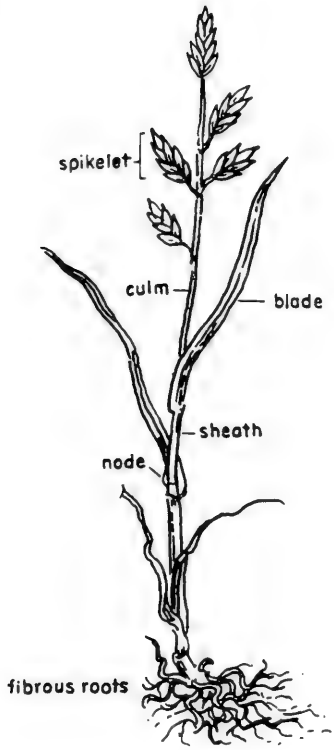
This key was prepared as part of a study on the behavior and ecology of Nilgiri tahr supported by the American Institute of Indian Studies, The Caesar Kleberg Program in Wildlife Ecology, and the New York Zoological Society. We are grateful for the contributions of these organizations as well as the U.S. Fish and Wildlife Service for their logistical support. We would also like to thank P.V. Sreekumar and T.A. Cope for identification of grass specimens. Dr. Cope also provided valuable comment on an earlier draft of the key. We also wish to thank Ellen Rice for her assistance in preparing the manuscript.

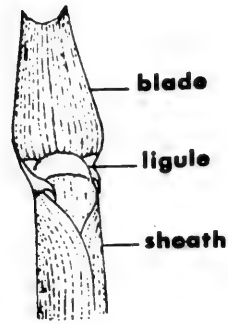
REFERENCES

HARRINGTON, H.D. 1957. How to indentify plants. Swallow Press, Chicago.

HARRINGTON, H.D. 1977. How to indentify grasses and grasslike plants (sedges and rushes). Swallow Press, Chicago.

ACHARIYAR, R.B.K.R. and C.T. MUDALIYAR. 1921. A handbook of some South Indian grasses. Bishen Singh Mahendra Pal Singh, Dehra Dun.





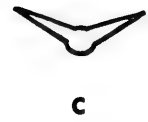


Fig. 1a. The main parts of a grass plant. 1b. Juncture of the sheath and blade, showing location of the ligule (reproduced with permission from Harrington, H.D. 1977. How to indentify grasses and grasslike plants (sedges and rushes). Swallow Press, Chicago). 1c. A winged rib consists of a prominent median rib with two much reduced blade surfaces on either side.

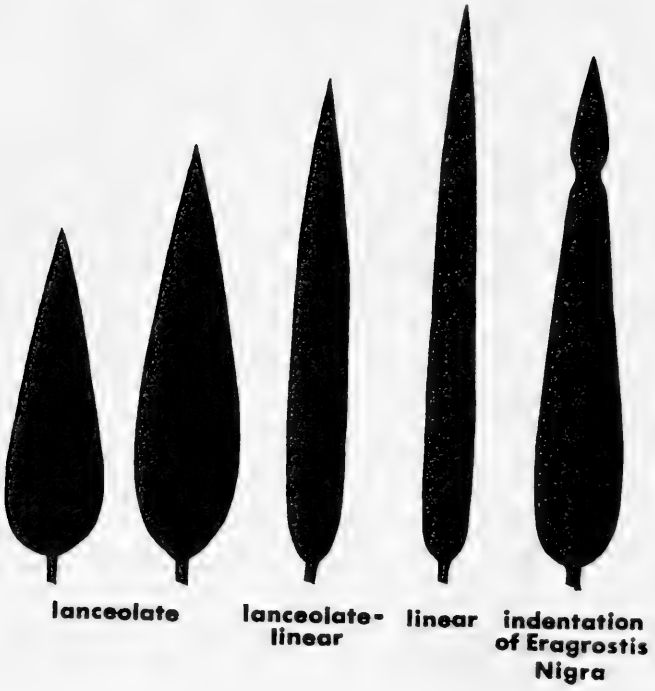


Fig. 2. Grass blade shapes.

BOOK REVIEWS

Alma L. Moldenke

"CLASSIC ROSES: An Illustrated Encyclopaedia and Grower's Manual of Old Roses, Shrub Roses and Climbers" by Peter Beales, 432 pp., 550 color photo., 14 color maps, 2 b/w maps, 1 tab., 14 multi-b/w diag. Holt, Rinehart & Winston, New York, N. Y. 10175. 1985. $45.00.

Such a wonderful, beautiful, informative book -- virtually a rose encyclopedia, the newest and the best, with well over a half thousand color photo portraits of roses and other illustrative materials, notes on the origin and development of roses from much of the author's own researching, a section on the selection and uses of roses in the landscape, another on the cultivation of roses and then the descriptive dictionary of over 1,000 species and hybrids of old roses! (I found myself making compulsive lists of roses for our own backyard!) Roses probably attracted early man's attention for their edible shoot tips and fruits before their floral beauty. Cultivation started about 5,000 years ago in China (*Rosa chinensis* painted on a 10th century vase). The other main centers are Europe (esp. *R. canina*), the Middle East (esp. *R. pimpinellifolia*) and North America (esp. *R. virginiana*). The author has provided much study and specimen tracing through hybridity records for understanding origins and directing new development in the huge genus *Rosa*. His effective plea is for perpetuating many of the classics for which he is to be congratulated as well as for this excellent publication.

"THE GROWTH OF BIOLOGICAL THOUGHT -- Diversity, Evolution, and Inheritance" by Ernst Mayr, xii & 974 pp. The Belknap Press of Harvard University Press, Cambridge, Massachusetts 02138. 1982. &30.00 clothbound & 1985. $12.95 paperbound reprint.

This will be an important book for study by all kinds of biologists, advanced students and folks with broad philosophical reading interests for quite a few years to come and even much longer because of its well weighted historical and scholarly information that is biologically, scientifically oriented. This book "on the history of ideas in biology" required far more than 10 years of actual researching and writing: it needed the professional lifetime of a great biological thinker and teacher with access to vast literature sources, students' wonderment over the years, and his organizing and weighing of answers. The introduction describes the place of biology in the sciences, its conceptual structure and its changing intellectual milieu. Part I deals with the diversity of life, Part II with evolution, and Part III with variation and its inheritance. A wonderful book , so logically and effectively explained!

"INVITATION TO BIOLOGY" Fourth Edition, by Helena Curtis & N. Sue Barnes, xxii & 730 pp., hundreds of color & b/w photo., draw., diag. & tab. 1985. $29.95.

This new somewhat abbreviated edition is published along with the new regular "Biology" 4th edition whose previous 3 editions I scrutinized carefully as though I were preparing to teach from them. This one, too, has "outstanding text", "stimulating and scientifically well-presented contents". "clear language", "superb and pertinent illustrations" many of which are differently arranged or new. The topics of evolution and ecology are effectively juxtapositioned and developed. A mention of AIDS appears. I am glad to note a correction: the chloroplasts in the leaf cross section are now green. Next the guard cell chloroplasts should be so fixed. For the average entering freshman on the quarter system this text offers plenty of exposure to this fascinating subject with the prospect for reasonable carry-over into further studies and adult life enrichment. The regular "Biology" 4th edition (unseen but assumed) would probably be better for those students with high entrance exam scores, better high school records and special interests in biology. Along with each of these texts there are Study Guides - for the students, $8.95 & $9.95, and Lab Manuals - $14.95 & $13.95, "Preparator's Guide" (not checked for misspellings), "Instructor's Manual" and "Transparencies"- all free to adopters.

"ANALYSIS OF CONIFEROUS FOREST ECOSYSTEMS IN THE WESTERN UNITED STATES" edited by Robert L. Edmonds for the U. S. International Biological Program, No. 14, xvii & 419 pp., 133 b/w fig. incl. 4 photo,, 11 maps & 57 tab. Van Nostrand Reinhold Inc., New York, N. Y. 10003. 1982. $46.95.

Since coniferous forests occupy about 1/3 of the land area of the western United States, are unique because their trees are unrivaled in size, longevity and biomass accumulation, are among the most productive in the world and are of great economic, natural and recreational values, this report of experimental and observational studies is highly valuable. The 11 chapters cover our current understanding of vegetation distribution in this biome forest productivity and its physiological controls, nutrient cycling, physical stability vs. erosion, relations among terrestrial, riparian and aquatic (stream and lake) ecosystems, and forest management practices vs. natural ecosystems. These valuable studies are centered on the Douglas fir region of Oregon and Washington. There are several really effective diagrammatic figures which could have had more "professional finish" for this I.B.P. book that will go all over the world. A full list of coniferous biome literature is provided in the appendix.

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CONTENTS

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DEUX OCHNACEES NOUVELLES DU VENEZUELA

par Claude **SASTRE**

M.N.H.N. Phanérogamie 16, rue Buffon
75005 Paris FRANCE

Parmi les collections récentes effectuées au Venezuela, deux spécimens appartenant respectivement aux genres Sauvagesia L. et Tyleria Gleason sont représentatifs de deux espèces d'Ochnacées non décrites à ce jour.

1. Sauvagesia falcisepala Sastre sp. nov.

Frutex 0,5 m altus glaberrimus, foliis coriaceis sessilibus, falciformibus, 5-10 cm longis, 0,7-1,2 cm latis, margine serrulata, stipulis ovatis, 1-1,2 cm longis cum margine ciliosissima; flores axillares, sepalis inaequalibus, arcuatis et aristatis, externis 1,3 cm longis, internis 0,8 cm longis, petalis non visis, staminodiis externis nullis, staminodiis internis, 5 petaloideis, ovoideis, 6 mm longis, antheris 5, ovario conico; pedunculo fructifero pendante, 3 cm longo, capsula 5 mm longa, stylo persistente, seminibus 0,8-0,9 mm longis.

TYPUS : Venezuela, Terr. Fed. Amazonas, Dpt. Rio Negro, arbustales roca abierta y bosque bajo denso en la vertiente oriental del Macizo Aracumuni, 1º 32' N, 65º 48W, alt. 750 m, leg. Huber et Medina (5918) 10 II 1981 (holo- P, iso- VEN).

Cette espèce originale par la forme et la taille de ses sépales est à rapprocher de S. nudicaulis Maguire et Wurdack.

2. Tyleria apiculata Sastre sp. nov.

Frutex 3 m altus, glaberrimus, foliis coriaceis sessilibus, lanceolatis, 5-8,5 cm longis, 1-1,5 cm latis, apice obtusi, venis secundariis numerosis paralelicis, 5-10º angulis cum vena primaria, margine subter integras supra minute spinulosa serrulata; inflorescentibus terminalibus, erectis, paniculatis, ad 8 cm longis, bracteis caduducis, 0,6-1 cm longis, pedicellis 4-6 mm longis, sepalis, 5 sub-aequalibus 8-9 mm longis, obtusaris, petalis, 5, corona 1-cyclica, staminodiis 5, 8 mm longis, oblongis, appendicibus lateralibus 1-2 minutis, antheris 5, 4 mm longis, sub-sessilibus, apiculatis, ovario conico 3-loculari, ovulis numerosis, stylo simplice; capsula

conica 12 mm longa, stylo persistente, seminibus alatis, 3 x 1 mm.

TYPUS : Venezuela, Terr. Fed. Amazonas, Dpt. Atabapo, cerro Marahuaca, laderas que miren al suroeste, cabeceras del rio Iguapo, sector meridional de la meseta sureste, bosque enano musgoso con ramas semidecumbentes y entrecruzadas, 3º 36' N, 65º 23' W, alt. 1560 m, leg. Steyermark (129649) 13-14 X 1983 (holo- P, iso- VEN).

Cette espèce remarquable par ses anthères apiculées, appartient au groupe de Tyleria à feuilles sessiles et à inflorescences composées à axes secondaires bien développés. Elle se distingue de T. spectabilis Maguire et Wurdack et de T. floribunda Gleason par ses feuilles moins longues inférieures à 9 cm, tandis que chez ces deux dernières espèces la longueur des feuilles est supérieure à 11 cm.

DELISSEA KONAENSIS SP. NOV. (LOBELIACEAE)

Hawaiian Plant Studies 131

Harold St. John

As presently known Delissea contains eight species and five varieties. These occur: on Kauai one species, and one variety, on Oahu four species and four varieties, on Maui one species, and on Hawaii two species. The present paper adds one species for the island of Hawaii.

Delissea konaensis sp. nov. (sect Micranthae). Fig. 1.

Diagnosis Holotypi: Frutex glaber est, petiolis 6-11 cm longis, laminis 13.5-16 × 4-4.5 cm chartaceis oblanceolatissubacuminatis basi cuneata dentibus marginis 0.5-1 mm longis subulatis sparsis, racemis 5-7 cm longis 10-15-floriferis, pedunculo 20-23 mm longo, pedicellis 7-9 mm longis, 5 lobis calycis 0.6-1 mm longis anguste deltoideis, corollis 2 mm longis albis arcuate decurvatis cum 3 protrusis parvis.

Diagnosis of Holotype: Glabrous shrub; petioles 6-11 cm long; blades 13.5-16 × 4-4.5 cm, chartaceous, oblanceolate, subacuminate, the base cuneate, the margins with spaced teeth 0.6-1 mm long, subulate, slightly ascending; racemes 6-7 cm long, 10-15-flowered; peduncle 20-23 mm long; pedicels 7-9 mm long; the basal bracts 2-2.5 mm long, subulate; hypanthium 4-8 mm long, ellipsoid, but constricted below the collar-like apex; calyx lobes 0.6-1 mm long, narrowly deltoid; corolla 2 cm long, 1 mm in diameter near the base, 2.5 mm in the apical third, white, arcuate decurved, with 3 near basal small bumps, one dorsal, two lateral, the upper lobes 5 mm long, 1 mm wide, acute; the lower lobes 5 mm long; filament tube glabrous; anthers glabrous, the upper ones 5 mm long, the lower ones 4 mm long and penicillate with white bristles 1 mm long.

Holotypus: Hawaiian Islands, Hawaii Island, South Kona District, Puu Lehua, above , above the Greenwell Ranch House (Capt. Cook), 5,000 ft elev., 9 Aug. 1968, G. W. Gillett 1,969 (BISH).

Discussion: The closest relative of D. konaensis is D. fallex Hbd., of Hawaii, a species with the petioles 10-12.5 cm long; blades 10-25 × 5 cm, oblong oblanceolate; pedicels 10 mm long; bracts 3 mm long; and the calyx teeth 3 mm long. D. konaensis has the petioles 6-11 cm long; blades 13.5-16 × 4-4.5 cm, oblanceolate; pedicels 7-9 mm long; bracts 2-2.5 mm long; and the calyx teeth 0.6-1 nn long,

Fig. 1. Delissea konaensis St. John, from holotype. a, leaf; b, raceme, X 1; c, flower, X 2; d, stamens, X 5.

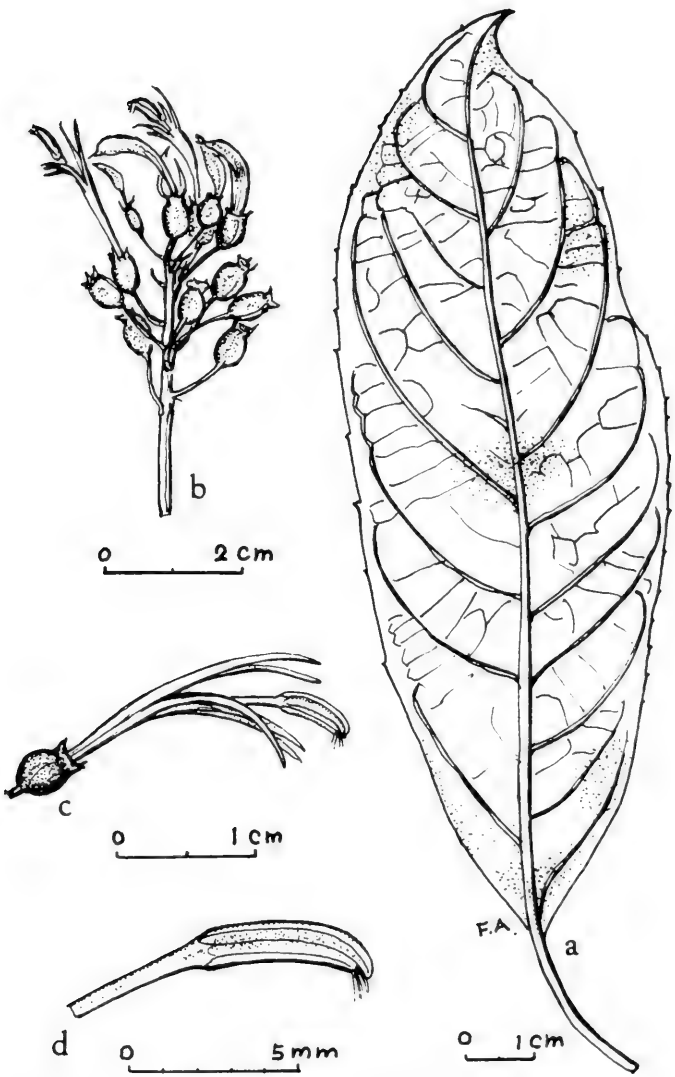

Fig. 1. Delissea konaensis St. Johr.

A NEW SPECIES OF HYALOSERIS (ASTERACEAE-MUTISEAE) FROM BOLIVIA

B. L. Turner

Department of Botany, University of Texas, Austin TX 78713-7640

Attempts to identify recent collections of Asteraceae from Bolivia has revealed the following novelty in Hyaloseris. Espinar (1973) presented a revision of the genus in which he recognized 5 species. Cristobal and Cabrera subsequently added a sixth species with their description of H. andrade-limae from Argentina.

The species below belongs to the section Hyaloseris as circumscibed by Espinar, at least it has the cylindro-turbinate, few-flowered heads of that group. Among these several taxa it is apparantly most closely related to H. quadriflora but is readily distinguished by its larger heads, larger florets (Fig. 1) and pubescent achenes with long pappus bristles.

HYALOSERIS LONGICEPHALA B. L. Turner, sp. nov.

H. quadriflora accedens sed capitulis amplioribus, floribus amplioribus, achaenis minute puberulis, et cetera.

Shrub or shrublet. Stems terete, striate, flocculose at first but soon glabrate and reddish. Leaves opposite, 4-7 cm long, 1.5-3.0 cm wide; petioles 4-8 mm long; blades ovate to elliptical, penninervate, flocculose on both surfaces, the margins crenulo-denticulate. Heads sessile, 3.5-4.5 cm long, cylindrical, arranged in congested glomerules. Involucre 2.5-3.5 cm long, 6-8 seriate, imbricate; bracts lanceolate, straw-colored, 3-35 mm long, scabridulous to nearly glabrate, the margins ciliate. Receptacle plane, finely puberulent. Florets 3; corollas white (?), ca 3 cm long, the tube ca 12 mm long glabrous, the ligule ca 28 mm long, minutely 5-lobed. Anthers ca 20 mm long, the appendages narrowly lanceolate, ca 4 mm long, the tails ca 8 mm long, pubescent basally. Achenes columnar, ca 6 mm long, minutely pubescent; pappus of numerous ciliate bristles, 7-30 mm long.

TYPE: BOLIVIA. Chuquisaca: Prov. Oropeza, an der strasse von Sucre Richtung Cochabamba, vor Surima; ca 2000 m, 27 Jun 1980, T. Feuerer & N. Hohne 45762 (holotype TEX; isotypes HBG).

According to Espinar (1973), Bolivia has 3 species of Hyaloseris (excluding H. bolilviensis Koster, a poorly known taxon which he took to be close to or perhaps synonymous with H. salicifolia, the only member of his Section Dinoserus). The present novelty brings to 7 the number of species in Hyaloseris, 4 of these from Bolivia (H. camataquiensis, H. longicephala, H. quadriflora and H. salicifolia); 3 also occur in Argentina (H. andrade-limae, H. cinerea and H. rubicunda), the only other country from which the genus is known.

LITERATURE CITED

Cristobal, C. L. and A. L. Cabrera. 1982. Novedad en Hyaloseris Griseb. (Compositae). Hickenia 1: 256-258.

Espinar, L. A. 1973. Revision del genero Hyaloseris (Compositae). Kurtziana 7: 195-211.

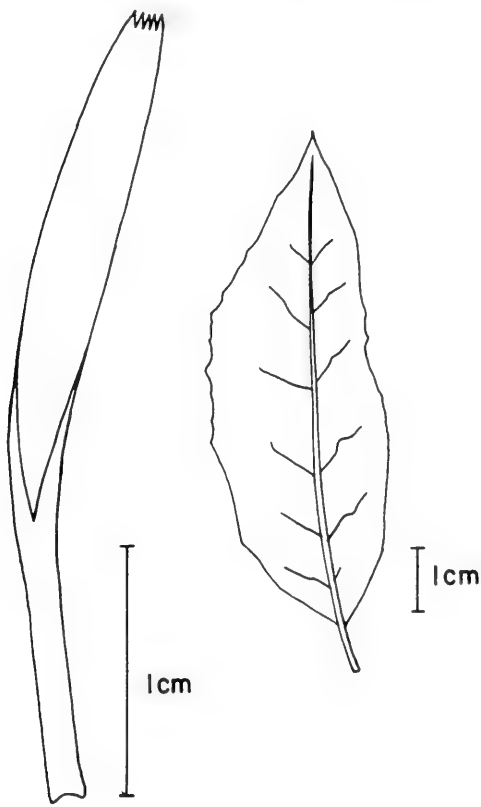

Fig. 1. Ray corolla; leaf (from holotype)

AGALINIS GYPSOPHILA (SCROPHULARIACEAE), A NEW SPECIES FROM GYPSUM OUTCROPS IN NUEVO LEON MEXICO

B. L. Turner

Department of Botany, Univ. of Texas, Austin TX 78713

Exploration of the considerable gypsum outcrops surrounding Cerro Potosi, the highest peak in Nuevo Leon, has yielded a large number of localized edaphic endemics (Turner, 1985; etc.). The taxon discussed below is remarkable in being the only perennial reported for the genus Agalinis, although it is almost certainly derived from the annual species, A. peduncularis (Benth.) Pennell.

AGALINIS GYPSOPHILA B. L. Turner, sp. nov.

A. peduncularis accedens sed plantis perennis, foliis glabratis.

Perennial herbs to 50 cm high, usually darkening after preservation. Stems stiffly erect, slender, glabrous or nearly so, usually much-branched from the base, on robust plants these arising from the crown of well-developed lignescent tap-roots. Leaves 1-2(3) cm long, 0.5-1.5 mm wide, glabrous or nearly so. Pedicels slender, ascending-spreading, 2-4 cm long. Flowers largely as in A. peduncularis, but with mostly smaller corollas (15-20 mm long). Capsule and seeds as in A. peduncularis.

TYPE: MEXICO. NUEVO LEON. Municipality of Galeana. 1.6 mi N of Galeana on S facing gypsum hillside (ca 24° 50' x 100° 05'), 10 Oct 1985; B. L. Turner, T. Ayers & R. Scott 15588 (holotype TEX; isotype MEXU).

ADDITIONAL SPECIMES EXAMINED: NUEVO LEON. Munic. Galeana: Galeana, dry mountain slope, 1 Aug 1939, Chase et al. 7716 (LL); 10 km NE Pocitos, 26 Aug 1985, Hinton et al. 18770 (TEX); above El Nogal, 5 Dec 1983, Hinton et al. 18090 (TEX); Santa Rita, 23 Aug 1981, Hinton et al. 18328 (TEX); ca 8 km E of San Roberto Junction, 12 Aug 1981, Lowry & Warnock 3180 (TEX); ca 15 m SW of Galeana, 18 Jul 1935, C. H. & M. T. Mueller 1068 (TEX); Hacienda Pablillo, 11 Aug 1936, Taylor 154 (TEX); NE lowermost slopes of Cerro Potosi along road to microwave station; ca 12 mi NW of Galeana, 20 Aug 1979, Turner & Davies A-38 (TEX).

The species, so far as known, occurs only on gypsum outcrops in the pine-oak zone about Cerro Potosi from 1700 to 2300 meters. Collections have been seen from at least 10 different localized populations in this region, (cited above, but several noted in the field and not collected), always from gypsum substrates.

Agalinis gypsophila is closely related to A. peduncularis and might, with equal merit, be considered only varietally distinct; however, as species go in the genus (Pennell, 1929), it is as distinct as most. It can be readily distinguished from A. peduncularis by its perennial habit, the fascicle of aerial stems arising from a tough perennial crown. In addition, it is glabous or nearly so, the numerous specimens examined, both in the field and in herbaria, lack the rough scabrous pubescence which is characteristic of A. peduncularis. Further, A. gypsophila, so far as known, is confined to gypsum outcrops in the area surrounding Cerro Potosi. Its likely progenitor, the annual A. peduncularis, is not known to occur in the state of Nuevo Leon, although it is a wide spread, commonly collected, species elsewhere in Mexico. Pennell (1929), in his treatment of Agalinis, did not examine material of what I consider A. gypsophila. Indeed, he does not report any collections of Agalinis from the state of Nuevo Leon. If typical A. peduncularis is subsequently found over a large area of the limestone outcrops surrounding the gypsum substrates about Cerro Potosi I would be the first to suggest that the populations concerned are but recently evolved edaphic variants, albeit genetic. However, since I attempted to find such individuals without success and since A. gypsophila occurs with a large number of other very remarkable endemic gypsophiles (e.g., Antiphytum hintoniorum Higgins & Turner; Lobelia margarita Wimmer; Verbesina hintoniorum Turner; Helianthella gypsophila Turner; Linum modestum Rogers; Nama hitchcockii Bacon, etc.) it seems perfectly logical to assume that Agalinis gypsophila is itself part of this local assemblage of edaphic endemics.

LITERATURE CITED

Pennell, F. W. 1929. Agalinus and allies in North America. I. Proc. Acad. Natural Sci. Phila. 80: 339-449.

Turner, B. L. 1985. A new species of Verbesina (Asteraceae) from gypsum outcrops in southern Nuevo Leon, Mexico. Brittonia 37: 96-97.

SEDUM GYPSOPHILUM (CRASSULACEAE), A NEW SPECIES FROM NUEVO LEON, MEXICO

B. L. Turner

Department of Botany, University of Texas, Austin, Texas 78713-7640

Recent exploration of the numerous and extensive gypsum outcrops about Galeana, Nuevo Leon, Mexico has revealed the following gypsophile belonging to the genus Sedum. After describing the taxon as specifically distinct, I found that this had received an earlier name at the subspecific level (ssp. desertorum) by the late R. T. Clausen (1978). He included this under the widespread Sedum calcicola, but nonetheless, making fairly detailed comparisons with yet two other populations of S. calcicola ssp. calcicola, he concluded that the ssp. desertorum was from a "peculiar population" with a number of distinctive characteristics but on the whole seemed closer to S. calcicola than to yet other species of Sedum. His Table 2 shows that the ssp. desertorum differs from ssp. calcicola in possessing a smaller height; smooth twigs (as opposed to papillose); shorter, narrower, leaves; longer petals with less basal cohesion; yellow nectaries (versus orange); and echinate seeds (as opposed to papillose). He fails to mention the sparsely branched simple inflorescence of the ssp. desertorum, which readily distinguishes it from the usually more elaborate cymes of ssp. calcicola.

In any case, I have opted to recognize the ssp desertorum at the specific level, calling it Sedum gypsophilum since it appears to be, as Sedums go, specifically distinct, restricted to gypsum soils, having now been collected at 3 separate sites on such substrates and does not, so far as known, occur adjacent to or intergrade with S. calcicola. Further, the subspecific epithet suggests a desert habitat when, in fact, the several sites concerned are in oak-pine forests at 2200 meters or more. In short, Sedum calcicola and S. gypsophilum appear to look and act like "good" species, albeit closely related.

SEDUM GYPSOPHILUM B. L. Turner, sp. nov.

Sedum calcicola accedens sed inflorescentiis sparse ramosis, floribus amplioribus, caulibus laevibus, et seminibus echinatis.

Seemingly perennial herbs to 30 cm high. Stems erect, slender, somewhat flexuous, suffrutescent, glabrous, branched from the base. Leaves alternate, glabrous, ovate to ovate lanceolate, 0.5-1.2 mm long, 1-3 mm wide, 1-2 times wider than thick, acute at the apex. Inflorescence mostly of 5-7 flowers in simple cymes of 2-(3) terminal branches, the latter 2-3 cm long. Sepals narrowly ovate, 4-5 mm long, glabrous, acute. Petals ca 10 mm long, 2-3 mm wide, spreading, white with greenish, narrowly acute, apices.

Stamens 10. Carpels erect, 5-7 mm long, glabrous, the styles ca 2.5 mm long, somewhat diverging, more so in fruit.

TYPE: NEUVO LEON: 3.2 mi S of Galeana (ca 24°47' x 100°03'). Gypsum flat in open pine woodland along dry arroyo. 10 Oct 1985, B. L. Turner, T. Ayers & R. Scott 15557 (holotype TEX; isotype UMEX).

Additional collections examined: MEXICO, NUEVO LEON: Municipality Galeana, El Sauce, 2440 m, hillside, 5 Nov 1980, G. B. Hinton et al. 18076 (TEX); 6 km N La Escondida (24°09' x 99°01') 25 Aug 1977, R. T. Clauen 772,031 (holotype of Sedum calcicola ssp. desertorum R. T. Clausen, CU!).

The Clausen collection, cited above, notes the plant to occur "In caliche on south slope of hill of gypsum, Cerrito Blanco". This is a confusing statement since caliche, by the usual definition, is a local evaporite of calcium carbonate ($CaCO_3$). Probably the collection concerned was obtained from an anhydrous form of gypsum ($CaSO_4$, or "rock gypsum"), which occurs with the hydrous or soft form of gypsum ($CaSO_4 \cdot 2H_2O$). The semi-barren, white hills in this region are largely massive depositional substrates of gypsum, most of which house an impressive array of endemics (Turner, 1985; etc.).

To my knowledge this is the only gyposphilic species of Sedum recorded for continental North America, although S. gypsicolum Boiss. & Reut. is recorded for Hispaniola, presumably also occuring on gypsum outcrops of that island. Several plants of S. gypsophilum were observed at the type locality, all stiffly erect and without basal rosettes or leafy stolons. It was not observed elsewhere adjacent to such habitats in this region.

Finally, it should be recorded that Clausen apparently obtained seed or reproductive materials from the type locality of ssp. desertorum, growing and describing the actual holotype from this material (K. Nixon, pers. comm.). His type, while grown in potting soil, is remarkably similar to the field-collected materials cited above.

LITERATURE CITED

Clausen, R. T. 1978. Sedum-seven Mexican perennial species. Bull. Torr. Bot. Club 105: 214-233.

Turner, B. L. 1985. Ageratina gypsophila (Asteraceae-Eupatorieae) a new species from Neuvo Leon, Mexico. Phytologia 57: 130-132.

A NEW SPECIES OF EUPATORIASTRUM (ASTERACEAE-EUPATORIEAE) FROM OAXACA MEXICO

B.L. Turner

Department of Botany, Univ. of Texas, Austin TX 78713

The genus Eupatoriastrum is currently under investigation by the present author. In preparation of a revisional treament of the group the following species is described. I am grateful to Dr. M. C. Johnston for the Latin diagnosis.

EUPATORIASTRUM CHLOROSTYLUM B.L. Turner, sp. nov.

Eupatoriastrum angulifolium accedens sed foliis trilobatis, capitulis magnioribus, ramis stylorum viridibus, setis pappi ad apicem expansis, etc.

Erect perennial herbs to 2 m high with pendulous branches. Stems terete, striate, glabrous, hollow at maturity. Leaves opposite, petiolate, 15-30 cm long, 10-18 cm wide; petioles 3-7 cm long, glabrous; blades with 3 major lobes, the sinuses 6-8 cm deep, the primary lobes with 2-3 lesser lobes, the margins denticulate to somewhat serrate, glabrous on both surfaces. Heads 6-7 in axillary or terminal(?) corymbose cymes, the ultimate peduncles puberulent, 1-3 cm long. Involucre hemispheric 7-8 mm high,12-14 mm across, 4-5 seriate, imbricate; bracts ovate to obovate with mostly rounded apices, glabrous or nearly so. Receptacle convex, chaffy, ca 3 mm across. Pales numerous, linear-oblanceolate, 6-7 mm long, the appendages fimbrilliate. Florets numerous; corollas "verdes" (probably the extended styles, the corollas probably yellowish), tubular, ca 4 mm long, glabrous, the lobes ca 0.5 mm long. Achenes (immature) ca 2 mm long, glabrous; pappus of ca 30 fragile ciliate, bristles ca 4 mm long, the apices somewhat expanded.

HOLOTYPE: MEXICO. Oaxaca: Mpio. Candelaria Loxicha. Terraceria nueva a Pluma Hidalgo, 1 km al E de la carretera Pochutla-Oaxaca, 43 km al N de Pochutla. Suelo arenoso, de granito descompuesto; 1000 m, 13 Nov 1979, Koch, Fryxell & Wendt 79527 (holotype TEX; isotypes MEXU, to be distributed).

Euptoriastrum chlorostylum is seemingly most closely related to E. awgulifolium (B.L. Rob.) K. & R., but is readily distinguished by its lobed leaves; larger, axillary heads; pappus bristles with expanded apices; etc. It is a remarkably distinct species what with its Ficus-like leaves and green style branches. The species was collected along the margin of a tropical semideciduous forest and is from a region where several well-marked endemics occur.

NOTES ON THE GENUS *CLERODENDRUM* (*VERBENACEAE*). XIV

Harold N. Moldenke

CLERODENDRUM Burm.

Additional & emended bibliography: Reichard, Linn. Syst. Pl. 3: 198. 1790; P. Mill., Gard. Dict., ed. 9, 1: *Clerodendrum*. 1797; Willd. in L., Sp. Pl., ed. 4 [5], 3 (1): 381--388. 1800; Lindl., Edwards Bot. Reg. 30 [ser. 2, 7]:19. 1844; Paxt., Mag. Bot. 13: 115, 217, 218, & 275. 1847; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 207--208 & 218--222. 1863; Pritzel, Icon. Bot. Ind. 1: 23. 1866; Aschers. in G. Schweinf., Beitr. Fl. Aethiop. 1: 119 & 278. 1867; Hereman, Paxt. Bot. Dict. 13. 1868; Benth. in Benth. & Hook. f., Gen. Pl. 2 (1): 632 (1876) and 2 (2): 1155--1156. 1876; Schinz, Verhandl. Bot. Ver. Brandenb. 3: 205--206. 1890; C. B. Clarke in Schmidt, Bot. Tidsskr. 26: 173--174. 1904; F. N. Williams, Bull. Herb. Boiss., ser. 2, 5: 431. 1905; Sim, For. Fl. Cape Colony 286, pl. 120. 1907; O. E. Schulz in Urb., Synb. Antill. 6: 68--69. 1909; Rübsaamen, Marcellia 10: 106, fig. 9 & 10. 1911; Dalla Torre, Justs Bot. Jahresber. 39 (1): 1328. 1913; Perrot & Hubert, Bull. Sci. Pharm. 21: 449. 1914; Lévl., Cat. Pl. Yun-nan 277. 1917; Firminger, Man. Gard. India, ed. 6, 2: 386--387. 1918; Chung, Mem. Sci. Soc. China 1 (1): 228. 1924; Chiov., Fl. Somala 1: 49, 60, & 63. 1929; Stapf, Ind. Lond. 1: 79. 1929; Wehmer, Pflanzenst. 2: 1024--1025. 1931; P'ei, Verbenac. China 1, 2, 5, & 122--162, pl. 24--29. 1932; Mold., Brittonia 1: 354, 437, 468--469, & 472. 1934; E. D. Merr., Brittonia 2: 197. 1936; E. D. Merr., Journ. Arnold Arb. 19: 64--65. 1938; Fedde & Schust., Justs Bot. Jahresber. 59 (2): 416, 515, & 692. 1939; Calderón & Standl., Fl. Salvad., ed. 2, 236. 1941; E. D. Merr., Brittonia 4: 171. 1941; Guillaumin, Fl. Anal. Synop. Nouv-Caled. 305. 1948; Backer, Beknopte Fl. Java 9: 2, 30, & 45. 1949; Wild, Rhodes. Agric. Journ. 49: 289. 1952; Wild, Veg. South. Rhodes. Term. 11. 1952; Wild, Vict. Falls Handb. 158. 1953; Pardy, Rhodes. Agric. Journ. 52: 414. 1955; Wild, Observ. Veg. Sabi 8. 1955; Wild., Rhodes. Agric. Journ. 52: 538. 1955; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1955: 63. 1956; Alain in Leon & Alain, Fl. Cuba, imp. 1, 4: 280, 299, 301, 310, & 319--322, fig. 138. 1957; Coates & Palgrave, Trees Cent. Afr. 427--[429]. 1957; Mold., Phytologia 6: 276 (1958), 6: 453--454 (1958), and 7: 76 & 79. 1959; G. Taylor, Ind. Kew. Suppl. 12: 26, 36, & 76. 1959; Mold., Phytologia 7: 458. 1961; Rao & Rabha, Bull. Bot. Surv. India 8: 301. 1966; C. A. Sm., Comm. Names S. Afr. Pl. 601. 1966; Hocking, Excerpt. Bot. A.11: 504. 1967; Mold., Biol. Abstr. 49: 4199. 1968; Greenway, Journ. East Afr. Nat. Hist. Soc. 27: 196. 1969; Hyland, U. S. Dept. Agric. Pl. Invent. 173: 4. 1969; Liogier, Fl. Cub. Supl. 124. 1969; Van der Schijff, Check List Vasc. Pl. Kruger Natl. Park 81. 1969; Gillett, Numb. Check-list Trees Kenya 46. 1970; Debray in Debray, Jacquem., & Razafind., Contrib. Invent. Pl. Medic. Madag. 1: 34. 1971; Farnsworth, Pharmacog. Titles 7 (7): iii & 395. 1972; Poisson & al., Ann. Pharm. Franç. 30: 241--254. 1972; Alain in

Leon & Alain, Fl. Cuba, imp. 2, 2: 280, 299, 301, 310, & 319--322, fig. 138. 1974; [Farnsworth], Pharmacog. Titles 7, Cum. Gen. Ind. [31]. 1975; Hocking, Excerpt. Bot. A.28: 260. 1976; Mold., Phytologia 39: 273. 1976; Prasad, Mehta, Dave, & Suma, Indian Journ. Exp. Biol. 18: 1524--1525. 1980; Chrabarti & Mondal, Acarologia 21: 396--407. 1981; Chrabarti & Mondal, Biol. Abstr. 72: 343. 1981; Pal, Bull. Bot. Surv. India 22: 96--99. 1982; Capote & García, Revist. Jard. Bot. Nac. 4: 48 & 118. 1983; Pal, Biol. Abstr. 75: 584 & 9495. 1983; Mold., Phytologia 59: 234--268. 1986.

CLERODENDRUM DISCOLOR var. *VERBASCIFOLIUM* Mold.

Additional bibliography: Mold., Phytologia 59: 268. 1986.

This variety is based on *A. Peter 32288* from between Mission Selesiens and Lugongo, in the Uluguru Mountains above Morogoro, Tanganyika, collected on November 19, 1925, and deposited in the Berlin herbarium, now probably destroyed. The sheet was annotated as *Clerodendron verbascifolium* n. spec." by "E. W[all?]" and as "*Clerodendrum* (*Cyclonema*) sp." by J. B. Gillett at Kew. where, he avers, it cannot be matched.

Peter states that the corolla-tube is about 1 cm. long, the lobes unequal, and comments that the plant is related to *C. ternatum* Schinz, but the leaves are more or less petiolate, larger, and densely hairy on both surfaces. Thus far it is known to me only from the original collection.

Citations:TANZANIA: Tanganyika: *A. Peter 32288* [V.70] (B--type, Ld--isotype).

CLERODENDRUM DISPARIFOLIUM Blume, Bijdr. Fl. Ned. Ind. 14: 809. 1826 [not *Clerodendron disparifolium* Bakh., 1938, nor Hassk., 1921].

Synonymy: *Clerodendrum disparifolium* var. *foliis obsolete denticulatis* Blume, Bijdr. Fl. Ned. Ind. 14: 109. 1826. *Clerodendron acuminatum* Wall., Numer. List [49], no. 1792 hyponym. 1829; Schau. in A. DC., Prodr. 11: 662. 1847. *Clerodendron jackianum* Wall., Numer. List [49], no. 1794 hyponym. 1829. *Clerodendrum jackianum* Wall. apud W. Hook., Bot. Misc. 1: 284. 1830. *Clerodendrum acuminatum* Wall. apud Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840. *Clerodendron sackeanum* Wall. ex Walp., Repert. Bot. Syst. 4: 114. 1845. *Clerodendron eriosiphon* Schau. in A. DC., Prodr. 11: 662. 1847. *Clerodendron disparifolium* Blume apud Hassk., Retzia 57. 1855. *Clerodendron obtusidens* Miq., Fl. Ned. Ind. 2: 870. 1856. *Clerodendron disparifolium* f. *prianganense* Bakh. ex Mold., Résumé 190 & 449 nom. nud. 1959. *Clerodendron dispar* Geesink & Santisuk ex Mold., Phytol. Mem. 2: 385 in syn. 1980. *Clerodendron disparifolium* Kochum. ex Mold., Phytol. Mem. 2: 385 in syn. 1980. *Clerodendron disparifolium* β *denticulatum* Hort. ex Mold., Phytol. Mem. 2: 385 in syn. 1980. *Aterodendron diversifolium* Vahl, in herb. *Clerodendron disparifolium* f. *coriaceum* (Miq.) Bakh., in herb. *Clerodendron disparifolium* f. *eriosiphon* (Schau.) Bakh., in herb. *Clerodendron disparifolium* var. *prianganensis* Bakh., in herb. *Clerodendron eriosiphon* var. *coriacea* Miq., in herb.

Bibliography: Jack, Malay. Misc. 1, imp. 1, 17. 1820; Blume,

Bijdr. Fl. Ned. Ind. 14: 809. 1826; Wall., Numer. List [49], no. 1792 & 1794. 1829; W. Hook., Bot. Misc. 1: 284. 1830; Steud., Nom. Bot. Phan., ed. 2, 1: 382 & 383. 1840; D. Dietr., Syn. Pl. 3: 617. 1843; Walp., Repert. Bot. Syst. 4: 104--105, 109, 113, & 114. 1845; Schau. in A. DC., Prodr. 11: 662, 664, & 672. 1847; Hassk., Retzia 57--58. 1855; Buek, Gen. Spec. Syn. Candoll. 3: 105 & 106. 1858; Miq., Fl. Ned. Ind. 2: 869--873. 1858; C. Muell. in Walp., Ann. Bot. Syst. 5: 710--711. 1860; Miq., Fl. Ind. Bat. Suppl. 1: 242. 1861; Bocq., Adansonia, ser. 1 [Baill., Rec. Obs. Bot.], 3: 214. 1863; Naves & Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: Nov. App. 160. 1880; C. B. Clarke in Hook. f., Fl. Brit. India 4: 589--590. 1885; Kuntze, Rev. Gen. Pl. 2: 505. 1891; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560 & 561. 1893; Stapf, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 216 (1894) and ser. 2, 4: 522. 1896; Skeat, Journ. Roy. Asiat. Soc. Straits 31: 34. 1898; Koord. & Valet., Meded. Lands Plant. Bot. 42 [Beijdr. Booms. Java]: 212--213. 1900; Ridl., Agric. Bull. Straits Fed. Mal. St. 1: 219. 1902; Gamble in King & Gamble, Journ. Asiat. Soc. Beng. 74 (2 extra): 826 & 829--830. 1908; Ridl., Journ. Roy. Asiat. Soc. Straits 53: 84. 1910; Koord., Exkursionsfl. 3: 137 & 138. 1912; Koord. & Valet., Atlas Boomsart. Java pl. 277. 1914; Backer, Tropische Natuur 5: 92. 1916; H. Hallier, Meded. Rijks Herb. Leid. 37: 73. 1918; H. J. Lam, Verbenac. Malay. Arch. 250, 362, & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 74, 83--84, 108, & viii. 1921; E. D. Merr., Bibl. Enum. Born. Pl. 516. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 406. 1923; Ridl., Fl. Malay Penins. 2: 624 & 625. 1923; S. Moore, Journ. Bot. Brit. 63: Suppl. 81. 1925; E. D. Merr., Univ. Calif. Publ. Bot. 15: 264. 1929; Burkill & Haniff, Gard. Bull. Straits 6: 234. 1930; Stapf, Ind. Lond. 2: 238. 1930; P'ei, Mem. Sci. Soc. China 1 (4): 153 & 154. 1932; Hochr., Candollea 5: 193 [Pl. Hochr. 3: 19]. 1934; L. H. Bailey, List Florists Handl. Verb. mss. 1935; Beer & Lam, Blumea 2: 225. 1936; Fletcher, Kew Bull. Misc. Inf. 1938: 404, 407, 408, 424, & 426. 1938; Mold., Geogr. Distrib. Avicenn. 37. 1939; Mold., Prelim. Alph. List Inv. Names 18--21. 1940; Mold., Suppl. List Comm. Vern. Names 2, 6, 9, 11--13, 17--19, 21, & 23. 1941; Mold., Suppl. List Inv. Names 2. 1941; Mold., Alph. List Inv. Names 16--19. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59, 61, 63--65, 72, & 89. 1942; Mold., Phytologia 2: 98. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560 & 561. 1946; Mold., Alph. List Cit. 1: 77, 91, 192, 210, & 248. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; Mold., Alph. List Cit. 2: 584 (1948), 3: 718, 751, 774, & 840 (1949), and 4: 987, 1001, 1002, 1101, & 1241. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 136, 139, 143--146, 158, & 181. 1949; E. D. Merr., Journ. Arnold Arb. 33: 219. 1952; Gilliland & Jabil, Proc. Sympos. Humid Trop. Veg. 64. 1959; Anon., Kew Bull. Gen. Ind. 77. 1959; Mold., Résumé 175, 179, 187, 189--193, 197, 215, 260, 262, 265, 267, & 449. 1959; Mold., Résumé Suppl. 1: 13. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560 & 561. 1960; Backer & Bakh., Fl. Java 2: 609 & 610. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 1: 596. 1966; Mold., Résumé Suppl. 14: 8. 1966; Balan Menon, Malay. For. Rec. 27: 102. 1971; Mold., Fifth Summ. 1: 295, 299, 304, 322, 329, 358, 439, 444, & 448 (1971)

and 2: 864. 1971; Hyland, U. S. Dept. Agr. Pl. Invent. 178: 209 & 277. 1972; Mold., Phytologia 28: 454 (1974) and 34: 272. 1976; Mold., Phytol. Mem. 2: 284, 291, 295, 313, 320, 349, 385, 391, & 536. 1980; Mold., Phytologia 58: 183, 280, & 408. 1985.

Illustrations: Koord. & Valet., Atlas Baumsart. Java pl. 277. 1914.

A large, erect, mostly very glabrous, sometimes arborescent shrub, undershrub, or small tree, 1--10 m. tall; stems not fistular, to 10 cm. in diameter at breast height, often producing many root-suckers; bark pale yellow-brown; branches and branchlets slender, tetragonal or subtetragonal, glabrous or subglabrous to puberulent; leaves decussate-opposite, very often anisophyllous, the smaller of a pair sometimes even absent; petioles variable in length, 0.5--14 [mostly about 3] cm. long, semiterete; leaf-blades membranous or thin-membranous, fragile in drying, paler beneath, elliptic or oblong to oblong-lanceolate, oblong-obovate, or ovate, 5--25 [mostly about 10] cm. long, 1.5--15 [mostly about 4] cm. wide, apically acute or acutely acuminate or submucronate, marginally entire or subentire to shallowly or even coarsely crenate-exscuptate-dentate near the apex or obscurely toothed to irregularly and distantly serrate above the middle towards the apex, basally rounded or obtuse to acute or cuneate, glabrous above or occasionally slightly pubescent on the venation, the "young scarcely pubescent" [fide Clarke]; secondaries very slender, 5 or 6 per side, the lowermost basal, arcuate-ascending; vein and veinlet reticulation sparse, open; inflorescence terminal, paniculate, foliose, 5--30 cm. long, very loose, glabrous to loosely short-pubescent or puberulent, the lower ramifications issuing from the axils of the uppermost leaves or very leaf-like bracts, the panicle much brachiate, the ramifications dark-purple, very slender; cymes 3--20-flowered, very loose, the lower ones often issuing from the axils of the uppermost often caducous leaves and slightly surpassing them, the upper ones subtended by linear bracts about 6 mm. long; peduncles very slender, 1--13 cm. long, numerous, red or dark-purple, axillary or penultimate; flowers small; buds green; pedicels filiform, lax, 5--13 mm. long; calyx campanulate, purple or red, 4--7 mm. long, externally (dorsally) glabrous or minutely puberulent with both long and short hairs, 5-parted nearly to the base, the lobes ovate to narrowly or broadly lanceolate or oblong-lanceolate, 3--4 mm. long, apically acuminate, connivent during anthesis, ventrally glabrous; corolla hypocrateriform, mostly white to yellow, the throat usually not violet, externally glabrous or villosulous, the tube very slender, 2--3.5 cm. long, about 5 times as long as the calyx, the segments nearly obovate or spatulate, 6--15 mm. long; stamens about twice as long as the corolla, much exserted; filaments pale or yellowish, exserted by 1--1.5 cm.; stigma-lobes short and equal; fruiting-calyx somewhat accrescent, red, 2.2--2.5 cm. wide, enclosing only the base of the fruit, the lobes oblong, about 8 mm. long, somewhat longer than the tube, apically acuminate, decidedly reflexed; fruit drupaceous, at first green, then blue, and finally black when ripe, globose, about 6 mm. long and wide, succulent, glaucous.

This species is based on unnumbered Blume collections from the mountains of Salak, Seribu, etc., in Java. Blume's original (1826) description is: "C. foliis oppositis longiter petiolatis oblongis acuminatis medio ad apicem repando-dentatis altero minore, panicula terminali brachiata laxa, caule subtetragono (aff. C. *calamitoso*: calix quinquepartitus, laciniis lanceolatis acuminatis; flores pallide flaventes). Crescit: in montanis Salak, Seribu, etc. Floret: toto anno. Varietas: foliis obsolete denticulatis. Crescit: in montanis Seribu. Observ.: folia ratione magnitudinis in haece specie secundum locum natalem valde differunt; in sylvis altioribus plerumque repando-dentata sunt et in ultraque pagina pube tenui obsessa; in sylvis contra humilioribus et locis calcareo-argillosis folia fere integerrima et glaberrima: se ostendunt." It would thus appear that his so-called "variety" is merely an edaphic form probably undeserving of special nomenclatural designation.

Collectors have encountered *Clerodendrum disparifolium* in various types of forest - damp, evergreen, primary, secondary, and mixed deciduous - forest edges and clearings, waste ground, on high banks and hillsides, by waterfalls and cascades, and on granite outcrops, at 5--1500 m. altitude, in flower in every month of the year, and in fruit in May and June. Backer & Bakhuizen (1965) report that in Java it is found in brushwood, young forests, forest borders, and "rarely in primary forests". In Thailand Sørensen and his associates describe it as an undershrub in open oak-*Dipterocarpus* forests, while in Pahang Balgooy reports it from "dipterocarp forests in undulating country crossed by more or less dry streams".

The corollas are said to have been "yellow" on *Forbes 2782* and *Foxworthy 424*, "pale-yellow" on *Balgooy 2571* and *Blume s.n.*, "white" on *Docters van Leeuwen-Reijnvaan 6193* and *Geesink & Santisuk 5394*, "white with a tinge of green" on *Forbes 2033*, "greenish-white" on *Rehsodihardjo 622*, "yellowish-white" on *Forbes 2113*, "light-green" on *Niyondham & al. 215*, "green" on *Ramos 1421*, "violet-white" on *Phengklai & al. 4092*, and "tube brown-red, lobes yellow" on *Meijer SAN. 44030*. The *Phengklai & al. 4092* collection bears the curious notation "stigmata 5" on its label.

Fernandez-Villar (1880) records C. *disparifolium* from Luzon, but Merrill (1923) insists that it does not occur anywhere in the Philippine Islands. Hallier (1918) gives its distribution as Malacca, Penang, Singapore, and western Java; Kuntze (1891) collected it in Singapore; Clarke (1885) refers to it as found "throughout Malaya, frequent in Malacca and Singapore". Burkill (1966) reports it from the western part of Malaysia, common in lowland forests throughout the Malay Peninsula. Fletcher (1938) knew it from Malaya and Java, but found it in cultivation in Thailand. Bailey (1935) listed only the Singapore Botanical Garden as source of seeds for the horticultural trade. Hyland (1972) reports it cultivated in Maryland from seedlings and cuttings collected in Indonesia by Winters & Higgins.

Vernacular names reported for C. *disparifolium* are "anting-anting", "chĕlĕguri", "chinaguri", "guriam", "kakapolan kai", "kĕcholan", "kibangbara" [a name also applied to C. *calamitosum* L.], "lampin badak", "lampin budak", "lĕlampang badak", "mengkoeboeng",

"pĕncholam", "puding", "quilau", "sĕlĕguri", "sĕlĕguri bĕtina", "sĕlulang bukit", "sembong", "sĕmpayan pitu", "tampan putĕri jantan", "tjantigie lebak", "tudong roman", "ubat tumboh", "uloh-ulai", and "unting-unting".

The species is employed in Cochinchina in popular medicine as an antidote for venomous snakebite. Burkill (1966) reports that the roots may be pounded and rubbed over the body to alleviate pains, while a paste made from such pounded roots is packed into hollow teeth to cure toothache. He adds that "Alvins has left a note in which he calls it a vegetable, but apparently he referred to the use of the leaves with food for constipation."

Ridley (1902) reports the timber too small to be of use commercially, but it is one of the woods used for making a wood-tar for blackening teeth in Malaya. Burkill & Haniff (1930) also speak of the leaves being used to treat constipation, and, mixed with others, as a tonic. Skeat (1898) tells us that the leaves of this plant enter into the besom used to sprinkle consecrated rice gruel at weddings and in rice ceremonials in Malaya, "but not in ceremonies connected with a fishing-station".

The *Clerodendron acuminatum* Wall., mentioned in the synonymy (above) is based on *Wallich 1792* from Singapore, collected in 1822, deposited in the East India Company herbarium at Kew, and *C. jackianum* Wall. is based on *Wallich 1794* from Penang, also collected in 1822 and deposited in the same herbarium; *C. obtusidens* Miq. apparently was based on *Horsfield s.n.* deposited in the Utrecht herbarium as no. 49913.

Clarke (1885) notes that "Wallich's specimens exactly agree with those from Java, but the one species has been made into two [*C. disparifolium* Blume and *C. acuminatum* Wall.] because Blume's description of the panicle as terminal, which Schauer regarded as axillary." Hallier (1918) says that "Schauer und Clarke haben diese Art sehr zu Unrecht mit *Cl. inerme* Gaertn. in eine und dieselbe Gruppe gestellt, von dem sie in Kelch und Frucht grundverschieden ist."

Hasskarl (1855) first united *C. acuminatum* Wall. and Schauer's *C. eriosiphon* with the *C. disparifolium* of Blume, noting that "Species haec [*C. disparifolium*] hueusque nondum sufficienter nota inter *C. acuminatum* Wll. et *C. eriosiphon* Schauer collocenda est (DC. l.c. 662 n. 17, 18) et diagnosi sequenti fusiori distinguenda.

"Diagn. Glaberrimum ramis ramulisque tetragonis, foliis membranaceis petiolatis (inaequalibus in eodem pare), oblongo-lanceolatis basi acutis, apice acuminatis, integerrimis aut supra medium repando-denticulatis, subtus pallidis opacis; cymis pedicellisque tenuibus laxis, lapsu foliorum paniculam laxam formantibus, apice plerumque foliiferam, folia sua dimidia tantum aequantibus; calyce glabro in anthesi conniventi, fructifero refracto, 5-partito, laciniis oblongis acuminatis; corollae tubo calycem suum 5-quies superante, filiformi. -- Folia ad 6 poll. longa, 2½ poll. lata; petiolus 2 poll. longus; pedunculi et cymae ramificationes atro purpurei; calyx purpureocoloratus 2 lin. longus; fructifer auctus 3-linearibus; corolla flavescens; tubus 10 lin. longus; limbi laciniae angustae 3-lineares; stamina has duplo excedentis, pallide flavescentia.

"De *Clerodendron*-soorten zijn alle min or meer groote, doorof bij korte tusschenpoozen bloeijende heesters of boompjee, de meeste met prachtvolle bloemen. De hier vermelde is een boompje, dat in deze streken te huis behoort en de hoogte van 8--10 voeten bereikt, met opstaande bloemtros, waaruit de geelachtig witte bloemen aan horitale zijtakjes ontluiken. Deze soort is zeer vruchtbaar zoo zelfs, dat zij soms met zwarte ronde bessen als behangen is. De inlandsche naam dezer em der beide volgende ist: Kibangbara....*Clerodendron eriosiphon* Schauer.....Observ. Valde haec praecedenti speciei [*C. disparifolium*] accedit, a qua autem diversa floribus majoribus et cymis minus gracilibus tomentosulis, corollae tubo villoso breviori. -- Calycis laciniae, in anthesi sunt erectae subconniventes, fructiferae patentissimae. Deze heeft de meeste overeenkomst met de voorgaande, wordt zelfs nog wel zoo kolossaal en komt ook in deze streken voor."

Backer & Bakhuizen (1965) keep *C. disparifolium* and *C. eriosiphon* separate by means of the following key characters"

1. Lower leaf-blade surface glabrous or only thinly and patently short-hairy on the venation, marginally entire or very shallowly incised, never coarsely or deeply dentate-serrate..... *C. disparifolium.*

1a. Lower leaf-blade surface rather densely hairy on the venation and often also hairy between the veins. marginally entire or shallowly to coarsely exsculptate-dentate; cymes 7--20-flowered, leaf-blades 5--25 cm. long and 1.5--15 cm. wide, petioles 0.5--14 cm. long.....*C. eriosiphon.*

It should be pointed out here that the *Clerodendron nutans* of Jack, Malay. Misc. 1 (1): 17 (1820), was regarded by Wallich (1829) and some other authors as conspecific with what we now call *C. disparifolium*, but seems to be a quite distinct species, which will be discussed in the proper alphabetic sequence in the present series of notes -- it is distinct from the *C. nutans* of Wallich.

The *Clerodendron disparifolium* Bakh., referred to in the synonymy (above) is a synonym of *C. garrettianum* Craib, while *C. disparifolium* Hassk. is now regarded as belonging in the synonymy of *C. laevifolium* Blume. The *C. disparifolium* var. *kinabaluense* (Stapf) Bakh. is regarded by me as *C. kinabaluense* Stapf, and *C. disparifolium* var. *pubiflorium* Bakh. is *C. laevifolium* Blume.

Bakhuizen, based on his herbarium annotations, apparently regarded *Horsfield s.n., Koorders 34350b,* and *Winckel 368b,* cited below, as representing what he called *C. disparifolium* f. *coriaceum* (Miq.) Bakh., while *Backer 21004* and *Herb. Hort. Bot. Bogor. XI.B* were regarded by him as representing what he called *C. disparifolium* f. *eriosiphon* (Schau.) Bakh. [a form perhaps worthy of reinstation. A f. or var. *prianganense* Bakh., a description of which I have as yet not been able to locate in any of his writings known to me, seems to be typified by *Backer s.n.* [Tjibodas], *Beumee 4354, Sapin 50,* and *Winckel 64b & 1180b,* all from Java. Boerlage regarded *Herb. Tjibodas A.12* as representing *C. eriosiphon* Schau.

For *Clerodendrum disparifolium* Clarke (1885) cites only unnumbered Griffith and Wallich collections from Singapore and Malacca; Hallier

(1918) cites for *C. disparifolium* Forbes 782 from Sumatra, Foxworthy 424 from Sarawak, and Korthals s.n. and Winkler 2260 from Borneo and for *C. eriosiphon* Forbes 2033, 2113, & 2470 from Sumatra, Korthals s.n. from Borneo,and Hallier 257 from Java. He notes for Forbes 2113 "Eine Form mit langen, dicht behaarten Kelchen".

From Thailand Fletcher (1938) lists Collins 85 & 1078, Garrett 899, Kerr 3495, 4357, 6702, 7762, 7821, & 19146, Lakshnakara 665, Marcan 484 & 2301, Put 2547, and Winit 643 & 1690.

It may be worth noting here that the Miquel (1858) reference in the bibliography of *C. disparifolium*, is cited by Hallier (1918) and other authors as "1856", but actually pages 705--960 were issued in 1858. Similarly, the Blume (1826) reference is sometimes cited as "1825", but pages 485--942 were not issued until 1826; the Miquel (1861) reference is sometimes cited as "1860", but pages 161--656 actually were not published until 1861.

Material of *C. disparifolium* has been misidentified and distributed in some herbaria as "*C. calamitosum* var.", *C. horsfieldii* Miq., *Polygala venenisa* Juss., and *Sterculia* sp. On the other hand, the Bruggemans 854, distributed as *C. disparifolium*, actually is *C. elmeri* Merr., while Bartlett 8195, Best 14135, Boeea 1842, 7842, 7944, & 8480, Bünnemeijer 3750, Clemens & Clemens 22566, Elmer 20287 & 20625, Haniff 7, Haniff & Nur 10094, Hochreutiner 1724, Khoo & Ming N.K.002, Maxwell 72-15, Medani SAN.91691, Pételot 1260, Scortechini 297a, Stone 10769, and Toroes 942, 1433, 2059, 2277, 2412, 2637, 2720, 3251, & 4772 are *C. laevifolium* Blume and Maxwell 71-90 is *C. laevifolium* var. *fletcheri* Mold.

Citations: THAILAND: Bunpheng 673 [Roy. For. Dept. 10767] (Ld); Collins 1078 (W--1700970); Geesink & Santisuk 5394 (Ac), 5431 (Ac); Niyomdham & al. 215 (Ac); Phengklai, Tamura, Niyomdham, & Sangkachand 4092 (N); J. F. Rock 138 (W--1090141); Sørensen, Larsen, & Hansen 4632 (Cp). VIETNAM: McClure 7397 [Canton Chr. Coll. 253.7191] (I). MALAYA: Malacca: W. Griffith s.n. [1843] (Br), s.n. [1845] (Br), s.n. [Malacca] (L, Pd). Pahang: Balgooy 2571 (Ac, N); Pursegłove 4324 (Ng--20204). Penang: Wallich 1794 (L). Singapore: Wallich 1792 (L). GREATER SUNDA ISLANDS: Java: Arnaud Gerkens 1 (Bz--19234); Arsin 154 (Bz--19219, Bz--19220, Bz--19221); Backer 1911 (Bz--19224), 12447 (Bz--19230, Bz--19232), 23249 (Bz--19229, Bz--19233), s.n. [27/12/1910] (Bz--19223), s.n. [Tjibodas] (Bz--19222); Bakhuizen 125 (Bz--19177, Bz--19178), 638 (Bz--19216), 761 (Bz--19179), 882 (Bz--19208, N), 1503 (Bz--19214, Bz--19215), 4379 (Bz--19235), 4657 (Bz--19236); Beumee 4354 (Bz--19218); Blume s.n. [Salak] (Mi--isotype), s.n. (N--isotype, Qu--isotype); Boerlage 453b (Mi); Hochreutiner 160 (E--1614560); Hallier 352 (Bz--19226, Bz--19227, Bz--19228, N); Horsfield s.n. (Ld--photo, N--photo, Ut--49911, Ut--49912); Jensen s.n. [9.12.1900] (Cp); Koorders 27105b [217*] (Bz--19187, Bz--25504), 27605b [490*] (Bz--19243, Bz--19244, Bz--19245, Bz--19248, Bz--25501), 32836b [1534*] (Bz--19237, Bz--19242), 34343b [2789*] (Bz--19173), 34350b [4063*] (Bz--19174), 36859b [1117*] (Bz--19246, Bz--19247), 39150b [75*] (Bz--19188, Bz--19189), 39547b [6*] (Bz--19239, Bz--19241), 41176b [382*] (Bz--19239, Bz--19240); Ploem 155 (N); Reinwardt s.n. (S); Sapin 50 (Mu); Scheffer s.n. (Bz--

19180, Bz--19181); *Steenis 1815* (Bz--19165); *Teijsmann s.n.* [1868] (Mi); *Winckel 63* (Ut--22883A), *64* (Ut--63843), *64b* (Bz--19209, Bz--19210, Bz--19212, Bz--19213, Ca--301397), *77b* (Bz--19217), *368b* (Bz--19176), *1180b* (Bz--19225, Ca--235838, Ut--80823), *s.n.* [13 Mrt. 1919] (Bz--25497); *Zollinger 1968* (S), *3598* (Br). Kalimantan: *Motley 912* (K, Ld--photo, Mi--photo, N--photo). Kambangan: *Backer 21004* (Bz--19182, Bz--19183, Bz--19184, Bz--19185, N, Ut--63842); *Berger 283* (Bz--19186). Krakatoa: *Docters van Leeuwen-Reijnvaan 6193* (Bz--19169, Bz--19170, Bz--19171, N). Sabah: *Meijer SAN.44030* (Sn--40678); *M. Ramos 1421* [field no. 350] (Ph). Sarawak: *Foxworthy 424* (Ph). Sumatra: *Bünnemeijer 3750* (K, N); *Docters van Leeuwen-Reijnvaan 5096* (Bz--19249, Bz--19250); *Pijl 323* (Bz--19254); *Rehsodihardjo 629* (Ac). LESSER SUNDA ISLANDS: Banka: *Reijsmann 3371H.B.* (Bz--19168). CULTIVATED: Java: *Herb. Hort. Bogor. V.A.N.10* (Bz--26491), *XI.B* (Bz--19175), *XI.G.81* (Bz--25790, Bz--26533, Bz, Bz), *XII.B.II.29* (Bz--26236, Bz--26237, Bz, Bz, Bz, Bz, N), *XII.B.III.22* (Bz--26238, N); *Herb. Hort. Bot. Jav. s.n.* (Pd); *Herb. Tjibodas A.7* (Bz--26493), *A.12* (Bz--26492, Bz--26494); *Teijsmann s.n.* [Hort. Bot. Bogor. 1860] (Le), *s.n.* [Hort. Bot. Bogor. 1867] (Le, Le), *s.n.* [Herb. Hort. Bogor. 1868] (K). Singapore: *Nur s.n.* [25 Oct. 1924] (Ba).

CLERODENDRUM DUMALE (Hiern) J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 519--520 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 90 & 93. 1936.

Synonymy: *Siphonanthus dumalis* Hiern, Cat. Afr. Pl. Coll. Welw. 1: 846--847. 1900. *Clerodendron dumale* J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 519. 1900. *Clerodendron dumale* (Hiern) K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1902. *Clerodendron dumale* K. Schum. apud Prain, Ind. Kew. Suppl. 3: 44. 1908. *Clerodendrum dumale* Schumach. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 93 in syn. 1936.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 519--529. 1900; Hiern, Cat. Afr. Pl. Coll. Welw. 1: 846--847. 1900; L. Schum., Justs Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43 & 172. 1904; Prain, Ind. Kew. Suppl. 3: 44. 1908; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 90 & 93. 1936; Mold., Alph. List Inv. Names 17 & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 50 & 89 (1942) and ed. 2, 118 & 181. 1949; Mold., Résumé 146, 262, 344, & 449. 1959; Mold., Fifth Summ. 1: 242 & 443 (1971) and 2: 622 & 865. 1971; Mold., Phytol. Mem. 2: 232 & 536. 1980.

A shrublet, 30--60 cm. tall; branches subterete, pale-brown, glabrate, inconspicuously lenticellate; branchlets softly pubescent-tomentose, leafy at the extremities; buds tomentose; leaves decussate-opposite, short-petiolate; petioles 3--6 mm. long; leaf-blades ovate or oval-obovate to oblong or elliptic, 2.5--3.7 cm. long, 1.2--1.8 cm. wide, apically obtuse or acute, marginally entire or nearly so, basally narrowed or cuneate, firmly chartaceous, closely clothed with short, stiff, pale hairs and minute glands especially beneath, pale-green, the floral ones smaller; inflorescence terminal or subterminal, somewhat leafy and bracteose, rather lax, 5--10 cm. long, hispid-tomentose, the primary ramifications patent, brachiate; pe-

duncle 0.6--3.1 cm. long; pedicels up to 1.2 cm. long; bractlets spatulate or subulate; flowers rather numerous; calyx shortly and obliquely campanulate, 5--6 mm. long, externally minutely glandulose and beset with short, whitish, stiff hairs, internally glabrous, shortly lobed, the lobes apically rounded or obtuse, basally imbricate, marginally ciliate or ciliolate; corolla blue, the tube 6--18 mm. long, 3 mm. wide, oblique, ventricose, externally minutely glandulose, the limb subbilabiate, spreading, venose, unequally 5-lobed, the lobes oval or obovate, 8--12 mm. long, apically rounded, the throat shaggy, slit down one side; stamens 4, subdidynamous, exserted; filaments apically glabrous, basally shaggy, inserted at the base of the corolla-throat, 1.8--2.1 cm. long; anthers 1.5 mm. long, glabrous; ovary glandular-squamulose; style equalling or somewhat surpassing the stamens, glabrous; stigma bifid; fruit drupaceous, quadrate-globose, 8 mm. long and wide, somewhat compressed, furrowed down the two sides.

This species is based on *Welwitsch 3914, 5760* and *5763* from thickets near Lopollo, Huila, Angola, where it was growing in association with *Psiadia arabica* Jaub. & Spach and *Duranta repens* L, in flower in October 1859 and in fruit in January 1860. Hiern (1900) comments that "This belongs to the section *Cyclonema* and comes near to *S.* (*Cyclonema*) *discolor* (Kl.) and to *S.* (*Clerodendron*) *Neumayeri* (Vatke)."

Since Baker (1900) cites Hiern's binomial to correct volume and page, while Hiern (1900) does not mention Baker's binomial, I am assuming that Hiern's work appear earlier in 1900 than did that of Baker. Schumann's reference (1902) is sometimes also cited as "1900" but was not actually published until 1902.

Thomas (1936) comments that he knew this taxon only from its original description, but that it obviously is a member of the Subgenus *Cyclonema*. I, also, know nothing of the species beyond what is given in its bibliography (above).

CLERODENDRUM DUSENII Gürke, Engl. Bot. Jahrb. 28: 293 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 42, 76, & 93. 1936.

Synonymy: *Clerodendron dusenii* Gürke, Engl. Bot. Jahrb. 28: 293. 1900. *Clerodendron barteri* J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 298. 1900.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293, 298, & 518. 1900; Gürke, Engl. Bot. Jahrb. 28: 293. 1900; K. Schum., Justs. Bot. Jahresber. 28 (1): 495. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; S. Moore, Journ. Bot. Brit. 57: 248. 1919; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 273 & 274. 1931; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 16, 42, 76, & 93. 1936; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 49 & 57. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 112, 113, & 181. 1949; Mold., Résumé 138, 139, 260, & 449. 1959; H. Huber in Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 2, 441 & 444. 1963; Mold., Résumé Suppl. 9: 3 (1964) and 15: 7 & 8. 1967; Mold., Fifth Summ. 1: 221, 223, 225, 242, 440, & 443 (1971) and 2: 865. 1971; Mold., Phy-

tol. Mem. 2: 212, 213, 215, 232, & 536. 1980; Mold., Phytologia 59: 109. 1986.

A scrambling undershrub or erect shrub, to 2 m. tall, with yellowish-brown or rusty pubescence; young branches and branchlets finely brownish-pubescent or puberulent; leaves mostly decussate-opposite, rarely ternate; leaf-scars wide and compact, 1 cm. long, somewhat recurved; petioles 1--2 cm. long, brownish-puberulent; leaf-blades moderately firm in texture, oblong, elliptic, or ovate to obovate-oblong or obovate, 6--15 cm. long, 4--8 cm. wide, about 1½ times as long as wide, apically acuminate or cuspidate, marginally entire, basally angustate-rotund or cuneate, not cordate, green and glabrous above or slightly pubescent along the midrib, sparsely pubescent or puberulent only on the midrib and secondaries beneath, otherwise glabrous; inflorescence terminal, the cymes dense, about 5 cm. wide, pedunculate, the ramifications brownish-puberulent, forming a branched, mostly subcorymbose thyrse; bracts linear; pedicels short; flowers small; calyx campanulate, 2--4 mm. long, externally glabrous or minutely puberulent, 5-toothed, the teeth ovate or deltoid, small, spreading, nearly as long as the tube; corolla white or greenish-white, the tube cylindric, about 5 mm. long, twice as long as the calyx, the lobes obovate, about 2 mm. long; stamens 3 times as long as the corolla-limb; fruiting-calyx campanulate, basally narrowed into the pedicel, about 5 mm. long, externally very sparsely puberulent, 5-toothed, the teeth subtriangular, about 1.5 mm. long, basally about 1.5 mm. wide.

This species is based on *Dusén 326* from Ssangille, Cameroons, collected on March 28, 1892, and deposited in the Berlin herbarium, now doubtless destroyed. *Clerodendron barteri* is based on *Barter 51* from Brass on the Niger delta in Southern Nigeria.

Gürke (1900) says of *C. dusenii*: "Die Art ist am nächsten verwandt mit *Cl. scandens*; wahrscheinlich rankt sie in derselben Weise wie diese mit Hülfte der rückwärts gekrümmten Blattstielreste im Gebüsch emper. Obwohl Blüten in dem vorliegenden Material nicht vorhanden sind, zeigt sich doch an den abgeblühten Kelchen ein deutlicher Unterschied von *Cl. scandens*; die Kelchzähne sind bei der neuem Art deutlich 3-eckig. Ausserdem sind die jüngeren Zweige, die Blattstiele und die Nerven auf der Unterseite des Blattes mit bräunlichgelben Flaum bedeckt, während sie bei *Cl. scandens* kahl sind."

Collectors have found this plant growing in thickets, in flower in March. The corollas are said to have been "greenish-white" on *Blickenstaff 10*, while Baker (1900) refers to them as "white".

Huber (1963) includes in the synonymy of this species the *Premna macrosiphon* of Baker, *Clerodendrum macrosiphon* (Baker) Thomas, *C. intermedium* Thomas, and *C. premnoides* Meeuse, but I regard all of these as synonyms of *C. thomasii* Mold., which see. Huber cites *Barter 51, Brenan 9016, Mann 486, Talbot 1491* & *3122*, and *Thomson 28* from Southern Nigeria and *Maitland 531* & *980* from Cameroons.

The Schumann (1902) reference in this species' bibliography is sometimes cited as "1900, apparently in error.

Baker's (1900) key for distinguishing this species from its small-flowered non-capitate relatives is as follows (with the nomenclature brought up-to-date):

1. Leaf-blades oblong.
 2. Leaf-blades glabrous.
  3. Bases of old petioles indurated and persistent..
  3a. Bases of old petioles not indurated.
   4. Inflorescence small.....C. *glabrum*.
   4a. Inflorescence a large compact thyrsoid panicle...C. *volubile*.
   4b. Inflorescence a large subumbellate panicle....C. *triplinerve*.
 2a. Leaf-blades slightly pubescent beneath.
  5. Inflorescence small, compact.
   6. Leaves small.....C. *glabrum* var. *vagum*.
   6a. Leaves large.....C. *dusenii*.
  5a. Inflorescence a large thyrsoid panicle.....C. *toxicarium*.
 2b. Leaf-blades densely pubescent beneath.
  7. Leaf-blades marginally entire.....C. *tanganyikense*.
  7a. Leaf-blades marginally deeply crenate.....C. *kirkii*.
1a. Leaf-blades ovate, basally rounded.
 8. Leaf-blades glabrous.
  9. Leaf-blades 5--7.5 cm. long.....C. *melanocrater*.
  9a. Leaf-blades 7.5--15 cm. long.....C. *silvaeanum*.
 8a. Leaf-blades very pubescent.....C. *glabrum* var. *vagum*.
1b. Leaf-blades cordate-ovate, basally cordate.
 10. Calyx 3 mm. long.....C. *polycephalum*.
 10a. Calyx 4 mm. long.....C. *johnstoni*.
 10b. Calyx 6 mm. long.....C. *pleiosciadium*.

Hutchinson & Dalziel (1911) distinguish C. *dusenii* from its nearest relatives as follows (the nomenclature, again, updated):

1. Inflorescence an elongated panicle.....C. *thyrsoideum*.
1a. Inflorescence a corymbose or slightly pyramidal cyme.
 2. Leaf-blades basally cordate.....C. *polycephalum*.
 2a. Leaf-blades not basally cordate.....C. *dusenii*.

Citations: LIBERIA: *Blickenstaff 10* (Ld, Mi). CAMEROONS: *Dusén 326* (Ld--photo of isotype, N--photo of isotype, N--fragment of isotype, S--isotype).

CLERODENDRUM EBURNEUM Chiov. ex Chiarugi, Webbia 8: 238--239 [as "*Clerodendron*"]. 1951; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959.

Synonymy: *Clerodendron eburneum* Chiov. ex Chiarugi, Webbia 8: 238. 1951

Bibliography: Chiarugi, Webbia 8: 238--239. 1951; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 799. 1962; Mold., Phytologia 57: 34. 1985.

The original description of this obscure species is: "Frutex ramis ultimis ad basin 3--3,5 mm. crassis, cortice subeburneo, lenticellis perminuti punctiformibus dense sparsis, et perminute puberulis. Folia facillime caduca 3--4-subverticillata, interdum solitaria, pseudoverticillis 1,5--2,5 cm. discretis; petiolus prope basin articulatus, 10--17 mm. lo., dense ut tota lamina ubique pilis perminute pubescens; laminae plus minusve carnosae, sicco crassae et rigidae valde corrugatae triangulares vel reniformi- vel ovato-triangulares, basi lateribus fere horizontaliter distentis integris, in media parte abrupte plus minusve breviter cuneatae et in petiolum

decurrentes, latera laminae antica grosse dentato-lobulata, dentibus 2--4 mm. lo. apice rotundatis, cum dente summo caeteris valde majore integro et cum dentibus imis caeteris minoribus, lamina e linea basali 1,5--3 cm. lo. 2,2--3,4 cm. la., pars basalis cuneata 3--7 mm. lo."

The species is based on *Corradi 8414* from Baidon, Somalia, collected on October 19, 1939. Cufodontis (1962) claims that the type locality lies in south-southeastern Ethiopia, but Taylor (1959) places it in what was then Italian Somaliland. Nothing further is known to me about this species.

CLERODENDRUM EKETENSE Wernham, Journ. Bot. Brit. 52: 32 [as "*Clerodendron*"]. 1914; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 35, 60, & 93. 1936.

Synonymy: *Clerodendron eketense* Wernham, Journ. Bot. Brit. 52: 32. 1914. *Clerodendrum ekatense* Wernh. ex Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 89 sphalm. 1942.

Bibliography: Wernham, Journ. Bot. Brit. 52: 32--33. 1914; Fedde & Schust., Justs Bot. Jahresber. 42: 252. 1920; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 272. 1931; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 8, 35, 60, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 89 (1942) and ed. 2, 113 & 181. 1949; Mold., Résumé 138 & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Résumé Suppl. 18: 6 & 9. 1969; Mold., Fifth Summ. 1: 221, 446, & 461 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 212 & 536. 1980.

A softly pubescent climbing shrub; branchlets softly pubescent; leaves decussate-opposite; petioles elongate, 3.5--5 cm. long, densely pubescent, the indurated base persistent; leaf-blades thinly membranous, broadly oval or ovate-elliptic, 10--16 cm. long, 7--10 cm. wide, apically very short-acuminate (the acumen itself very acute), basally rounded or subcordate, sparsely pilose above, more densely spreading-pilose on the venation beneath; secondaries very oblique; inflorescence thyrsoid or narrow-paniculate, about 10 cm. long and 6 cm. wide, rather crowded or lax, densely pubescent throughout; bracts very numerous, small, linear-lanceolate; pedicels 8--9 mm. long or longer; calyx large, 1.5--1.6 cm. long, externally minutely hispidulous, the lobes triangular-lanceolate or narrowly ovate, not more than 1 cm. long, apically acuminate and very acute, longer than the broadly campanulate tube, dorsally thinly pubescent; corolla 12--16 mm. long, scarcely exserted from the calyx, the tube comparatively short, about 1.7 cm. long, very slender, externally rather densely glandular-pilose especially apically, the lower slender portion 1.3 cm. long, the upper portion more or less ampliate, the lobes oblanceolate-oblong, 4.5 mm. long; stamens erect, not long-exserted, surpassing the corolla-mouth by only about 7 mm.

This species is based on *Talbot 3393* from Eket, Southern Nigeria, deposited in the herbarium of the British Museum in London. Hutchinson & Dalziel (1931) and Thomas (1936) each cite only the original collection, Thomas commenting that "Das vorliegende Material ist sehr dürftig".

Wernham (1914) comments that this is "A well-defined species, distinguished by its short soft pubescence, the ample thin oval leaves with long stiff stalks directed outwards and downwards, and the large calyxes with but a short length of the corolla exserted. The nearest allied species seems to be *C. Welwitschii* Gürke, but this has the corolla-tube nearly 4 cm. long."

Citations: NIGERIA: Southern: *Talbot & Talbot 3393* [Mo. Bot. Gard. Type Photos A.843] (E--photo of type, Gz--photo of type, N--photo of type, W--photo of type).

CLERODENDRUM EKMANI Mold., Geogr. Distrib. Avicenn. 28 & 29 nom. nud. 1939; Phytologia 1: 445--446. 1940.

Synonymy: *Megalosiphon splendens* Ekman ex Mold., Prelim. Alph. List Inv. Names 32 in syn. 1940.

Bibliography: Mold., Geogr. Distrib. Avicenn. 28 & 29. 1939; Mold., Prelim. Alph. List Inv. Names 32. 1940; Mold., Phytologia 1: 445--446. 1940; Mold., Lilloa 6: 320. 1941; Mold., Alph. List Inv. Names 33. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 40, 43, & 89. 1942; Mold., Alph. List Cit. 1: 11. 1946; Hill & Salisb., Ind. Kew. Suppl. 10: 55. 1947; Mold., Lilloa 14: 22. 1948; H. N. & A. L. Mold., Pl. Life 2: 57. 1948; Mold., Alph. List Cit. 3: 837 (1949) and 4: 1257. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 98, 103, & 181. 1949; Mold., Résumé 116, 123, 319, & 449. 1959; Mold., Fifth Summ. 1: 181 & 195 (1971) and 2: 571 & 865. 1971; Troncoso, Darwiniana 18: 396--398 & 408, fig. 36 & 37. 1974; Mold., Phytologia 31: 384. 1975; Mold., Phytol. Mem. 2: 140, 177, 185, & 536. 1980.

Illustrations: Troncoso, Darwiniana 18: 397 & 398, fig. 36 & 37. 1974.

A low bush; branchlets slender, obtusely tetragonal, very densely villous-tomentose with long albidous hairs; nodes not annulate; principal internodes 1--3 cm. long; leaf-scars not conspicuous; leaves decussate-opposite; petioles slender, 5--17 mm. long, densely hirsute with long whitish hairs, flattened above, basally not noticeably annulate; leaf-blades membranous, rather uniformly dark-green on both surfaces, ovate or ovate-elliptic, 3.3--5.8 cm. long, 1.5--4 cm. wide, apically rounded or obtuse (in outline), marginally regularly serrate from base to apex with acute or bluntish antrorse teeth of uniform size throughout, basally rounded or subcordate to acute and usually somewhat prolonged into the petiole, densely villous on both surfaces with whitish hairs 1--1.5 mm. long, especially densely so on younger leaves and on the larger venation beneath; midrib slender, plane above, prominulous beneath; secondaries very slender, 4--6 per side, arcuate-ascending, mostly plane on both surfaces; vein and veinlet reticulation obscure or indiscernible on both surfaces, hidden by the dense pubescence; inflorescence axillary, cymose; peduncles very slender, about 1 cm. long, hirsute like the petioles; corolla hypocrateriform, white, the tube elongate, to 9 cm. long, narrow-cylindric, straight or somewhat curved, equal in diameter for its entire length or slightly ampliate below the apex, the limb spreading, 5-lobed, the lobes subequal; stamens wine-color.

This curious species, obviously a member of the Subgenus *Siphonanthus*, is based on an unnumbered H. Quiroga collection from San Ignacio, Posedas, Misiones, Argentina, collected on October 21, 1913, and deposited in the Delessert Herbarium in Geneva. It is named in honor of Erik Leonard Ekman who also collected it at the type locality and who regarded it a representing a new verbenaceous genus, *Megalosiphon*. Hatschbach refers to it as "rare" and found it in flower in February at 625 m. altitude. It is astonishing that a plant with such very large and showy flowers has been so infrequently collected.

Citations: BRAZIL: Paraná: *Hatschbach 8868* (W--2692386). PARAGUAY: *Anisits 2816* (S). ARGENTINA: Misiones: *Ekman 2029* (S); *Quizoga s.n.* [San Ignacio] (Cb--type, Ld--photo of type, N--fragment of type, N--photo of type).

CLERODENDRUM ELACHISTANTHUM Merr. ex Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57 & 89 nom. nud. 1942; Li, Journ. Arnold Arb. 25: 426 [as "*Clerodendron*"]. 1944.

Synonymy: *Clerodendron elachistanthum* Merr. ex Li, Journ. Arnold Arb. 25: 426. 1944.

Bibliography: Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57 & 89. 1942; Li, Journ. Arnold Arb. 25: 426. 1944; Mold., Alph. List Inv. Names 6. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 131 & 181. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 56. 1953; Mold., Résumé 169, 262, & 449. 1959; Mold., Fifth Summ. 1: 287 & 443 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 277 & 536. 1980; Mold., Phytologia 59: 238. 1986.

A shrub, 1--8 m. tall; stems woody, erect, to 20 cm. in diameter; bark brownish-gray; branchlets brown, glabrous; leaves decussate-opposite; petioles 4--6 cm. long, glabrescent; leaf-blades chartaceous, ovate or cordate-ovate, 12--15 cm. long, 7.5--10 cm. wide, apically acuminate, marginally entire, basally broadly truncate or subcordate, 5-veined, glabrous above, minutely puberulent beneath; secondaries (including the basal ones) 4--6 per side, prominulent; veinlet reticulation prominulent on both surfaces; inflorescence terminal, paniculate, minutely puberulent, about 28 cm. long; peduncles 3 cm. long; primary inflorescence ramifications opposite, about 10 in all, the lower ones to 13 cm. long, dichotomously branched; bracts linear, to 5 mm. long; flowers minute, fragrant or ill-smelling, about 4 mm. long; bractlets about 1 mm. long; pedicels about 1 mm. long; calyx campanulate, about 2 mm. long, externally puberulent, the rim 5-dentate; corolla white or light-yellow, its tube 3--4 mm. long, externally puberulent, the limb 5-lobed, the lobes 1--2 mm. long; stamens 4, slightly exserted; style 4--5 mm. long; stigma bilobed, the lobes apically acute.

This species is based on *W. T. Tsang 27743* from thickets on steep slopes at Pai-yun-an and its vicinity, in Ch'uan District, Kwangsi, China, collected on June 26, 1937, and deposited in the Arnold Arboretum herbarium. The collector reports that the plant is fairly common in the type locality. Li (1944) cites also *Taam 824* from Kwangtung, where Taam says that it is also fairly common. It has been

collected in anthesis only in June. Tsang reports the corolla color as "white" and the flowers fragrant, while Taam describes the corolla as "yellow" and the flowers ill-smelling [perhaps due to ageing?].

Li (1944) comments that "This species is apparently near *Clerodendron cyrtophyllum* Turcz., but it is readily distinguished by the much broader leaves, the more elongated panicles, and the very small flowers". Material has been misidentified and distributed in some herbaria as *C. cyrtophyllum* Turcz.

Citations: CHINA: Kwangsi: *Tsang 27743* (Ld--photo of isotype, W--1757020--isotype). Kwangtung: *Taam 824* (Mi); *Tso 21153* (N).

CLERODENDRUM ELBERTI H. Hallier, Meded. Rijks Herb. Leid. 37: 83. 1918.

Synonymy: *Clerodendron elberti* H. Hallier apud H. J. Lam, Verbenac. Malay. Arch. 316. 1919.

Bibliography: H. Hallier, Meded. Rijks Herb. Leid. 37: 83. 1918; H. J. Lam, Verbenac. Malay. Arch. 316 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94, 108, & viii. 1921; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Beer & Lam, Blumea 2: 224. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 66 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 58. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 147 & 181. 1949; Mold., Résumé 197 & 449. 1959; Mold., Fifth Summ. 1: 330 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 320 & 536. 1980; Mold., Phytologia 58: 216. 1985.

A shrub; branchlets fistular, round in cross-section, 4--7 mm. in diameter, glabrous, the younger ones olivaceous in drying; leaves decussate-opposite; petioles 2--10 cm. long, glabrous; leaf-blades chartaceous, subcordate-rotundate, 6.5--21 cm. long, 4.5--14.5 cm. wide, apically acuminate, marginally entire, basally subcordate or rounded, completely glabrous on both surfaces, covered with minute caducous scales above; inflorescence paniculate, terminal, to 24 cm. long and 25 cm. wide, glabrous, many-flowered, the ramifications often 3 or 4 times bifurcate, terminating in cincinni; peduncles about 4 cm. long, glabrous; bractlets minute, linear-spatulate; pedicels 3--5 mm. long, glabrous; calyx membranous, wide, 3-parted for 2/3 to 3/4 its length, the segments always 3, ovate, 12--15 mm. long, basally 8 mm. wide, apically acute or acuminate, crimson, glabrous, irregularly venose; corolla glabrous, its tube slender, 1.8--2.5 cm. long, about twice as long as the calyx, apically somewhat infundibular, the upper portion externally glanduliferous, the lobes spatulate, 12 mm. long, 3 mm. wide, apically obtuse, dorsally glanduliferous; stamens inserted in the throat of the corolla-tube, exserted about 4--5 cm.; style exserted 4--5 cm.; stigma shortly bifid; ovary 4-lobed, externally glabrous; fruiting-calyx accrescent, crimson, enclosing the immature fruit.

This curious species is based on *Elbert 3977*, in flower and young fruit, collected on December 23, 1909, at 10--60 m. altitude, at Kempong on Saleh Bay, in the Sultanate of Dompuh, Sumbawa, deposited in the Senckenberg, Buitenzorg, Leiden, and other herbaria. The species is closely related to *C. hettae* H. Hallier "sed praeter alias notas paniculae ramis compluries dichotomis, floribus multo minor-

ibus, staminibus altissime exsertis bene distinctum" (Hallier, 1918). Hallier placed it in Section *Squamata*, but Lam (1919) erected a special Section *Tridens* for it and *C. hettae*. Beer & Lam (1936) added a third species, *C. brassii*, from New Guinea, which "differs [from *C. elberti*] only in some minor points (bidentate calyx lobes, broader petals)". They claim that these three species are taxonomically related to the genus *Faradaya*, "a typical eastern genus (N. Borneo, Talaud, Moluccas, New Guinea, Australia, Polynesia)".

Nothing is known to me of *Clerodendrum elberti* beyond what is given in its bibliography (above).

CLERODENDRUM ELEGANS Manetti ex Lem., Jard. Fleur. 4: Misc. 47. 1855.

Synonymy: *Clerodendrum calamistratum* Hort. Belg. ex Lem., Jard. Fleur. 4: Misc. 48 in syn. 1855. *Clerodendron elegans* Manetti apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893. *Clerodendron elegans* "Manetti ex Lem." apud Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 108. 1921.

Bibliography: Lem., Jard. Fleur. 4: Misc. 47--48. 1854; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560 & 561. 1893;.H. J. Lam, Verbenac. Malay. Arch. 320 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94, 108, & viii. 1921; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 72 & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560 & 561. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 158 & 181. 1949; Mold., Resume 215, 261, & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560 & 561. 1960; Mold., Fifth Summ. 1: 358 & 441 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 349 & 536. 1980.

The original description of this taxon reads as follows: "*Clerodendrum elegans* Manetti, Msc.?...C. Fruticosum canescens: ramulis teretiusculis; foliis longe petiolatis ovalibus vel ovato-rhombeis obtusiusculis basi attenuatis grosse et inaequaliter serrato-dentatis subtus nervosis; panicula terminali pyramidata nutante; pedunculis subtrifloris, pedicellis lateralibus bibracteolatis, calycibus campanulatis 5-fidis, laciniis lanceolatis acutis; corolla (alba) tubo pilosiuscolo infundibulari gracili calyce quadruplo longiore, limbi lobis ovalibus obtusis involutis; staminibus styloque longe exsertis. Patria agnota, floret novembre in caldariis. Manetti. l. i. c. *Clerodendrum elegans* Manetti, in litteris! et in....? -- *calamistratum*? Hort.? -- (*Verbenaceae*). M. Manetti, inspecteur des jardins impériaux, à Monza (Lombardie), nous fait parvenir. pour en enrichir notre recueil, par l'entremise obligeante de M. Auguste Van Geert, horticulteur, à Gand, la description d'un *Clerodendrum*, qu'il regarde comme nouveau. Il l'avait reçu, il y a huit ans environ, de Belgique, sous le nom de *C. calamistratum*! nom mal écrit, peut-être, pour *C. calamitosum*; car rien dans la phrase spécifique de ce botaniste, phrase qui nous semble fort bien rédigée, ne fair allusion à de la frisure (calamistratus, frise au fer!). Ce ne saurait etre ce dernier, dont le nouveau diffère de tout point; et d'un autre côté, nous ne connaissons pas de *C. calamistratum* dans les jardins belges. C'est un arbrisseau couvert d'une pubescence blanchâtre, à rameaux

cylindriques, à feuilles ovales, ou ovées-rhomboïdes, subobtuses, à panicule pyramidale, dont les pédicellules triflores; les fleurs blanches, dont les corolles quatre fois plus longues que les calyces; les étamines et le style longuement exserts. Nous souhaitons que M. Manetti nous gratifie bientôt d'un dessin colorié, que nous nous empresserions de reproduire dans le Jardin fleuriste." The page is dated "les Juillet 1855".

Nothing is known to me of this taxon beyond this description which indicates that it was originally described from material cultivated in Italy. Neither Lam (1919) nor Bakhuizen (1921) could add anything further.

CLERODENDRUM ELLIOTI Mold., Bull. Torrey Bot. Club 77: 396. 1950.

Bibliography: Mold., Bull. Torrey Bot. Club 77: 396. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 56. 1953; Mold. in Humbert, Fl. Madag. 174: 153, 216--218, & 267, fig. 35 (1). 1956; Mold., Résumé 155 & 449. 1959; Mold., Fifth Summ. 1: 259 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 248 & 536. 1980; Mold., Phytologia 58: 188. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 267, fig. 35 (1). 1956.

A shrub, 1--2.5 m. tall; branches and branchlets rather slender, very finely puberulous, glabrescent in age, grayish-brown, rather conspicuously lenticellate, the lenticels round and small; twigs sparse, very slender, densely puberulent; nodes not annulate; principal internodes abbreviated, 0.5--2.5 cm. long; leaf-scars large and prominent on the younger parts; leaves decussate-opposite; petioles very slender, 1--2.2 cm. long, glabrous; leaf-blades thin-membranous, very fragile and brunnescent in drying, elliptic, 2.5--8.5 cm. long, 2--2.5 cm. wide, apically short-acuminate, marginally entire, basally mostly acuminate, glabrous or subglabrous on both surfaces, more or less punctate beneath; midrib very slender, flat above, prominulous beneath; secondaries very slender, flat above, very slightly subprominulous beneath, 4--7 per side, divergent-ascending, arcuately joined near the margins beneath; vein and veinlet reticulation mostly indiscernible on both surfaces; inflorescence axillary, cymose, few-flowered, often reduced to one flower; peduncles very slender, 12--17 mm. long, minutely puberulent; pedicels very slender, 5--15 mm. long, minutely puberulent; bracts foliaceous, 2 or 4 per cyme or caducous, 10--15 mm. long, stipitate; bractlets linear, 5--6 mm. long; calyx thinly membranous, brunnescent in drying, elliptic-tubular, 2.5--3 cm. long, to 14 mm. wide at the mid-point, externally glabrous, 5-plicate, the rim 5-lobed, the lobes ovate, about 7 mm. long, apically attenuate-acuminate; corolla red, infundibular, its tube about 3.5 cm. long, slightly surpassing the calyx, externally very sparsely scattered-pulverulent or puberulent with very minute hairs, the limb about 3 cm. wide, the lobes about 1.5 cm. long; stamens and style included by the limb; fruiting-calyx coriaceous, nigrescent in drying, about 3 cm. long, to 1.8 cm. wide, dorsally glabrate, obscurely veined, the rim conspicuously 5-lobed; fruit drupaceous, brown-purple.

This species is based on *G. F. Scott Elliot 2039* from dry rocky hills at Betsilec, near Yeanar, in the interior of Madagascar, col-

lected on February 3, 1890, and deposited in the Paris herbarium. The vernacular name, "asélo", is recorded by the collector.

Collectors have found this plant in flower in February, July, and October. A key to distinguish it from other Madagascar species will be found under *C. baronianum* Oliv. in the present series of notes.

Material of *C. ellioti* has been misidentified and distributed in some herbaria as *C. arenarium* Baker and *Barleria prionitis* Lindl. The *Scott Elliot 3039* collection, cited below, is a mixture with *C. macrocalycinum* J. G. Baker.

Citations: MADAGASCAR: *Decary 5533* (N, P); *Scott Elliot 2039* (E--photo of type, F--photo of type, Ld--photo of type, N--photo of type, P--type), *3039* in part (K, N).

CLERODENDRUM ELLIPTIFOLIUM Merr., Philip. Journ. Sci. Bot. 7: 341--342 [as "*Clerodendron*"]. 1912; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62 & 89. 1942.

Synonymy: *Clerodendron elliptifolium* Merr., Philip. Journ. Sci. Bot. 7: 341. 1912.

Bibliography: E. D. Merr., Philip. Journ. Sci. Bot. 7: 341--342. 1912; Fedde & Schust., Justs Bot. Jahresber. 40 (2): 335. 1915; H. J. Lam, Verbenac. Malay. Arch. 261 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 78, 94, 108, 111, & viii. 1921; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; E. D. Merr., Enum. Philip. Flow. Pl. 3: 401. 1923; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62 & 89 (1942) and ed. 2, 141 & 181. 1949; Mold., Resume 183 & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Fifth Summ. 1: 315 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 306 & 536. 1980.

A small tree or shrub, about 3 m. tall, glabrous except for the inflorescence; branches terete or obscurely angled, glabrous, the younger ones olivaceous, lenticellate; leaves decussate-opposite; petioles 3--3.5 cm. long, glabrous; leaf-blades chartaceous or submembranous, elliptic to elliptic-ovate, 12--15 cm. long, 7--11 cm. wide, olivaceous when dry, apically stoutly short-acuminate, marginally obscurely subundulate with incipient teeth 1--1.5 cm. apart, basally rather broadly rounded or sometimes very obscurely cordate, unicolored on both surfaces, glabrous and shiny above, dull and glabrous beneath; secondaries 5 or 6 per side, prominent, curvate, anastomosing; veinlet reticulation loose; inflorescence terminal, dense, many-flowered, cymose, subsessile or at least branched from the base, about 10 cm. wide, sparingly pubescent with short scattered hairs; bractlets acicular, 1--2.3 mm. long, pubescent; flowers numerous; calyx infundibular or somewhat cupuliform, about 6 mm. long, 3.5 mm. wide, the rim truncate and obscurely 5-toothed, narrowed to the acute base, externally sparingly pubescent with very short hairs; corolla white or nearly so, the tube slender, cylindric, about 18 mm. long, glabrous, the limb spreading, about 12 mm. wide, the lobes ovate or broadly oblong-ovate, apically rounded; ovary externally glabrous.

The species is based on *Ramos Herb. Philip. Bur. Sci. 14463* from thickets at Panatayum, Camiguin de Dindinao, Philippine Islands, collected on March 20, 1912, and deposited in the herbarium of the

Philippine Bureau of Science, now doubtless destroyed. Merrill (1912) comments that this is "A characteristic species not, apparently, very closely allied to the other Philippine forms, although manifestly in the same group with *Clerodendron quadriloculare* Merr., *C. mindorense* Merr., and *C. klemmei* Elm. It is distinguished by its elliptic, obscurely undulate leaves, and its dense, terminal, many-flowered, cymose panicles".

Bakhuizen (1921) suggests that *C. sahelangi* Koord. may possibly be conspecific with *C. elliptifolium*, but had no material of the latter for comparison.

Nothing is known to me of *C. elliptifolium* beyond what is given in it bibliography (above).

CLERODENDRUM ELMERI Merr., Univ. Calif. Publ. Bot. 15: 264--265 [as "*Clerodendron*"]. 1929; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62, 65, & 89. 1942.

Synonymy: *Clerodendron elmeri* Merr., Univ. Calif. Publ. Bot. 15: 264. 1929. *Clerodendron oblongifolium* Kochm., in herb.

Bibliography: E. D. Merr., Univ. Calif. Publ. Bot. 15: 264--265. 1929; A. W. Hill, Ind. Kew. Suppl. 8: 54. 1933; Fedde & Schust., Justs Bot. Jahresber. 59 (2): 416. 1939; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62, 65, & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 58. 1948; Mold., Alph. List Cit. 4: 1232 & 1260. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 141, 145, & 146. 1949; Mold., Resumé 183, 192, 193, & 449. 1959; Mold., Fifth Summ. 1: 322 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 313 & 536. 1980.

An erect unbranched subshrub, about 0.5 m. tall, glabrous except for the inflorescence; stems simple, terete, tough, pale-gray, about 4 mm. in diameter; leaves decussate-opposite, in equal pairs; petioles 3--3.5 cm. long, deep-green, glabrous; leaf-blades membranous, lanceolate to oblanceolate, 15--22 cm. long, 3--5.5 cm. wide, pennineryed, apically narrowly and acutely acuminate, marginally entire, basally cuneate, glabrous and eglandular on both surfaces, deep-green and shiny above, much paler beneath, drying green above and only slightly paler beneath; secondaries about 11 per side, slender, distinct, arcuately anastomosing; veinlet reticulation loose; inflorescence terminal, paniculate, erect, pale-green, pedunculate, about 15 cm. long and 8 cm. wide, puberulent, the primary ramifications opposite, subpatulous, about 4 cm. long; bracts linear-lanceolate, 1--1.5 cm. long; buds descending; flowers horizontal, disposed in cymes on the primary inflorescence-branches; pedicels 5--8 mm. long; bractlets linear-lanceolate, about 2 mm. long; calyx deeply 5-fid, the lobes lanceolate, green, about 8 mm. long and 1.4 mm. wide, apically acuminate, sparsely glanduliferous, externally puberulent; corolla white, the tube slender, about 13 mm. long, externally puberulent, the lobes subequal, oblong-obovate to oblong, about 5.5 mm. long, 2--3 mm. wide, apically rounded, dorsally slightly puberulent; filaments exserted about 2 cm. from the corolla-mouth, dark-purple, glabrous; ovary subglobose, externally glabrous; fruiting-calyx red; immature fruit green.

This species is based on *Elmer 20534* from near Tawao, Sabah, deposited in the herbarium of the University of California at Berkeley.

Merrill (1929) comments that "As the species are arranged by Lam in his recent treatment of the Malaysian representatives of this genus, the form above described falls in the group with *Clerodendron nutans* Wall. and *C. macrophyllum* Blume, but it is remote from both". Collectors refer to it as "a roadside weed" in Sabah and have encountered it at 5500 feet altitude. Material has been misidentified and distributed in some herbaria as *C. disparifolium* Blume, *C. disparifolium* f. *prianganense* Bakh., and *Rubiaceae* sp.

Citations: GREATER SUNDA ISLANDS: Kambangan: *Bruggeman 854* (Bz--19211, N). Sabah: *Cockburn SAN.76818* (Sn); *Elmer 20534* (Ca--312127--type, Du--165497--isotype, Ld--photo of isotype, Mu--isotype, N--photo of isotype).

CLERODENDRUM EMIRNENSE Bojer ex W. Hook., Curtis Bot. Mag. 56 [ser. 2, 3]: pl. 2925 [as "*Clerodendron*"]. 1829; Bojer, Hort. Maurit. 255. 1837.

Synonymy: *Clerodendrum* (*Volkamera*) *floribundum* Lindl., Edwards Bot. Reg. 12: pl. 1035 textu. 1827 [not *C. floribundum* R. Br., 1810]. *Egena erminensis* Raf., Fl. Tellur. 2: 85. 1837. *Clerodendron erminense* Hook. ex Raf., Fl. Tellur. 2: 85 in syn. 1837. *Clerodendrum floribundum* B. Reg. ex Steud., Nom. Bot. Pham., ed. 2, 1: 382 in syn. 1840. *Clerodendron floribundum* Hort. ex Schau. in A. DC., Prodr. 11: 661 in syn. 1847. *Clerodendron floribundum* Hort. Angl. ex Buek, Gen. Spec. Syn. Candoll. 3: 106 in syn. 1858. *Clerodendron floribundum* Lindl. apud Buek, Gen. Spec. Syn. Candoll. 3: 106 in syn. 1858. *Egena emirnensis* Rafin. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 822. 1893. *Clerodendron eminense* Woodrow, Gard. Trop., ed. 6, imp. 8, 437. 1910. *Clerodendron emirense* Robledo, Lecc. Bot. 2: 499 sphalm. 1940. *Clerodendrum emirnense* "Bojer ex Hook." apud Mold. in Humbert, Fl. Madag. 174: 266. 1956. *Clerodendron emirnense* Bak. ex Mold., Résumé 262 in syn. 1959. *Clerodendron diversifolium* Lab., in herb. [not *C. diversifolium* L. C. Rich., 1940, nor Vahl, 1791].

Bibliography: Lindl., Edwards Bot. Reg. 12: pl. 1035. 1827; W. Hook., Curtis Bot. Mag. 56 [ser. 2, 3]: pl. 2925. 1829; Wall., Numer. List [49], no. 1791. 1829; Sweet, Hort. Brit., ed. 2, 415. 1830; Loud., Hort. Brit., ed. 2, 549. 1832; Bojer, Hort. Maurit. 255. 1837; Raf., Fl. Tellur., imp. 1, 2: 85. 1837; G. Don in Sweet, Hort. Brit., ed. 3, 549. 1839; J. Grah., Cat. Pl. Bomb. 158. 1839; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; Voigt, Hort. Suburb. Calc. 465. 1845; Walp., Repert. Bot. Syst. 4: 111. 1845; Schau. in A. DC., Prodr. 11: 661. 1847; Schnitzl., Icon. Fam. Nat. Reg. Veg. 2: 137 Verbenac. [3] & 137, fig. 1 & 2. 1856; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Woodrow, Gard. India, ed. 5, 419. 1889; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561 & 822. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; Woodrow, Journ. Bomb. Soc. Nat. Hist. 5: 12. 1899; T. Cooke, Fl. Presid. Bomb., ed. 1, 434. 1906; Woodrow, Gard. Trop., ed. 1 [Gard. India, ed. 6, imp. 8], 437. 1910; Stapf, Ind. Lond. 2: 238. 1930; Mold., Geogr. Distrib. Avicenn. 37. 1939; Mold., Prelim. Alph. List Inv. Names 19 & 22. 1940; Mold., Alph. List Inv. Names 17 & 21. 1942; Mold., Known

Geogr. Distrib. Verbenac., ed. 1, 53, 72, & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561 & 822. 1946; Mold., Alph. List Cit. 1: 48 & 250. 1946; Raf., Fl. Tellur., imp. 2, 2: 85. 1946; Terrac., Trav. Lab. Mat. Med. Ecole Sup. Pharm. Paris 33 (3): 101. 1947; Mold., Alph. List Cit. 2: 352, 484, 560, & 562 (1948) and 4: 1141. 1949; E. D. Merr., Ind. Raf. 204. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 123, 158, & 181. 1949; Mold., Amer. Journ. Bot. 38: 325. 1951; Mold., Phytologia 4: 44. 1952; Mold. in Humbert, Fl. Madag. 174: 150, 156, 186--191, 266, & 267, fig. 30 (6--11). 1956; T. Cooke, Fl. Presid. Bomb., ed. 2, imp. 1, 2: 514. 1958; Mold., Résumé 155, 157, 215, 262, 263, & 272. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561 & 822. 1960; Mold., Resume Suppl. 4: 11. 1962; T. Cooke, Fl. Presid. Bomb., ed. 2, imp. 2, 2: 514. 1967; Mold., Fifth Summ. 1: 260, 264, 358, 443, 444, & 461 (1971) and 2: 491 & 865. 1971; Mold., Phytologia 28: 448 (1974), 31: 395 (1975), and 36: 41. 1977; Mold., Phytol. Mem. 2: 248, 252, 349, 385, & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 456. 1983; Mold., Phytologia 57: 38 & 349 (1985) and 58: 181, 187, & 203. 1985.

Illustrations: W. Hook., Curtis Bot. Mag. 56 [ser. 2, 3]: pl. 2925 (in color). 1829; Schnitzl., Iconogr. Fam. Nat. 2: 137 Verbenac. pl. 137, fig. 1 & 2. 1856; Mold. in Humbert, Fl. Madag. 174: 187, fig. 30 (6--8). 1956.

A shrub or small tree, to 6.5 m. tall, much branched and twiggy; main branches often quite stout; branchlets slender or very slender, gray or grayish, subterete or obscurely tetragonal, mostly conspicuously lenticellate, varying from densely to more or less sparsely short-pubescent, strigillose, or puberulent, glabrescent in age, often ternate or whorled; twigs very slender, subterete or obscurely tetragonal, grayish or brownish, densely short-pubescent with sordid-cinereous hairs, becoming less so in age; nodes not annulate; principal internodes 0.5--3 cm. long, often much more abbreviated on twigs, occasionally elongate to 6 cm.; leaves mostly decussate-opposite on younger plants or branches, sometimes ternate or quaternate on older branches, numerous, small; petioles very slender, mostly 1--10 mm. long, short-pubescent or strigillose-puberulent; leaf-blades thin-chartaceous or submembranous, bright-green above, often brunnescent in drying, lighter beneath, varying from ovate, oblong-ovate, oblong, or lanceolate to elliptic or obovate, 1--4.5 cm. long, 0.4--2.7 cm. wide, apically varying from blunt or rounded to acute or short-acuminate, marginally mostly entire or subentire, basally acute or acuminate, sometimes attenuate into the petiole, dark-green and varying from more or less pulverulent-puberulent to minutely puberulent or strigillose and minutely scabrous above but soon becoming glabrous and shiny, paler and densely punctate beneath and more or less strigillose-puberulent on the larger venation or sometimes over the whole lower surface, rarely subglabrate beneath; midrib very slender, flat or very slightly prominulous above, usually very slightly prominulous beneath; secondaries very slender, 3--5 per side, flat or obscure above, flat or very slightly subprominulous beneath, arcuate-ascending, joined at the margins; vein and

veinlet reticulation sparse, obscure or indiscernible above, obscure or rarely somewhat conspicuous beneath; inflorescence terminal, cymose or corymbose, small to large, congested and compact, mostly subumbelliform, densely many-flowered, usually 2--3.5 cm. long and wide, rarely to 5 cm. wide, shortly pubescent-strigillose throughout; peduncles very slender or mostly obsolete; cyme-branches often numerous, very slender, mostly 2--10 mm. long or rarely the lowermost longer, densely short-pubescent; foliaceous bracts sometimes present and leaf-like in all respects; bractlets and prophylla linear or setaceous, 1--3 mm. long, minutely puberulous or strigillose; pedicels mostly obsolete; flowers odorous; calyx campanulate, 1--2 mm. long and wide, mostly brunnescent or nigrescent in drying, externally more or less strigillose, the rim apiculate-dentate, the apiculations mostly divergent, often reflexed; corolla hypocrateriform, varying from white, yellowish-white, or white tinged with purple to whitish-rose, rose, or mauve, sometimes pale-purplish or flesh-color, the tube very slender, cylindric, about 1 cm. long, externally minutely puberulent or glabrate, the limb about 5 mm. wide, the 5 lobes elliptic, about 3 mm. long and 1.5 mm. wide, subequal; stamens 4, inserted just below the mouth of the corolla-tube, long-exserted, projecting 1--1.5 cm. from the corolla-tube, 2 slightly shorter tahn the others; filaments rose-violet; style long-exserted, a little shorter than the stamens, rose-violet; stigma bifid, the branches apically acute; fruiting-pedicels obsolete or to 1 mm. long; fruiting-calyx campanulate, incrassate, usually to about 3 mm. long and 4 mm. wide, externally sparsely strigillose, the rim deeply and irregularly lobed; fruit drupaceous, subglobose, about 5 mm. long and wide, externally glabrous, at first yellowish, later nigrescent, 4-seeded, more or less included by the fruiting-calyx.

Hooker (1829) asserts that this species was "Discovered by Professor Bojer in waste and mountainous places about Tananarivou, the capital of the province of Emirne, in the interior of Madagascar. Seeds were communicated by that gentleman and by C. Telfair, Esq. to Mr. Barclay, at Bury Hill, in whose stove the plants produced blossoms in the month of February, 1824. From these our drawing was made: but it is only fair to observe that I have lately received from Mrs. Telfair a beautiful drawing of this plant, made in the Mauritius, from which it is evident, that the plant as it advances in age becomes larger in all its parts, especially in the leaves, which are twice or thrice the size of those here figured."

The species is known in the wild form only from Madagascar, but is cultivated in Mauritius and in various places in Europe and the United States. It is said to be used as a fumigant and to make a cooling herb-tea, but some collectors have asserted that it is said by natives to be very toxic. In its pubescence and dense terminal inflorescences it closely resembles *C. grevei* Mold. and is certainly also allied to *C. glabrum* var. *vagum* (Hiern) Mold. of southern Africa.

Common and vernacular names recorded for *C. emirnense* are "sasandroy", "small-flowered clerodendrum", "small-flowered Madagascar clerodendron", "tanikisky", and "varikitia".

What appears to be material of the type Bojer collection bears labels inscribed as *Clerodendron diversifolium* Lab. and *C. diversifolium* Vahl. The latter binomial has been regarded by some writers as a possible synonym of *C. emirnense*, but is now regarded as the name-bringing synonym of *C. paniculatum* var. *diversifolium* (Vahl) C. B. Clarke; the *C. diversifolium* credited to Richard belongs in the synonymy of *C. grandiflorum* (Hook.) Schau.

Collectors have encountered *C. emirnense* on dry hills and forested slopes, in dry forests and thickets, wet woods, forest and savoke remnants, and xerophyllous bush on limestone, as well as on gneiss and gneiss-laterite formations, at altitudes of 50--1200 m., in flower in February, April, May, September, October, and December. Loudon (1832) assert that it was introduced into cultivation in England in 1823 from Madagascar. In 1837 Bojer reported it cultivated in Mauritius, while in 1845 Voigt lists it as cultivated in the suburbs of Calcutta, India. Jafri & Ghafoor, in a personal communication to me in 1974, state that it is "Sometimes cultivatio in gardens of Sind [Pakistan] as an ornamental". They cite *Ali s.n.*, *Saida s.n.*, and *Saida, Zaib, & Nuzhat s.n.*, describing the "flowers" as about 1 cm. across and the corolla-tube as "curved". Their statement that the original specimen was "a plant cultivated....in Mr. Barclays store" is a misinterpretation of Hooker's statement in his 1829 description of the plant as having been grown in Mr. Barclay's stove [i.e., hot-house].

The Copenhagen collection, cited below, is said to have been grown in the botanical garden greenhouse there from seeds that came from the West Indies -- the sheet, curiously, is annotated as "*Ricinus*" sp.

The corollas of *C. emirnense* are said to have been "white" on *Croat 30950*, *Humbert 6759*, *Qureshi s.n.*, and *Qureshi & al. s.n.*, "yellowish-white" on *Humbert 12386 & 12871* "rose" on *Catat 122*, *Decary 2500*, and *LeMyre s.n.*, "rose or whitish-rose" on *Decary 6143*, and "mauve" on *Decary s.n.* The inflorescence on *Decary 699* is fasciated.

Woodrow (1889, 1910) describes the species as "A very useful shrubbery species thriving in the Deccan [India] in fair soil when established without irrigation".

A very typical fruiting specimen of *C. emirnense* may be seen on *Perrier 10244* -- this should be compared with the very different fruiting clusters on *Baron 918* representing var. *diffusum* Mold.

It may be worth pointing out here that the Rafinesque (1837) publication, cited in the synonymy and bibliography (above), is often cited in botanical literature by the incorrect titlepage date of "1836". It should also be noted that the plate 1035 accompanying Lindley's 1827 article constitutes the type of *C. pubescens* Lindl. and apparently does not apply to the *C. floribundum* described by him in the text accompanying the plate.

Clerodendrum emirnense is said to be referred to by Willdenow in L., Sp. Pl., ed. 4, 3 (1): 387--388 (1800) or "3 (2). 1802", but I fail to find any reference to it there.

A key to distinguish *C. emirnense* and its subspecific taxa from related Madagascar taxa will be found under *C. baronianum* Oliv. in

the present series of notes.

Material of *C. emirnense* has been misidentified and distributed in some herbaria as *C. aucubifolium* Hemsl., *C. heterophyllum* (Poir.) R. Br., and *Ricinus* sp. On the other hand, the cultivated material from South Africa, distributed as typical *C. emirnense*, actually is its var. *diffusum* Mold., while *Boivin s.n.* [Madagascar, 1847-1852] is *Holmskioldia mira* Mold.

Citations: MADAGASCAR: *Baron 539* (K, P), *656* (P); *Bernard 96070* (P); *Bojer s.n.* (F--photo of type, K--isotype, L--isotype, Ld--photo of type, Mu--784--isotype, Mu--785--isotype, N--photo of type, P--type, P--isotype, P--isotype, Pd--isotype); *Campenon s.n.* [Fev. 1888] (P); *Catat 122* (P); *Croat 30950* (N); *D'Alleisette 379m* (P); *Decary 699* (P), *713* (P), *2500* (P), *6143* (P, W--2495333), *6712* (P), *8533* in part (P), *s.n.* [Ilafy, 4.2.17] (P), *s.n.* [Beloha, 29.8.17] (P), *s.n.* [Beloha, 5.9.17] (P); *Grevé s.n.* [Mouroumvana] (P); *Herb. Jard. Bot. Tananarive 271* (P); *Humbert 6759* (P), *12386* (P), *12871* (P), *14394* (P); *Humblot 641* (P, P); *Lyall 86* in part (K); *s.n.* (Ed); *LeMyre de Vilers s.n.* [20 Octobre 1888] (P); *Perrier 10201* (P), *10244* (N, P), *13219* (P); *Telfair s.n.* (N); *Waterlot 686* (P), *s.n.* [rec. 21 Mai 1919] (P), *s.n.* (P, P). CULTIVATED: Austria: *Herb. Reichenbach s.n.* (V). Denmark: *Herb. Hort. Bot. Hafn. s.n.* [Semina ex Ind. occid.] (Cp, Ld--photo, N, N--photo). England: *Herb. Hort. Barclay s.n.* [15-7-30] (K, N). India: *Woodrow s.n.* [Poona Bot. Gard., May 1880] (K). Mauritius: *N. J. Andersson 10* (P, S). New Jersey: *Guyot s.n.* [Princeton] (Pr). Pakistan: *Qaiser s.n.* [10-3-74] (Kh); *Qureshi s.n.* [12.10.1966] (Kh); *Qureshi, Zaib, & Muzhat s.n.* [25.3.1969] (Kh). Russia: *Herb. Fischer s.n.* [1832] (L). MOUNTED ILLUSTRATIONS: Hooker, Curtis Bot. Mag. 56 [ser. 2, 3]: pl. 2925 (Ba--380841, Ld).

CLERODENDRUM EMIRNENSE f. *DENTATUM* Mold., Bull. Torrey Bot. Club 77: 397. 1950.

Bibliography: Mold., Bull. Torrey Bot. Club 77: 397. 1950; Mold. in Humbert, Fl. Madag. 174: 187, 190, & 267, fig. 30 (9). 1956; Mold., Résumé 155 & 449. 1959; Mold., Fifth Summ. 1: 260 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 248 & 536. 1980; Mold., Phytologia 58: 186. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 187, fig. 30 (9). 1956.

This form differs from the typical form of the species in having most or all of its leaf-blades marginally dentate above the middle with 1 or 2 apically blunt or subacute teeth on each side.

The form is based on *Waterlot 486* from the vicinity of Tananarive, Madagascar, collected in April, 1922, and deposited in the Paris herbarium.

Citations: MADAGASCAR: *Greville 86* (Ed); *Waterlot 29* (P), *486* (F--photo of type, Ld--photo of type, N--photo of type, P--type).

CLERODENDRUM EMIRNENSE var. *DIFFUSUM* Mold., Bull. Torrey Bot. Club 77: 397. 1950.

Bibliography: Mold., Bull. Torrey Bot. Club 77: 397. 1950; Mold., Phytologia 4: 44. 1952; Mold. in Humbert, Fl. Madag. 174: 187, 190--

191, & 267, fig. 30 (10 & 11). 1956; Mold., Résumé 155, 215, & 449. 1959; Mold., Fifth Summ. 1: 260 & 358 (1971) and 2: 864. 1971; Mold., Phytol. Mem. 2: 249, 349, & 536. 1980; Mold., Phytologia 58: 181 & 190. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 187, fig. 30 (10 & 11). 1956.

This variety differs from the typical form of the species in having its cymes much more loose and diffuse during anthesis, mostly wide-spreading, the pedicels sometimes well developed and to 5 mm. long during anthesis, the calyx mostly 2--3 mm. long, the fruiting-pedicels well developed, to 7 mm. long under the terminal flowers, the fruiting-calyx about 4 mm. long and 6--7 mm. wide, and the fruit about 7 mm. long and wide.

The variety is based on an unnumbered Bojer collection [Kew 11. 675] from Madagascar, deposited in the Paris herbarium. The *Baron 918* collection in the Paris herbarium exhibits an especially fine fruiting cluster. The variety is endemic to Madagascar, but apparently has been cultivated in France and South Africa. The vernacular name, "léha", has been recorded for it.

Cloisel describes this plant as a small tree, the corollas white; *Decary 2822* is also said to have had white corollas. Parker refers to the plant as a small tree, 8--10 feet tall. It has been found growing in calcareous thickets and slopes, in tropophilous forests, and in xerophyllous bushland on limestone formations, at 100--350 m. altitude, in flower in June.

The Tepin collection, cited below, is a mixture with *C. heterophyllum* (Poir.) R. Br. The specimen cultivated in France, also cited below, was grown from seeds sent by Poisson, as no. F.211-A.599, collected at Tulear, Madagascar, in 1921.

Citations: MADAGASCAR: *Baron 918* (K, P, P); *Bojer s.n.* [Kew 11. 675] (F--photo of type, Ld--photo of type, N--photo of type, N--isotype, P--type, P--isotype, P--isotype, Ut--115531b--isotype); *Cloisel 36* (P); *Decary 2822* (P), *4407* (P), *9563* (P), *9574* (P), *10715* (P); *Hooker s.n.* (T); *Humbert 20002* (P); *Lyall 86* in part (K); *G. W. Parker s.n.* [Andramasina] (K); *Rutenberg s.n.* [Abeloma, 1877] (P); *Tepin s.n.* [Herb. Reichenbach f. 134547 in part] (V). CULTIVATED: France: *Herb. Mus. Paris s.n.* (P). South Africa: *Herb, Crooke s.n.* [Garden of Baron von Ludwig] (N).

CLERODENDRUM ERECTUM DeWild., Feddes Repert. Spec. Nov. 13: 145 [as "*Clerodendron*"]. 1914; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 46, 83, & 93. 1936

Synonymy: *Clerodendron erectum* DeWild., Feddes Repert. Spec. Nov. 13: 145. 1914.

Bibliography: DeWild., Feddes Repert. Spec. Nov. 13: 145. 1914; Fedde & Schust., Justs Bot. Jahresber. 42: 252. 1920; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 17, 46, 83, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48 & 89 (1942) and ed. 2, 115 & 181. 1949; Mold., Résumé 141, 148, 426, & 449. 1959; Mold., Résumé Suppl. 1: 9. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Bouquet, Invent. Pl.

Méd. Tox. Cong. Braz. 32. 1967; Mold., Fifth Summ. 1: 228, 235, & 245 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 217, 218, 225, 385, & 536. 1980; Mold., Phytologia 58: 358 (1985) and 59: 110. 1986.

A low subshrub or shrub, 0.7--1 m. tall; branches erect, to 40 cm. long, brachiate, glabrous or sparsely pilose; leaves decussate-opposite or whorled, the blades obovate-lanceolate, 5--13 cm. long, 0.9--2.1 cm. wide, marginally irregularly short-denticulate, basally long-attenuate, glabrous or sparsely pilose above, sparsely pilose beneath; inflorescence paniculate, more or less long-pedunculate and branched; peduncles to 5 cm. long; flowers subfasciculate in groups of 3 or more, pedicellate; pedicels to 5 mm. long, basally bracteolate; bractlets 2--4 mm. long; calyx 5--6 mm. long, externally glabrous or sparsely pilose, the lobes apically rounded, marginally ciliate; corolla zygomorphic, light-blue, its tube about 7 mm. long, curvate, externally glabrous or sparsely velutinous, the lobes unequal, about 7 mm. long, dorsally sparsely velutinous, marginally ciliate; stamens exserted about 2 cm. from the corolla-mouth, curvate; anthers 1.3 mm. long; style exserted; stigma bilobed, the lobes spreading and to 4 mm. long; fruit drupaceous, "double", black.

This species is based on *Ad. Hock s.n.* from the Upper Katanga region of Zaire, collected in 1911, and deposited in the Brussels herbarium. DeWildeman (1914) comments that "*C. Corbisieri, C. Ringoeti* und *C. erectum* gehören zu der sehr wenig bekannten Gruppe von *C. myricoides*, und sind verwandt mit *C. luembensis* DeWild."

Bouquet (1967) lists *C. erectum* among his medicinal and/or poisonous plants of Congo Brazzaville, without specifying the use to which it is put. Collectors have encountered it at 1330 m. altitude, in flower in February and July, and in fruit in January and February.

Peter describes the leaves as somewhat leathery and the flowers "oberständig, wird dunkel". Thomas (1936) cites only the type collection, claiming that the stamens are exserted from the corolla-mouth by "höchstens 3/4 cm", but I suspect that he saw only immature flowers.

Material of *C. erectum* has been misidentified and distributed in some herbaria as *C. myricoides* var. *camporum* Gürke and as *Aeolanthus quarrei* DeWild.

Citations: ZAIRE: *DeGiorgi 271* (Br, N), *280* (Br); *Hock s.n.* [1911] (Br--type, Br--isotype, Ld--photo of type, N--isotype, N--photo of type); *Kevers B.27* (Br, Br); *Quarré 70* (Br), *3745* (Br, Br, Br), *4954* (Br); *W. Robyns 1546* (Br, Br, Br, N). ZAMBIA: *Vet. Officer CRS.327* (Af). TANZANIA: Tanganyika: *Peter 35512* [V.135] (B), *35584* [V.136] (B), *36248* [V.146] (B), *36374* [V.147] (B), *37042* (B).

CLERODENDRUM ERIOPHYLLOIDES Mold., Phytologia 9: 183--184. 1962.

Bibliography: Mold., Phytologia 9: 183--184. 1963; Mold., Résumé Suppl. 7: 6. 1963; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1963: 60. 1964; Hocking, Excerpt. Bot. A.7: 454. 1964; Mold., Résumé Suppl. 15: 7 & 8. 1967; G. Taylor, Ind. Kew. Suppl. 14: 34. 1970; Mold., Fifth Summ. 1: 239 & 250 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 229, 240, & 536. 1980.

A many-stemmed shrub, 2--5 m. tall; branches and branchlets slen-

der, rather densely grayish pilose with more or less antrorsely subappressed hairs, less so or glabrescent in age, obtusely tetragonal, the youngest ones sulcate; principal internodes 1--6.5 cm. long; leaf-scars large, corky, prominently elevated; leaves decussate-opposite or ternate; petioles slender, 1.4--2.4 cm. long, rather densely pilose like the branchlets; leaf-blades thin-chartaceous, oblong-ovate, 4.5--10.5 cm. long, 2.5--5.5 cm. wide, apically acute, marginally entire, basally acuminate, rather lightly short-puberulent above, more densely so beneath; midrib slender, flat above, prominulous beneath; secondaries very slender, 5 or 6 per side, arcuate-ascending, flat above, prominulous beneath; veinlet reticulation rather obscure on both surfaces; inflorescence axillary, clustered at the tips of the branchlets and appearing as though terminal, cymose, many-flowered, rather loose, not at all congested nor conglobate; peduncles very slender, 3--4 cm. long, rather densely antrorsely pilose like the branchlets, the individual cymes many times dichotomous, pilose like the peduncles; calyx obconic, its tube about 2 mm. long, the rim 5-aristate, the tube and teeth externally rather densely pilose; corolla hypocrateriform, white or cream-color, its tube very slender, about 9 mm. long, the limb about 6 mm. wide.

The species is based on *Mrs. Helen G. Faulkner 2785* from shade or semi-shade in coastal scrub at Chukwani, Zanzibar, collected on March 21, 1961, and deposited in the Stockholm herbarium.

The species has been collected in anthesis in January, March, and April, mostly close to the sea, from sealevel to 400 m. altitude. Torre & Paiva found it in "floresta aberta de *Brachystegia* spp., solos argiloso-arenosos negros" and "no recife de coral". They describe the corollas as "white" on their *no. 10113* and "cream-color" on *no. 12124*. The former collection is described by George Taylor, in a personal communication to me dated June 13, 1966, as "A very close match to the type. It is likely that *Torre & Paiva 12124* is also this species despite the narrower leaves."

Citations: TANZANIA: Zanzibar: *Mrs. H. Faulkner 2785* (Ld--isotype, S--type). MOZAMBIQUE: Cabo Delgado: *Torre & Paiva 10113* (Ul), *12124* (Ld, Ul).

CLERODENDRUM EUCALYCINUM Oliv. in W. Hook., Icon. Pl. 23: pl. 2242 [as "*Clerodendron*"]. 1892; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89. 1942.

Synonymy: *Clerodendron eucalycinum* Oliv. in W. Hook., Icon. Pl. 23: pl. 2242. 1892.

Bibliography: Oliv. in W. Hook., Icon. Pl. 23: pl. 2242. 1892; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; Stapf, Ind. Lond. 2: 238. 1930; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 89 (1942) and ed. 2, 123 & 181. 1949; Mold. in Humbert, Fl. Madag. 174: 148, 173--176, & 267, fig. 27 (3). 1956; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 155 & 449. 1959; Mold., Fifth Summ. 1: 260 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 249 & 536. 1980; Mold., Phytologia 58: 185. 1985.

Illustrations: Oliv. in W. Hook., Icon. Pl. 23: pl. 2242. 1892;

Mold. in Humbert, Fl. Madag. 174: 175, fig. 27 (3). 1956.

A shrub or tree, to 8 m. tall; branches and branchlets rather coarse, gray, corky, glabrous, conspicuously raised-lenticellate; twigs more slender, gray, obtusely tetragonal or somewhat flattened, glabrous, conspicuously lenticellate; Nodes not annulate; principal internodes 2.5--4.5 cm. long; leaves decussate-opposite; petioles medium-slender, 4--12 mm. long, flattened and canaliculate above, glabrous, often slightly submargined above; leaf-blades thin-coriaceous, bright-green and shiny on both surfaces or slightly lighter beneath, obovate-elliptic or obovate, 5--16 cm. long, 1--6 cm. wide, apically mostly rounded or obtuse, sometimes acute or very shortly apiculate-acuminate, marginally entire or often slightly revolute, basally cuneate-attenuate or acuminate, glabrous on both surfaces; midrib slender or strong, mostly flat above, very prominent beneath; secondaries slender, 6--8 per side, flat above, sharply prominent beneath, divergent, slightly ascending, conspicuously arcuate-joined some distance from the margins beneath; vein and veinlet reticulation rather subprominulous on both surfaces; inflorescence axillary or terminal, usually concentrated at the tips of the branchlets, cymose, few-flowered, short-pedunculate or subsessile; peduncles mostly obsolete or nigrescent and glabrous; cyme-branches obsolete or 1--2 cm. long, nigrescent, compressed, stout, glabrous; pedicels stout, nigrescent, 1.3--2.5 cm. long, glabrous, shorter than the calyx; bracts oblanceolate-linear or spatulate, foliaceous, often 1--2.5 cm. long; bractlets ovate-triangular or linear, 2--5 mm. long; calyx coriaceous, nigrescent, heavy and firm, obconic-campanulate or tubular, 3--3.5 cm. long, 1.3--1.8 cm. wide, very obscurely parallel-veined, the rim 4-lobed, the lobes ovate, 4--5 mm. long, apically rounded or obtuse; corolla white, whitish-rose, or violet, 7.5--10 cm. long, its tube very narrow-cylindric except at the ampliate infundibular apex, 5--6 cm. long when fully developed, externally glabrous, the limb obliquely split, 3--5 cm. wide, the lobes 5, elliptic, about 2 cm. long, 1.2--1.5 cm. wide, apically rounded; filaments exserted 2--2.5 cm. from the corolla-mouth, glabrous; anthers oblong-elliptic, about 3 mm. long, versatile; style equaling the stamens; stigma bifid, the lobes subulate.

This endemic Madagascar species is based on *Baron 6263* collected in or before January, 1892, in Madagascar and deposited in the Kew herbarium.

Collectors have encountered this plant in jungles at 500 m. altitude, in flower in February and June. The corollas are said to have been "white" on *Decary 6*, "whitish-rose" on *Decary 2222*, and "violet" on *Hildebrandt 3899*.

A key to distinguish this species from its relatives in Madagascar will be found under *C. baronianum* Oliv. in the present series of notes.

Citations: MADAGASCAR: *Baron 6263* (F--photo of type, K--type, Ld--photo of type, N--photo of type, P--isotype); *Bellamy s.n.* [1886] (P); *Decary 2* (P), *6* (P), *2222* (P); *Hildebrandt 3899* (N, P); *Humbert 18063* (P); *LeMyre de Vilers s.n.* [1887] (P).

CLERODENDRUM EUPATORIOIDES J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293 & 295--296 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 33, 55, & 93. 1936

Synonymy: *Clerodendron eupatorioides* J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293 & 295--296. 1900.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293 & 295--296. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 495. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 273 & 275. 1931; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 33, 55, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 89 (1942) and ed. 2, 113 & 181. 1949; Mold., Résumé 139 & 449. 1959; H. Huber in Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 2, 439 & 442. 1960; Mold., Résumé Suppl. 9: 3. 1964; Mold., Fifth Summ. 1: 223 & 444 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 213 & 536. 1980; Mold., Phytologia 58: 438. 1985.

An erect herb, 1.2--2 m. tall; stems and branches slender, herbaceous, deeply sulcate, finely glandular-pilose; internodes hollow; leaves decussate-opposite; petioles elongate, to 5 cm. long; leaf-blades membranous, ovate or deltoid-ovate, 6--10 cm. long, 4--6 cm. wide, apically acute or acuminate, marginally crenate or obtusely dentate, glabrate above, obscurely pubescent or puberulent on the venation beneath; inflorescence terminal, globose, dense, clustered; bracts lanceolate; calyx campanulate, 0.8--1.5 cm. long, externally pubescent, deeply divided almost to the base, the lobes linear or lanceolate, about 1 cm. long, much longer than the tube, less than 2 mm. wide; corolla white, about 3.3 cm. long, the limb oblique, 1.2--2 cm. long, the lobes oblong, subequal, not reaching to the base of the limb; stamens shorter than the corolla-limb; anthers large.

This puzzling species is based on *Mann 1295*, from 2000 feet altitude in the Cameroon Mountains of Cameroons, collected in flower in December and deposited in the Kew herbarium.

Because of the short stamens, included in the corolla, this species is placed into a monotypic Section *Stenocalyx* by Thomas (1936), who comments that "Das geringe Material gestattet keine Nachprüfung der Fruchtknotenverhältnisse; die Zugehörigkeit dieser Art zur Gattung ist daher noch nicht bewiesen". Huber (1963) agrees, saying: "This plant, the fruits of which are unknown, must be regarded as doubtfully belonging in *Clerodendrum*". For a key to distinguish it from some other African taxa, see under C. *capitatum* var. *conglobatum* (J. G. Baker) Thomas in the present series of notes.

Nothing is known to me of this taxon beyond what is give in its bibliography (above).

CLERODENDRUM EUROPAEUM Ettingsh. & Gardn., Proc. Roy. Soc. Lond. 30: 233 nom. nud. [as "*Clerodendron*"]. 1880; Mold., Prelim. Alph. List Inv. Names 19. 1940.

Synonymy: *Clerodendron europaeum* Ettingsh. & Gardn., Proc. Roy. Soc. Lond. 30: 233. 1880.

Bibliography: Ettingsh. & Gardn., Proc. Roy. Soc. Lond. 30: 233. 1880; Mold., Prelim. Alph. List Inv. Names 19. 1940; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed.

1, 75 & 89 (1942) and ed. 2, 166 & 181. 1949; Mold., Résumé 226, 262, & 449. 1959; Mold., Fifth Summ. 1: 375 & 444 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 368 & 536. 1985.

Ettingshausen & Gardner (1880) say merely that "Very diagnostic leaves of.....a *Clerodendron* allied to the East Indian *C. viscosum* Vent. are found, but rarely" in the Alum Bay, England, fossil beds of Early Tertiary age.

Nothing is known to me of this fossil species beyond what is stated in its meager bibliography (above).

CLERODENDRUM EURYPHYLLUM Mildbr., Notizbl. Bot. Gart. Berl. 11: 679--680 [as "*Clerodendron*"]. 1932; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 36, 63, & 93. 1936.

Synonymy: *Clerodendron euryphyllum* Mildbr., Notizbl. Bot. Gart. Berl. 11: 679--680. 1932.

Bibliography: Mildbr., Notizbl. Bot. Gart. Berl. 11: 679--680. 1932; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 9, 14, 36, 63, & 93. 1936; A. W. Hill, Ind. Kew. Suppl. 9: 68. 1938; Fedde & Schust., Justs Bot. Jahresber. 60 (2): 571. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47, 49, 50, & 89 (1942) and ed. 2, 113, 116, 118, & 181. 1949; Mold., Résumé 144 & 449. 1959; Mold., Fifth Summ. 1: 235 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 225 & 536. 1980; Mold., Phytologia 58: 330. 1985.

A shrub, 2--4 m. tall; flowering branches apically villous with unequal, multicellular, spreading, pale-brown hairs, apparently later glabrescent; leaves among the largest in the genus, decussate-opposite; petioles 2--7 cm. long, villous; leaf-blades chartaceous, ovate-rotund or subrhomboid, 10--20 cm. long and wide, apically obtuse but the very apex itself broadly acuminate, marginally coarsely dentate (the teeth broadly subacute or obtuse and apically excurrent) and ciliate, basally broadly rounded or rarely the very base somewhat cordate with broad sinuses, rather densely pilose above with many-celled, weak, prostrate hairs, spreading-pilose on the venation beneath, the uppermost leaves beneath the inflorescence much smaller, subsessile, ovate, and apically long-acuminate; midrib more or less impressed above, prominent and spreading-pilose beneath; secondaries 6 or 7 per side, more or less impressed above and spreading-pilose beneath; vein and veinlet reticulation more or less impressed above and spreading-pilose beneath; inflorescence capitate, dense, subglobose, somewhat smaller than the leaves and raised somewhat above them, to 5 cm. long; calyx about 2.5 cm. long, violet-brown in drying, externally more or less scarious with weak many-celled hairs, the tube subcylindric below, narrowly infundibular-ampliate above, the lobes broadly lanceolate, erect, apically very long-subulate-acuminate, 18 mm. long and 4 mm. wide, with a thick midrib and slender pairs or reticulately joined veins on each side, marginally conspicuously long-ciliate; corolla white, its tube among the longest in the genus, to 17 cm. long and only 1.5 mm. in diameter, externally glandular-pubescent, the lobes oval or obovate-oblong, 1.5 cm. long, 5 mm. wide; stamens inserted in the corolla-tube; filaments exserted about 3 cm. from the corolla-mouth; anthers oblong,

about 3 mm. long; style exserted about 3 cm.; stigma shortly bifid.

This species is based on *J. J. Schlieben 2048* from a rocky savanna with groups of trees, at 1000 m. altitude, Mahenge, Tanganyika, collected in flower on April 6, 1932, and deposited in the Brussels herbarium. The collector notes that the plants grew very scattered among rocks. Mildbraed (1932) comments that the species is "Verwandt mit *Cl. angolense* Gürke und dem diesem sehr nahestehenden, wenn nicht mit ihm identischen *Cl. Poggei* Gürke, aber gut verschieden durch die eigenartige Blattform, die grossen Randzähne, die zottige Behaarung der oberen Stengelteile und die verhältnismässig wenigblütigen Blütenköpfe". It should be noted that I regard *C. angolense* and *C. poggei* as conspecific (see under *C. angolense* in these notes).

Mildbraed's detailed description of the leaf-blades is worth repeating here: "apice (toto ambitu) obtusa (lineis apices dentium superiorum conjungentibus inter sese angulum rectum vel etiam ampliorum includentibus), summo apice late acuminata, margine praeter basin integram grosse dentata, dentibus latis subacutis vel obtusis nervo excurrente apiculatis". His description of the inflorescence is: "Inflorescentia capitato-conferta et (quoad capitulum calycibus offormatum) pro folia parva et supra ea paulo elata".

Thomas (1936) erroneously cites the original description to page "107" instead of to pp. 679--680.

Thus far the species is known (to me) only from the original collection.

Citations: TANZANIA: Tanganyika: *Schlieben 2048* (B--isotype, Br--type, Ld--photo of isotype, Mu--isotype, N--fragment of isotype, N--photo of isotype, S--isotype).

CLERODENDRUM EURYPHYLLUM var. *GLABRUM* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 63. 1936.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 63. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47, 50, & 89 (1942) and ed. 2, 113, 118, & 181. 1949; Mold., Résumé 139, 146, & 449. 1959; Mold., Fifth Summ. 1: 223 & 242 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 213, 232, & 536. 1980.

This variety differs from the typical form of the species in having the leaves only sparingly hairy or even subglabrous.

The variety is based on *Tessmann 2076* from Nola Mbaiki, "Neu-Kamerun", Cameroons, collected on October 25, 1913, and deposited in the Berlin herbarium, now destroyed. Thomas (1936) cites also *Nolde 293* from Angola.

Nothing is known to me about this taxon beyond what is stated in its bibliography (above).

CLERODENDRUM EXCAVATUM DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: 132--134 [as "*Clerodendron*"]. 1909; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 63 & 93 in syn. 1936.

Synonymy: *Clerodendron grandifolium* Gürke, Engl. Bot. Jahrb. 18: 173. 1893 [not *Clerodendrum grandifolium* Salisb., 1796]. *Clerodendron excavatum* DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: 132--133. 1909. *Clerodendron excavatum* var. *rotundum* DeWild., Ann. Mus.

Congo Belg. Bot., ser. 5, 3: 133 & 134, pl. 11, fig. 4. 1909.

Bibliography: R. A. Salisb., Prod. Stirp. Chap. Allert. 108. 1796; Gürke, Engl. Bot. Jahrb. 18: 173. 1893; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 294 & 307. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: 132--134, pl. 11, fig. 4. 1909; DeWild., Étud. Fl. Bas- Moyen-Congo 3: 132--134, pl. 11, fig. 4 (1909) and 3: 468. 1912; DeWild., Bull. Roy. Soc. Bot. Belg. 51 (3) [ser. 2, 1]: 192. 1913; DeWild., Compt. Rend. Hebdmad. Seanc. Mem. Soc. Biol. 72: 582--584. 1920; Bequaert in Wheeler, Bull. Amer. Mus. Nat. Hist. 45: 443--444. 1922; DeWild., Pl. Bequaert. 2: 261. 1922; Stapf, Ind. Lond. 2: 238. 1930; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 6--8, 37, 63, & 93. 1936; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47, 48, & 90 (1942) and ed. 2, 113, 115, & 181. 1949; Mold., Alph. List Cit. 1: 4: 1153. 1949; Durand & Jacks., Ind. Kew.. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 139, 141, 216, 262, & 450. 1959; Grout de Beaufors & Schnell, Mém. Inst. Fond. Afr. Noire 75: 9 & 40--41, pl. 9, fig. E. 1960; Mold., Fifth Summ. 1: 223. 228, 358, & 444 (1971) and 2: 866. 1971; Mold., Phytol. Mem. 2: 214, 218, 349, & 537. 1980; Mold., Phytologia 57: 346 (1985) and 58: 303 & 442. 1985.

Illustrations: DeWild., Ann. Mus. Congo Belg. Bot., ser 5, 3: 43, pl. 11, fig. E. 1909; DeWild., Étud. Fl. Bas- Moyen-Cong. 3: pl. 11, fig. E. 1909; Grout de Beaufort & Schnell, Mém. Inst. Fond. Afr. Noire 75: pl. 9, fig. E. 1966.

An aromatic subshrub, shrub, or tree, 1--4 m. tall, or liana; branches hollow, probably myrmecophilous, glabrous, spinose; leaves decussate-opposite or sometimes subalternate or alternate, large, long-petiolate; petioles 3.5--9 cm. long. flattened and canaliculate above, articulate toward the base, the basal 6--9 mm. remaining as a spine after the leaves have fallen; leaf-blades oval or lanceolate-obovate to obovate, 25--30 cm. long, 12--14 cm. wide, apically more or less abruptly acuminate, marginally entire, basally attenuate to broadly cuneiform or rounded, glabrous on both surfaces; midrib conspicuous on both surfaces; 3 basal secondaries very conspicuous, impressed above, prominent beneath; inflorescence cauline or terminal, capitate or densely umbellate, long-pedunculate (or subsessile when cauline), bracteate; bracts often violet in color; bractlets and prophylla small, 1--2 (rarely 3) mm. long, subcylindric, elongate awl-shaped or subulate, much shorter than the peduncles, marginally sparingly beset with stiff hairs; pedicels 1--1.2 mm. long, apically gradually merging into the calyx-base; flowers inodorous, nutant; calyx infundibular or tubular-cyathiform, 1.8--2.5 cm. long, externally green or rose to rose-violet. internally reddish or violet-red, deeply 5-parted, the lobes ovate-lanceolate, basally 6--7 mm. wide, membranous, apically long-acuminate, glabrous on both surfaces but marginally sparingly ciliate with rather stiff, spreading, many-celled hairs, conspicuously prominulent-veined; corolla long-tubular or hypocrateriform, mostly white or cream-color, the tube slender, 13--17 cm. long, externally glabrous, incurved, apically inflated, the limb 5-lobed, the lobes unequal; stamens very long-exserted; filaments about 4 cm. long, white; style pale-green,

about 17 cm. long.

The species is apparently based on *J. Solheid s.n.* from the vicinity of Yambuya, Zaire, collected in 1908, deposited in the Brussels herbarium. It is said by DeWildeman to have definitely cauline, not terminal inflorescences, thus differing from typical *C. grandifolium* Gürke. There is some question, also, whether *C. excavatum* is validly published and therefor available as the accepted designation for this taxon. DeWildeman (1909) seems to have proposed two varieties without a formal description of the species itself. Still, it seems rather obvious that he intended what he called *C. excavatum* var. *rotundum* to be the typical variety, with illustration, and it has been so regarded by Thomas (1936).

It is most unfortunate that the earlier name, *C. grandifolium* Gürke, an aptly descriptive name, is not available, since it is antedated by the *C. grandifolium* of Salisbury published 97 years earlier for the *Tsjeron theka* of Ray [now known as *Clerodendrum serratum* (L.) Moon]. I am indebted to my longtime friend and colleague, Dr. Rupert Barneby, for investigating this matter. Salisbury's proposal is: "Grandifolium. 2. C.? foliis lanceolatis serratis, subtus praesertim pulverulentis, nervosis, rigidis. Tsjerou Theka. Rheed. Hort. Mal. v. 4. p. 61. t. 29. Ex facie forsan hujus vel sequentis Generis."

Dr. Barneby, in a communication to me dated 27 January 1986, says: "There is a provision in the Code that rejects a name when its author expresses uncertainty about publishing it, or in what rank he publishes it. But a species that is described, and only its generic position questioned, has all the privileges and priorable qualities of a species squarely placed in its generic context. I don't think there is any way around Salisbury's intent to describe a new species, the query, in my opinion, being merely as to the genus adopted."

If Gürke's *C. grandifolium*, based on *Mechow 530*, from near the Quango [Kuango] River, Majakalla District, Angola, collected in flower in November 1880, is not available as the name for this taxon, then DeWildeman's *C. excavatum*, if, indeed, it be regarded as validly published, is the only other name available -- the question still remaining if it is really conspecific with Gürke's plant, as Thomas asserts that it is.

DeWildeman (1909) comments that the stems of this plant seem to be inhabited by ants of the genus *Crematogaster*, as they are in *C. angolense* Gürke, *C. triplinerve* Rolfe, *C. rotundifolium* Oliv., and *C. fistulosum* Becc. -- "Chez les *C. angolensis* et *excavatum*, les rameaux latéraux, naissant a l'aisselle des feuilles tombées, sont également creux mais leur cavité n'est pas en continuite avec celle du rameau principal; une cloison basilaire sépare les deux cavités."

Bequaert (1922) comments that "A number of species of *Clerodendron* have been found associated with ants, but the few published observations are too fragmentary to show whether any of the forms are true myrmecophytes. Among the African representatives, *Clerodendron excavatum* E. De Wildeman...is myrmecophilous according to certain observers, while others assert that its hollow stems are merely filled with water. At all events, ants were never found inside the stems

of that plant. At Penge, in January, 1914 (Coll. No. 2205), I collected on the bank of the Ituri River in the dense undergrowth of the forest a low bushy *Clerodendron* which may possibly be *C. excavatum*. The plant was 3 to 4 m. high and divested of leaves at that season of the year. Some of the branches, however, were covered with numerous, white, showy flowers, obliquely directed downward. No swelling or domatia could be found, but the internodes of stem and branches were normally hollow, due to the early resorption and drying up of the pith. Many of the hollow internodes contained nests, with a fertile queen, workers, brood, and newly hatched winged sexual forms of a small, unidentified ant. The insects entered and left by a circular entrance pierced through the wall about half-way between two nodes. In certain cases the partition at the nodes had not been removed, whereas in others the entire limb formed one continuous nesting cavity. An internode of one of the living branches was occupied by a nest of a small solitary bee belonging to the genus *Allodape*."

A key to distinguish at least some of the tropical African taxa of *Clerodendrum* from the present species will be found under *C. buchneri* Gürke in the present series of notes.

Baker (1900) cites only the original type collection of *C. grandifolium*; Grout be Beaufort & Schnell (1966) cite *Letouzey 2307* & *2349* from French Cameroons and *Schlieben 2751* from Tanganyika. Thomas (1936) cites *Mechow 530* and *Solheid s.n.* from Zaire and *Zenker 516* from the Cameroons.

It may be noted here, in passing, that Gürke's original (1893) description of this species is sometimes cited as "1894", the titlepage date; similarly, DeWildeman's 1913 work is sometimes cited as "1912", again, the titlepage date. DeWildeman, in his 1922 work, mis-cites his 1909 discussion of this plant as on page "122" instead of page 132.

Collectors have encountered this plant on terra firma in virgin forests of *Scorodophloeus zenkeri* and of *Macrolobium dewevrei*, as well as in forests in general, at altitudes of 470--1000 m., in anthesis in January, May to July, and November.

The corollas are described as having been "white" on *Gillardin 303* and *Lebrun 1702*, "cream" on *Louis 9981*, "creamy-white" on *Louis 3836*. "greenish-white" on *Louis 6681*, and "the tube pale-green, the lobes white or snow-white" on *Louis 4226* & *10477*.

Vernacular names reported for this species are "bakarotilu", "bimbu", "hortilu", "mbambake", "mbambake ya ngunda", "mudiantondo", "museke", "nganyahe", and "tmi".

The hollow stems are used by natives in Zaire to make whistles and pipe-stems. Louis refers to the plant as an "arbuste sciaphile" or "ombrophile", and speaks of the inflorescences as "très grosses ombelles subsessiles caulinaires; bractées florales violet-rouges". On *Gille 269* one can see some opposite and some alternate leaves on the same specimen.

Renier 79, cited below, is a mixture with *C. capitatum* var. *vanderysti* Mold.; *Vanderyst 19139* is a mixture with *C. fuscum* Gürke, while *Vanderyst 9932* determined by Staner in 1937 as *C. grandifolium*

and by DeWildeman as C. *excavatum* var. *rotundum*, is a mixture of some amaryllidaceous flowers and unknown leaves.

Material of C. *excavatum* has been misidentified and distributed in some herbaria as C. *angolense* Gürke.

Citations: ZAIRE: *Achten 761* (Br, Br, N); *Boone 39* (Br, N); *Callewaert s.n.* (Br); *DeGiorgi 1065* (Br, N); *Deleval s.n.* [Mayombe 1909] (Br); *DeWulf 522* (Br), *596* (Br, N); *Dijor 97* (Br); *G. Gilbert 1655* (Br); *Gillardin 303* (Br, Br, Br), *590* (Br, Br, Br); *Gille 269* (Br, Br, Br, Br, Br); *Gillet s.n.* [acc. 1924] (Br, Br, Br, N); *Hulstaert 540* (Br); *Lebrun 1702* (Br, Br); *Ledoux & Huyghe 51* (Br); *Lowis 1035* (Br), *3836* (Br, N), *4226* (Br, Ld--photo, N--photo), *6681* (Br), *9981* (Br), *10477* (Br); *Overlaet 985* (Br, Br); *Pere Van 1* (Br); *Renier 79* in part (Br); *Solheid s.n.* [Env. de Yambuya, 1906] (Br--type, Ld--photo of type, N--photo of type); *Vanderyst 10909* (Br), *14814* (Br), *19139* (Br); *Vermoesen 83* (Br). CULTIVATED: Zaire: *Gillet s.n.* [1926] (Br, Br, Br, Br, Br, N); *Schouteden 126* (Br, Br). MOUNTED ILLUSTRATIONS: DeWildeman, Étud. Fl. Bas- Moyen-Congo pl. 11, fig. 4. 1909 (N); Grout de Beaufort & Schnelle, Mem. Inst. Fond. Afr. Noire 75: 43, pl. 11, fig. E. 1966 (Ld, Z).

CLERODENDRUM EXCAVATUM var. *CUNEATUM* DeWild., Ann. Mus. Congo Belg. Bot., ser. 5. 3: 132--133, pl. 11, fig. 1--3 [as "*Clerodendron*"]. 1909; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 63 in syn. 1936.

Synonymy: *Clerodendron excavatum* var. *cuneatum* DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: 132--133, pl. 11, fig. 1--3. 1909. *Clerodendrum grandifolium* var. *cuneatum* (DeWild.) Thomas, Engl.Bot. Jahrb. 68: [Gatt. Clerod.] 63. 1936.

Bibliography: DeWild., Etud. Fl. Bas- Moyen-Congo 3: pl. 11, fig. 1--3. 1909; DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: 132--133, pl. 11, fig. 1--3 (1909) and ser. 5, 3: 468. 1912; Stapf, Ind. Lond. 2: 238. 1930; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 6 & 63. 1936; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47, 48, & 90 (1942) and ed. 2, 113, 115, & 181. 1949; Mold., Résumé 139, 141, 262, & 450. 1959; Mold., Fifth Summ. 1: 223, 228, & 444 (1971) and 2: 866. 1971; Mold., Phytol. Mem. 2: 214, 218, & 537. 1980.

Illustrations: DeWild., Ann. Mus. Congo Belg. Bot., ser. 5, 3: pl. 11, fig. 1--3. 1909; DeWild., Étud. Fl. Bas- Moyen-Congo 3: pl. 11, fig. 1--3. 1909.

This variety differs from the typical form of the species in its cuneiform leaf-blades and red corollas. It is based on *Laurent 1913* from Mogandjo, Zaire, collected in March of 1906 and deposited in the Brussels herbarium..

DeWildeman's original (1909) description of the variety is: "Frutex 1--3 cm. alt. [obviously a typographic error for 1--3 m.]; ramis glabris, cavis, spinescentibus; foliis adultis plus minus longe petiolatis, glabris, petiolo 5.8 cm. longo, articulato; lamina basi cuneata, apice plus minus abrupte acuminata, 24--35 cm. longa et 9--12 cm. lata; nervis basilaribus 3, nervis lateralibus circ. 6--7, supra excavata, subtus prominentibus; floribus capitulatis, densis."

[to be continued]

A NOTE ON THE STATUS OF SIDALCEA CAMPESTRIS GREENE (MALVACEAE)

Richard R. Halse
4535 NW Beta Place, # 3
Corvallis, Oregon 97330

Judith B. Glad
1400 N Holman
Portland, Oregon 97217

Sidalcea campestris Greene is an endemic of the Willamette Valley of western Oregon (Hitchcock, 1957). Hitchcock and Cronquist (1961) state that the species occurs from Portland, Oregon, southward, and is found in dry fields and along roadsides. Sidalcea campestris is an herbaceous perennial up to 2 m tall and can be recognized by the paleness of its flowers, which range from almost white to pale lavender to pale pink to rarely dark pink.

The species is currently listed by the Fish and Wildlife Service (1985) as a Category 2 plant. Ayensu and DeFilipps (1978) considered it to be endangered. Siddall et al. (1979) write that Sidalcea campestris was once a common Willamette Valley dry prairie endemic. According to them, it now survives along fencerows and roadsides and, although it is still locally common in the Salem area, it has disappeared from much of the rest of the Willamette Valley. They recommend that it be considered endangered (Sidadall, et al., 1979). Meinke (1982) also states that the species is now primarily found in the central portion of its range. The Oregon Natural Heritage Data Base (1985) has Sidalcea campestris on its list of taxa currently limited in abundance throughout its range, but currently stable. They consider the species to be local or limited enough to require monitoring of the populations.

Hitchcock and Cronquist (1961) write that Sidalcea campestris grows in dry fields, along roadsides, and in fencerows. Recent investigations in the Willamette Valley have shown this species to be very common in these habitats. Sidalcea campestris can be easily found growing along Interstate 5 between Wilsonville and Eugene, along State Route 99W from Newberg to Junction City, and along most secondary and tertiary roads in the Willamette Valley and, indeed, up into the foothills of the Coast Range. For example, during an intensive survey of western Yamhill County in 1985, it was found along every road traveled. Sidalcea campestris is abundant in fencerows and is a dominant member of the flora of

those areas -- places which are usually occupied by European weeds. In such places, Sidalcea campestris is commonly associated with Festuca arundinacea Schreb., Dactylis glomerata L., Holcus lanata L., Daucus carota L., Vicia spp., Rubus spp., and Rosa spp.

Sidalcea campestris is presently found from Multnomah County in the northern end of the Willamette Valley to Lane County in the south. During the summer of 1985, it was seen to be a major component of roadside vegetation in Yamhill, Marion, Polk, Linn and Benton Counties. There have also been recent sightings or collections of Sidalcea campestris in Multnomah, Washington, Clackamas, and Lane Counties.

The habitat of Sidalcea campestris is one which is not endangered by human activities. The species grows most abundantly on roadsides and along cultivated field margins, both areas where it must certainly be exposed to some sort of periodic vegetation management practices. At a site in Beaverton, Oregon, it was found immediately adjacent to a sidewalk which was constructed within the past five years, yet the plants appeared vigorous and had not been apparently affected by the construction. Plants growing along Interstate 5 were in areas that are mowed at least annually, as were those along SR 99W and county roads.

The observations made in 1985 indicate that Sidalcea campestris is much more abundant in the Willamette Valley than has been reported. Its occurrence in habitats which support a weedy flora indicates that it is not in any way restricted to remnants of native vegetation. Its presence in areas such as roadsides and field margins show that it is tolerant of some human activity. We therefore recommend that the status of Sidalcea campestris be reviewed, and that it be either delisted or reduced to Category 3C on the Fish and Wildlife Service list.

REFERENCES CITED

Ayensu, E. S., and R. A. DeFilipps. 1978. Endangered and threatened plants of the United States. Smithsonian Institution and World Wildlife Fund, Inc., Washington, D. C. 403 pp.

Fish and Wildlife Service. 1985. Endangered and threatened wildlife and plants; review of plant taxa for listing as endangered or threatened species; notice of review. Federal Register 50(188): 39526-39584.

Hitchcock, C. L. 1957. A study of the perennial species of Sidalcea. Univ. Wash. Pub. Biol. 18:1-79.

Hitchcock, C. L., and A. Cronquist. 1961. Vascular plants of the Pacific Northwest, Part III. University of Washington Press, Seattle. 614 pp.

Meinke, R. J. 1982. Threatened and endangered vascular plants of Oregon: an illustrated guide. U. S. Fish and Wildlife Service, Portland. 352 pp.

Oregon Natural Heritage Data Base. 1985. Rare, threatened and endangered plants and animals of Oregon. The Oregon Natural Heritage Data Base, Portland. 31 pp.

Siddall, J. L., K. L. Chambers, and D. H. Wagner. 1979. Rare, threatened and endangered vascular plants in Oregon -- an interim report. Oregon Natural Area Preserves Advisory Committee, Salem. 109 pp.

REINSTATEMENT OF THE GENUS SANANGO BUNTING & DUKE (BUDDLEJACEAE)

Kerry Barringer
Department of Botany
Field Museum of Natural History
Chicago, IL 60605-2496

ABSTRACT: The correct name for the species called Gomara racemosa Ruiz & Pavon or Gomaranthus racemosus (R. & P.) Rauschert is Sanango racemosum (R. & P.) Barringer.

A recent article (Barringer 1983) showed that the genus Gomara Ruiz & Pavon (1798), described as a genus of Scrophulariaceae, is synonymous with Sanango Bunting & Duke (1961) a genus of Buddlejaceae. However, the name Gomara Ruiz & Pavon is a later homonym of Gomara Adanson (1763) as shown by Rauschert (1982). Rauschert proposed the new name Gomaranthus to replace Gomara Ruiz & Pavon, but that name must be placed in synonomy under the earlier Sanango. Because of these changes, a new combination is necessary.

Sanango racemosum (Ruiz & Pavon) Barringer, comb. nov.

Gomara racemosa Ruiz & Pavon, Syst. Veg. Fl. Peru 162. 1798. Type: PERU. Huanuco: Pozuzo, 17 Sep. 1784. Ruiz & Pavon s.n. (HOLOTYPE: MA!).

Sanango durum Bunting & Duke, Ann. Missouri Bot. Gard. 48: 270. fig. 1. 1961. Type: PERU. Amazonas: Aramango, s. of Nazaret, 2 Apr 1960, Woytkowski 5619 (HOLOTYPE: MO!).

Gomaranthus racemosus (Ruiz & Pavon) Rauschert, Taxon 31: 562. 1982.

I thank Eliane Norman for pointing out my error.

LITERATURE CITED

ADANSON, M. 1763. Familles de Plantes. vol. 2. Paris: Vincent.

BARRINGER, K. 1983. The identity of Gomara racemosa (Buddlejaceae). Taxon 32: 627-629.

BUNTING, G.S. and J.A. DUKE. 1961. Sanango, a new Amazonian genus of Loganiaceae. Ann. Missouri Bot. Gard. 48: 269-274.

RAUSCHERT, S. 1982. Nomina nova generica et combinationes novae spermatophytorum et pteridophytorum. Taxon 31: 554-563.

RUIZ, H. and J. PAVON. 1794. Systema Vegetabilum Florae Peruvianae et Chilensis. Madrid: Gabrielis de Sancha.

TETRANEMA BICOLOR L.O. WMS. (SCROPHULARACEAE) TRANSFERRED TO NAPEANTHUS (GESNERIACEAE)

Kerry Barringer
Department of Botany
Field Museum of Natural History
Chicago, IL 60605-2496

ABSTRACT: The combination Napeanthus bicolor is made based on Tetranema bicolor L.O. Wms.

Species of Napeanthus G. Gardn. (Gesneriaceae) and Tetranema Turcz. (Scrophulariaceae) can be difficult to distinguish. All are low, understory herbs with opposite leaves and short-lived flowers. Traditional characters which usually distinguish the two families, such as placentation, staminal fusion, and ovary position do not always distinguish the genera, but seed morphology does. Beaufort-Murphy (1983) has shown that the seeds of Napeanthus species are always elliptic and have spirally reticulate coats with liniate-polygonate cells, elevated edges, and composite crests. She found this pattern to be widespread in the Gesneriaceae. No seeds of this type have been found in the Scrophulariaceae. Napeanthus bicolor has elliptic seeds with the spirally reticulate coat while all Tetranema species have subquadrate to subconical seeds with straight to irregular cells.

Williams (1972) noted the vegetative similarity between Tetranema bicolor L.O. Wms. and the other species of Tetranema, but pointed out that its inflorescence was shorter than other species, the calyx is larger and more foliaceous, and the flowers lack a staminode.

Napeanthus bicolor (L.O. Wms.) Barringer, comb. nov.

basionym: Tetranema bicolor L.O. Wms., Fieldiana, Bot. 34: 127. 1972. TYPE: NICARAGUA. near Rio San Juan at "el Relos" about midway between El Castillo and Delta de San Juan, 0-50 meters, 23 Mar 1961, Bunting & Licht 748 F!

Napeanthus bicolor can be distinguished from Napeathus apodemus Donn. Sm., the only other Central American species (Skog 1978; Wiehler 1977), by its erect leafy stem and its lowland habitat. The exclusion of Napeanthus bicolor makes Tetranema a more natural genus whose center is the Guatemalan uplands.

Since the species was described, additional material has been collected on the Osa peninsula in Costa Rica. The disjunct

distribution suggests that the species will be found throughout much of the lowland, wet forest of the Carribean plain in Costa Rica and in Panama.

Additional material studied: COSTA RICA. Prov. Puntarenas: Osa peninsula, 4 miles W of Rincon de Osa, 30 m, 4-7 June 1968, Burger & Stolze 5576 (F); Osa Peninsula, 8 km s. of Rincon, 28 Feb. 1965, A. Jimenez 3020 (F); Osa Peninsula, 4 miles W of Rincon de Osa, 100 ft, 8 August 1967, Raven 21639 (F).

LITERATURE CITED

BEAUFORT-MURPHY, H. T. 1983. The seed surface morphology of the Gesneriaceae utilizing the scanning electron microscope and a new system for diagnosing seed morphology. Selbyana 6: 220-422.

SKOG, L. E. 1978. Gesneriaceae. In Woodson, et al., Flora of Panama. Ann. Missouri Bot. Gard. 65: 783-998. (Napeanthus pp. 951-954.)

WIEHLER, H. 1977. New Genera and Species of Gesneriaceae from the Neotropics. Selbyana 2: 67-132.

WILLIAMS, L. O. 1972. Tropical American Plants, XII. Fieldiana, Bot. 34: 101-132.

BOOK REVIEWS

Alma L. Moldenke

"PROJECTO MADEIRA DO RIO GRANDE DO SUL" by Raulino Reitz, Roberto M. Klein & Ademir Reis in SELLOWIA 34-35, Botanical Annual of the Herbário Barbosa Rodrigues, Itajaí, Santa Catarina, Brazil, 527 pp., 55 b/w geog. distrib. maps, 87 photo. 62 multi-draw. & 5 tab., paperbound. [1983] 1984.

This is an excellent descriptive and well illustrated manual of the 515 trees and shrubs of the southernmost state of Brazil. They represent 75 plant families, their ranges are plotted on geographic distribution maps, their economic uses are explained, and their detailed descriptive drawings not only satisfy professional botanists but also show sprays of the leaves and flowers realistically as guides for woodsmen and practical workers; included also are photographic plates showing the whole trees and the tree trunks, and lists of native names. The emphasis beyond botanical identification is to save, use and restore these national and natural treasures. This highly important study by authors particularly skilled in taxonomic and ecological botany is of great value taxonomically, systematically, ecologically and economically for now and for the future of this interesting area of Brazil.

"GUIDE TO THE VASCULAR PLANTS OF THE FLORIDA PANHANDLE" by Andre F. Clewell, viii & 605 pp. & 20 b/w pp. of draw. of multi-plant parts & 1 map, University Press of Florida, Gainesville, Florida 32603. 1985. $30.00.

This area of northern Florida west of the Suwannee River which includes 21 counties and over 38,628 sq. km. now has its own printed keyed flora of pteridophytes and spermatophytes for teaching purposes at the junior college and university levels, for naturalist groups, ecological workers and individuals who will appreciate the updated nomenclature and the elimination of flora limited to other parts of Florida as in Small's wonderful manual of 1933. The book contains a description of the physiography and habitats, a pertinent glossary, a helpful series of plant structure illustrations, and workable keys for the gymnosperms and angiosperms. Single known common names are given for a total of 2,352 species with 989 indigenous, in 810 genera in 181 families. Because the research and the record keeping continues there is an addendum. This is a very useful, well prepared and needed publication.

"SEX IN NATURE" by Chris Catton & James Gray, 224 pp., 90 color photo., 65 b/w photo. & 14 fig. Facts on File, Inc., New York, N. Y. 10016. 1985. $19.95.

This book, written and first printed in England, is a copiously and effectively illustrated and well explained survey of the nature, purposes, means, manifestations and accomplishments of sex as a function throughout the plant and animal worlds and even those of simpler phyla with only those beginnings of sexual expression and possible variation in chromosome combinations, as in conjugation, etc. Meiosis followed by fertilization allows for the variations in recombination and mishap that may be responsible for new structural, behavioral and functional adaptations, minute chemical changes, etc. that make for evolutionary changes with the greater survival of the fittest. There is a marvellous array of all kinds of animal and some plant examples, such as bedbugs "in which the male injects sperm into the female through her body wall and into her blood....Male bedbugs now improve their reproductive performance by [similarly] mating other males....The sperm migrate to the testes of the recipient male, who cannot help but pass them on when he in turn mates with a female." In the final chapter on sex and human nature the emphasis is that "Humans do not transmit only genes. They also transmit their culture, and not only to their children, but to anyone with whom they communicate." There is an abundance of excellent illustrations and a broad appeal to a great variety of readers.

BOTANY ILLUSTRATED: Introduction to Plants, Major Groups, Flowering Plant Families" by Janice Glimn-Lacy & Peter B. Kaufman, xvi & 296 pp. & 130 pp. multi-fig. Van Nostrand Reinhold Inc., New York, N. Y. 10003. 1984. &19.45 paperbound.

The authors call this "a discovery book about plants and botanical illustration" with a system of coded coloring for right-hand side line-drawn illustrations and matching left-hand side descriptions and coloring directions. There are sections on introduction, major groups and "flowering plant families with an accent on those of economic importance." This book may well be useful for training horticultural workers for large nurseries, botanical gardens and large estates, but it surely should be supplemented with the study and dissection of living materials. Botanically interested adult classes and individuals who can no longer be active in field studies might like this approach.

"McGRAW-HILL DICTIONARY OF THE LIFE SCIENCES" by Daniel N. Lapedes, Editor-in-Chief, xiv & 907 & A38 pp., over 800 b/w draw., photos. & tab. McGraw-Hill Book Company, Inc., New York, N. Y. 10020. 1976. $36.00.

The more than 20,000 defined terms are the pertinent ones from the 1974 "McGraw-Hill Dictionary of Scientific and Technical Terms" (which

was highly recommended in an earlier issue of this journal) or they were especially written for this book. "Each definition is preceded by an abbreviation identifying the field in which it is principally used." There is much efficient cross-referencing of synonyms, etc. The many illustrations are small but clearcut. The Appendix explains the International System of Units, and has chemical elements listed, modern taxonomic classifications for plants, animals, bacteria, etc. and spectra tables for the activities of many antibiotic and other antimicrobial agents. The term *Coelenterata* is misspelled. Biological scientists, teachers, technicians and students will find this book very helpful to have handy. It also is very helpful for library use in high schools, laboratories and colleges.

"McGRAW-HILL DICTIONARY OF PHYSICS AND MATHEMATICS" by Daniel N. Lapedes, Editor-in-Chief, xvi, 1.074 & A46 77 & more than 700 graphs, draw., photos., diag. & tab. McGraw-Hill Book Company, Inc., New York, N. Y. 10020. 1978. $34.50.

The parent source of many of these more than 20,000 terms is the "McGraw-Hill Dictionary of Scientific and Technical Terms" (2nd ed., 1978) to which additional ones have been added. Each definition is preceded by an abbreviation identifying its more limited field such as CRYO for cryogenics. There is ample cross-referencing for synonyms, variant spellings, acronyms, abbreviations and symbols. The actual definitions are clear enough to be comprehensible to people educated in other fields and should be particularly helpful to students, technicians, teachers and researchers in these fields. The appendix has a fine store of valuable information including a comparison of the U. S. customary and metric system, mathematical signs and symbols, fundamental and special mathematical constants, etc. This book is essential not only to immediately involved individuals but also to public, school, lab and college libraries.

"McGRAW-HILL DICTIONARY OF CHEMISTRY" by Sybil P. Parker, Editor-in-Chief, iv & 665 pp., McGraw-Hill Book Company, Inc., New York, N. Y. 10020. 1984. $36.00.

Over 9,000 terms are defined from the vocabulary of theoretical and applied chemistry as well as from the names of chemicals and materials, and also from the specialized terminology of relevant atomic and nuclear physics. They have been selected from the "McGraw-Hill Dictionary of Scientific and Technical Terms". Third Edition, 1984. The explanations also include synonyms, acronyms and abbreviations that are also entered as cross-references. Chemical formulas are given in either empirical or line forms. This split off from the parent dictionary makes an excellent, handy, reliable information source for the desks and/or libraries of all kinds of working chemists and students.

"McGRAW-HILL DICTIONARY OF SCIENCE AND ENGINEERING" by Sybil P. Parker, Editor-in-Chief, xviii & 942 pp. McGraw-Hill Book Company, Inc., New York, N. Y. 10020. 1984. $32.50.

The more than 35,000 terms in this dictionary represent the basic vocabularies of 102 fields of science and engineering and have been extracted from the third edition (1984) of the "McGraw-Hill Dictionary of Scientific and Technical Terms" by "the input of editorial skills and with the output of magnetic tape.....generated electonically and set by computer composition". As in the other topical dictionaries each definition is preceded by an abbreviation of the appropiate subdivision(s) and these are all defined in the introduction. Because of the clarity, simplicity and authoritativeness of these definitions and full cross-referencing of synonyms, acronyms and abbreviations this dictionary becomes an excellent tool and guide not only for students, teachers, writers, researchers and technicians in these fields but also for the interested public. Consequently this book is a definite asset on the library shelves of the above individuals as well as in public, lab, school and college libraries.

"PLANTS" by David Black & Anthony Huxley in The World of Science series, 64 pp., 125 color photos. & 8 color draw. Facts on File Publications, New York, N. Y. 10016. 1985. $9.95.

This very attractive and very interesting book (also, possibly first,printed in England) provides an effectively displayed, easily read survey of the plant kingdom (wherein it also includes fungi and blue-green algae, but does not mention liverworts), describing and picturing its ranges of habitats, its absolutely essential uses to mankind and that broader picture in terms of the whole world ecosystem. While colors are used attractively on the leaf cross-section diagrams, it would also have been wise to use them correctly as in making chloroplasts only in green. The soft colored tissue surrounding the yew seed is an open aril, not a closed berry. The first page on drugs and poisons had some kind of printing problem in my review copy making it illegible. These items are mentioned so that they can be corrected in any future edition. This type of book should have wide circulation among the general public, students, etc. especially since the final chapter stresses meaningfully the great need for conservation.

"THE INVISIBLE WORLD" by Ron Taylor in The World of Science series, 64 pp., 85 color & 6 b/w photos. & 29 color diag. Facts on File Publications, New York, N. Y. 10016. 1985. $9.95.

The invisible world consists of the compositional and functional units of that which is visible -- people, other animals, plants, the simpler living creatures, inanimate objects and all materials in our universe. This book introduces their structures and functions, not on any gross visible scale but as that of their minute structur-

al particles and forces. These would be their solid, liquid and gas molecules, their atoms and subatomic particles (as electrons) and their energy and forces (as electricity, magnetism, gravity). "On Earth, the most familiar kinds of travelling energy are the light waves that allow us to see things, and the heat waves that help keep us warm". Radio and TV waves are also travelling waves, bringing us sound and pictures. Human physiology is explained briefly in terms of chemical nutrients and enzymes; thinking and feeling in terms of hormones and brain waves. Converting matter into energy on the largest scale humanly possible is into the H- and A-bombs. For those who would like quick, general explanations of many well illustrated phenomena of our universe this book, and the series to which it belongs, should get a rousing welcome.

"THE WORLD BENEATH US" in The World of Science series, 64 pp., 64 color photos., 39 diag. & 4 charts. Facts on File Publications, New York, N. Y. 10016. 1985. $9.95.

This captivatingly illustrated publication with more pictures than text gives an excellent interpretation of how geologists and allied scientists study our earth as to its original formation -- inner and outer cores, mantle, tectonic moving plates with their piggybacked continents and oceans; of intervening and present changing structures; of our mineral civilization, kinds of minerals, mines and their sources; of energy for the world, water; and future prospects for satellite mapping; geothermal heat, earthquake prediction, and how to proceed with further kinds of learning about geology. Since this book is a fine survey for the hasty and/or general reader and for students, it should be available in school, as well as public and personal libraries.

"ASTRONOMY" in The World of Science series, by Peter Lancaster Brown
"WEATHER AND ITS WORK" in The World of Science series, by David Lambert & Ralph Hardy
"MATHEMATICS" by Irene Fekete & Jasmine Denyer do.
"YOUR BODY" by Irene Fekete & Peter Dorrington Ward do.
"HOW EVERYDAY THINGS WORK" by Chris Cooper & Tony Osman do.
"COMPUTERS: AN INTRODUCTION" by Roger Ford & Oliver Strimpel do.

These books, less related to botany, are all in The World of Science series, all of 64 pages each, with profuse, attractive and effective color photos, diagrams, charts, and explanations in easy reading text, of the basics in these studies. They are all 1985 publications that I have read. There are more books listed in the series, but I have not as yet seen them. They cost only $9.95 each.

"ANNUAL REVIEW OF ENTOMOLOGY, Volume 31, 1986" edited by Thomas E. Mittler & associates, x & 565 pp., 40 b/w fig, incl. 3 photos. & 8 tab. Annual Reviews Inc., Palo Alto, California 94306. 1986. $31.00 U.S.A. & $34.00 foreign.

Deservedly boasting that this journal is "one of the most consulted and referred-to publications in the entomological literature" and "that future articles will continue to present timely, critical and innovative topics of lasting value," the editors present herein 22 worthwhile papers. They consider such topics as: spatial management of honey bees on crops that may often be less attractive than other flowering plants in the same area, host odor perception in phytophagous insects whose feeding is usually limited to specific parts of taxonomically related plants, bionomics of the variegated grasshopper in Africa, convergent patterns in subsocial insects, dormancy in tropical insects, sperm utilization in social insects with aspects of mating behavior, sperm acquisition and sperm utilization, and anti-juvenal hormone agents -- now tools for physiological research but not yet of any commercial use.

"THE ENCYCLOPEDIA OF MAMMALS" edited by David Macdonald, xlviii & 895 pp., 1150 color photo. & 72 draw., thousands of b/w distrib. maps and hundreds of silhouette proportional draw. and other draw. Facts on File Publications, New York, N. Y. 10016. 1984. $50.00.

This encyclopedia is really wonderful to peruse and/or study and to purchase at such a modest price for a production so large and so colorfully, copiously and engagingly illustrated in activity and/or habitat poses of the quality shown on fine television nature series. There is much more material presented than university students in an upper level mammalogy course can absorb, yet inquiring advanced-reading youngsters could spend hours poring over the pictures and descriptive text. Consequently this book is an excellent choice for home, school, university, "zoo", technical labs in related fields, animal behavior and conservation organizations libraries. I can report only one personal disappointment: I wanted to know if the "white" rhinoceros (which is hardly white, but sometimes is a bit lighter than the black one) is really the "weid" (Afrikaan for wide) one because of its obviously broader front lip. The book starts with a general treatment of the Class *Mammalia*, its characteristics and probable early ascendency over the dinosaurs. The rest of the text content is arranged by orders, and subdivided into families. In addition to presenting all known members and their definitive characteristics and activities, there are worldwide geographic distribution maps, silhouette figures compared to human size, notes on gestation and longevity -- material provided by more than 200 authorities of worldwide range.

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NEW SPECIES OF ECHEANDIA (LILIACEAE) FROM CENTRAL AMERICA

Robert William Cruden

Department of Botany, University of Iowa,
Iowa City, Iowa 52240, USA

The species proposed below will provide valid names for Flora Mesoamerica and floristic studies of the Mexican flora.

ECHEANDIA ALTIPRATENSIS Cruden, sp. nov.

Radicitubera juxta cormum. Scapus glaber, brevis vel brevissimus, internodio supero brevissimo, bracteis fere oppositis. Tepala flava, plerumque 13-18 mm longa, elliptica. Antherae liberae. Capsula oblonga.

Root-tubers close to corm, 1-2.5 cm long. Basal leaves 6-10(-13), lanceolate, falcate, ciliate, 4-15(-24) cm long, 4-9 mm wide. Scape(s) 1(2) glabrous, unbranched, 2-14 (25) cm high. Cauline leaves 0(1). Upper bracts nearly opposite. Flowers ± erect. Tepals yellow, elliptic, (11)13-18 mm long. Filaments linear, weakly scaled, 6-8 mm long. Anthers free, versatile, 2-3 mm long. Ovaries 2-4 mm long. Capsules 11-13 mm long, 5-6 mm wide. Chromosome number n=24 (Cruden 1585).

Type: GUATEMALA: HUEHUETENANGO: road to Todos Santos Cuchumatán, ca 5.5 km from RN 9 (at Paquix), 3300 m, 30 Jun 1969, Cruden 1585 (Holotype: UC!; Isotypes: BM!, F!, GH!, MEXU!, MO!, NY!, US!).

Representative Specimens Examined: GUATEMALA: HUEHUETENANGO: Sierra de los Cuchumatanes: Llano de Tierra Blanca, 2.5 mi W Llano de San Miguel, ca 3500 m, 2 Aug 1960, Beaman 3963 (DUKE, GH, TEX, UC); SAN MARCOS: Las Ventanas, San José Ojetenam, 3440 m, 26 Aug 1977, Smith & Olson 749 (F); TOTONICAPAN: Tecum Uman ridge, at K 154, RN 1, ca 20 km E Totonicapán, ca 3340 m, 14 Aug 1960, Beaman 4164 (GH, UC).

This diminutive species is endemic to the Sierra de los Cuchumatanes and other high-elevation sites in northwestern Guatemala. It is a plant of llanos, only occasionally encountered in the adjacent pine or juniper forest.

ECHEANDIA WILLIAMSII Cruden, sp. nov.

Radicitubera ab cormo 4 cm vel plus. Folia basalia denticulata vel breve ciliata. Folia caulina 2-6. Tepala flava ad crocea, elliptica. Filamenta antheris duplo vel plus longiora. Antherae liberae, lateraliter dehiscentes. Capsula oblonga, duplo vel plus longiora quam latiora.

Root-tubers numerous, probably 4 or more cm from corm. Basal leaves (5?)6-11, narrowly oblanceolate to oblanceolate, 20-60 cm long, 14-33 mm wide, densely denticulate to short ciliate, sometimes falcate. Scapes 67-150 cm, glabrous, usually branched. Cauline leaves 2-5(6). Flowers ± erect. Tepals yellow to orange, elliptic, 11-15(18) mm long. Filaments (6)7-8(10) mm long, linear and moderately scaled to narrowly clavate and heavily scaled. Anthers 2-3.6 mm long, free, dehiscing laterally, 1/2 the length of the filaments or less. Ovaries 2-3 mm long. Capsules (9)10-14 mm long, (4.5)5-6.5 mm wide, oblong, at least twice as long as wide. In flower Jul-Sep and (Nov-)Jan-early Apr (Alta Verapaz).

Type: HONDURAS: LEMPIRA: frequente en el bosque abierto faldas, Montaña Puca, entre Guatán and Cuábanos, 1600 m, 25 Sep 1963, Molina 12947 (Holotype: F!; Isotype: NY!).

Representative Specimens Examined: GUATEMALA: ALTA VERAPAZ: Coban, 1350 m, Nov 1912, Türckheim 3993 (GH, U, US); GUATEMALA: 7 mi E Guatemala, 1840 m, 5 Jul 1970, Harmon & Fuentes 2929 (ENCB, MO); HUEHUETENANGO: between San Sebastián H. and large penasco above town, 2000-2200 m, 13 Aug 1942, Steyermark 50515 (F, GH); HONDURAS: OCOTEPEQUE: Quebrada Tinasa, between Sinuapa and La Providencia, 900 m, 29 Aug 1968, Molina R. 22373 (F).

In Chiapas and Guatemala there are four robust, free-anthered species. They are ecologically isolated and may have different chromosome numbers. E. williamsii is generally a plant of mesic sites in pine, pine-oak, or oak woods between 1300 and 2200 m and flowers in late summer and early fall (Jul-Sep). Plants in the Alta Verapaz flower from December into early April. It is characterized by relatively broad, ciliate leaves, anthers that dehisce laterally, and oblong capsules whose length is usually twice their width.

ECHEANDIA BREEDLOVEI Cruden, sp. nov.

Plantae robustae. Radicitubera ab cormo 2 cm, 6-8 cm longa. Scapus glaber. Tepala flava, elliptica, 9-12 mm longa. Filamenta antheris duplo vel plus quam duplo longiora, squamata, 4-6 mm longa. Antherae liberae, 2-3 mm longae. Capsula late oblonga.

Root-tubers 6-8 mm long, 2 cm from corm. Basal leaves broadly oblanceolate, falcate, 35-40 cm long, 20-23 mm wide, densely denticulate. Scape glabrous, 65-75 cm high, branched. Cauline leaves 3-4. Flowers ± erect. Tepals yellow, elliptic, spreading, 9-12 mm long. Filaments 4-6 mm long, linear, light-moderately scaled. Anthers free, 2-3 mm long, dehiscing laterally. Ovaries 1-1.5 mm long. Capsules 8-13 mm long, 4.5-6 mm wide, for most length twice the width or less. In flower late Sep-Dec.

Type: MEXICO: CHIAPAS: Mirador for Chicoasén Dam, rd from Tuxtla Gutiérrez to the Chicoasén dam, Municipio San Fernando, 850 m, 17 Nov 1976, Breedlove 41481 (Holotype: DS!).

Additional Specimens Examined: MEXICO: CHIAPAS: Municipio San Fernando, 4-6 km W Mirador Los Chiapas, Parque Nacional del Sumidero, 1180-1240 m, 14 Nov 1984, Davidse, Sousa, Téllez, Martínez, & Davidse 29718 (MO); Municipio Suchiapa, 15 km SW Suchiapa, 750 m, 26 Sep 1972, Breedlove 28092 (DS); OAXACA: Distrito Juchitán, 14 km N Ventosa, rd to Matías Romero, 12 Dec 1980, Trigos & Lorence 528 (CAS).

This species occurs up to 1200 m in tropical deciduous vegetation on the Isthmus of Tehuantepec and the area drained by the Río Mezcalapa and Río Chiapa. The highly branched plants flower late in the year, and are characterized by their relatively small flowers and capsules, and anthers that dehisce laterally.

ECHEANDIA CHIAPENSIS Cruden, sp. nov.

Radicitubera ab cormo 3-6 cm. Folia basalia plerumque linearia, denticulata, raro serrulata vel breve ciliata. Folia caulina (4)5-11. Tepala flava, elliptica. Filamenta squamosa. Antherae liberae, graciles, ab imo ad apicem decrescentem, ad apicem dehiscentem. Capsula late oblonga.

Root-tubers 2-4 cm long, 3-6 cm from corm. Basal leaves 25-65 cm long, (6)9-20(29) mm wide, linear, rarely broadly linear, denticulate (serrulate, short-ciliate). Scape 69-160 cm high, glabrous, usually branched. Cauline leaves (4)5-11. Flowers ± erect. Tepals yellow, elliptic, spreading, 11.5-17 mm long. Filaments (4.5)5-7(8) mm long, linear-narrowly clavate, scaled. Anthers free, 4-5(5.5) mm long, slender and usually tapered from base to tip, dehiscing apically. Ovaries 2.5-3(3.5) mm long. Capsules 7-11 mm long, 4.5-6 mm wide, length less than twice the width. In flower (Aug)Oct-Dec. Chromosome number n=8 (Cruden 1916).

Type: MEXICO: CHIAPAS: Ruta 190, 2.4 km E Tapanatepec, grassy slopes in oak woodland, 340 m, 30 Aug 1971, Cruden 1916 (Holotype: UC!; Isotypes: BM!, ENCB!, GH!, MEXU!, MO!, US!).

Representative Specimens Examined: MEXICO: CHIAPAS: ridge back of Tonalá, 1200-2500 ft, 10 Aug 1895, Nelson 2900 (GH, US); Municipio Amatenango Frontera: Río Cuilco between Nuevo Amatenango and Frontera Comalapa, 1100 m, 22 Nov 1976, Breedlove 41783 (DS); Municipio Ocozocoautla de Espinosa: 3 km N Ocozocoautla, rd to Mal Paso, 900 m, 5 Nov 1971, Breedlove & Smith 21957 (DS, MO); OAXACA: District Tuxtepec, vicinity Chiltepec, 20 m, Jul 1940-Feb 1941, Martínez-Calderón 132 (GH, US).

This species is known primarily from lower elevations (300-1100 m) in the Sierra Madre de Chiapas, where it is found in drier habitats, including grassy openings in oak and pine-oak woodlands, thorn forest, and cliff faces and steep slopes in seasonal evergreen forest. The slender, tapered anthers, which dehisce apically, and numerous slender cauline leaves are diagnostic.

ECHEANDIA MATUDAE Cruden, sp. nov.

Radicitubera ab cormo 3-8 cm. Scapus glaber, (53)65-170 cm altus. Folia caulina (3?)4-6(7). Tepala flava, elliptica. Filamenta squamata, antheris plerumque minus quam duplo longiora. Antherae liberae, apicibus dehiscentibus. Capsula anguste oblonga, longitudo latitudine duplo vel plus longiora quam latiora.

Root-tubers 2-4 cm long, 3-8 cm from corm. Basal leaves 27-75 cm long, 8-22 mm wide, linear, denticulate or serrulate (short-ciliate). Scape (53)65-170 cm high, glabrous, usually branched. Cauline leaves (3?)4-6(7). Flowers ± erect. Tepals 11-16 mm long, elliptic, yellow (white). Filaments (5)5.5-7(8) mm long, linear-narrowly clavate, scaled. Anthers free, 3-4.1(5) mm long, dehiscing apically. Ovaries 2-3 mm long. Capsules 9-13.5 mm long, 4-5.5 mm wide, oblong, length twice the width or more. In flower (Feb) Aug-Nov. Chromosome number n=16 (Cruden 1215).

Type: MEXICO: CHIAPAS: Ruta 190, 1.5 mi E Escopetazo, 1570 m, 20 Aug 1966, Cruden 1215 (Holotype: UC!; Isotypes: BM!, ENCB!, F!, GH!, MEXU!, MO!, NY!).

Representative Specimens Examined: EL SALVADOR: SAN SALVADOR: Los PLanes Renderos/Cerro Chula, 1050 m, El Salvador 934 (MO); SANTA ANA: Hda. San José, N Metapán, 850 m, Instituto Tropical Investigaciones Científicas San Salvador 925 (MO); GUATEMALA: ALTA VERAPAZ: nr Tactic, 4500 ft, 16 Feb 1941, Hunnewell 17107 (GH); HUEHUETENANGO: nr El Reposa, 900-1000 m, 14-18 Dec 1972, Williams, Molina R. & Williams 41357 (F); JALAPA: rd between Jalapa and San Pedro Pinula, 1400-1800 m, 12 Nov 1940, Standley 77102 (GH); MEXICO: CHIAPAS: Municipio Tenejapa: paraje Mahbenchauk, barrio Tih Ha', 3600 ft, 28 Oct 1966, Ton 1398 (DS, DUKE, MICH).

This is primarily a mid-elevation (1000-1800 m) species of oak and pine-oak-Liquidamber woods of the mountains of central Chiapas, central Guatemala, and western El Salvador. The anthers dehisce apically. The other upland species, E. williamsii, occurs in pine, pine-oak, and oak woods, and has anthers that dehisce laterally.

ECHEANDIA PETENENSIS Cruden, sp. nov.

Radicitubera ab cormo 2-9 cm. Folia basalia anguste oblanceolata, marginibus denticulatis vel breviciliatis. Folia caulina 3-4. Tepala alba, anguste elliptica, 9-11 mm longa. Filamenta linearia, squamosa. Antherae connatae; conus gracilis, minus quam 1.5 mm diametro, ad apicem 0.4-0.6 mm latus. Capsula globosa ad late oblonga.

Root-tubers 2-9 cm from corm, 1.5-3 cm long. Basal leaves narrowly oblanceolate, 20-55 cm long, 7-12(-15) mm wide, denticulate to short-ciliate. Scapes glabrous, 56-110 cm high, usually branched. Cauline leaves 3-4, lowest to 5 cm long, others greatly reduced.

Flowers pendulous. Tepals white, narrowly elliptic, 9-11 mm long. Filaments linear, scaled, 3-4 mm long. Anthers 4.5-6 mm long, connate; cone slender, less than 1.5 mm across, 0.4-0.6 mm wide at apex. Ovaries 1.7-2 mm long. Capsules globose to broadly oblong, 4.5-7.5 mm long, 4.5-5.5 mm wide. In flower Jun-Oct.

Type: GUATEMALA: PETEN: La Libertad and vicinity, 17 Jun 1934, Aguilar H. 305 (Holotype: F!; Isotypes: MICH!, MO!, NY!).

Additional Specimens Examined: BELIZE: EL CAYO: Augustine, Mountain Pine Ridge, rd to resthouse (16°34' N, 88°54' W), 1500 ft, 11 Oct 1959, Hunt 109 (BM, US); TOLEDO: Cow Pen, nr Monkey River, 7 Jul 1942, Gentle 4049 (F, GH, LL, MO, MICH, NY, US).

This is one of three species endemic to the Yucatan Peninsula. It occurs between 100 and 500 m. The narrow basal leaves and white flowers distinguish it from the broader leafed E. luteola (cream-colored flowers) and E. campechiana (yellow flowers).

ECHEANDIA MOLINAE Cruden, sp. nov.

Radicitubera non videtur. Folia basalia anguste lanceolata, denticulata. Folia caulina 2-3. Tepala luteola, anguste elliptica. Filamenta linearia, glabra. Antherae connatae.

Root-tubers not seen, but probably some distance from corm. Basal leaves 4-8, 40-50 cm long, 3.5-11 mm wide, narrowly lanceolate, denticulate. Scape 90-105 cm high, glabrous, branched. Cauline leaves 2-3, lower to 21.5 cm long. Flowers nodding to pendulous. Tepals pale yellow, narrowly elliptic, 8-9 mm long. Filaments 3-4 mm long, linear, smooth. Anthers 4-4.5 mm long, connate. Ovary 1 mm long. Capsule 6-7.5 mm long, 4-4.5 mm wide. In flower Sep-Oct.

Type: GUATEMALA: BAJA VERAPAZ: rocky slopes, cutover forest of Cachil, 1500 m, 3 Oct 1972, Molina & Molina 27835 (Holotype: F!; Isotype: UI).

This species is known only from the type collection. It is characterized by its pale yellow flowers and smooth filaments.

ECHEANDIA LUTEOLA Cruden, sp. nov.

Radicitubera ab cormo 3-10 cm. Folia basalia anguste lanceolata, marginibus breviciliatis. Tepala luteola vel cremea, anguste elliptica. Filamenta squamosa. Antherae connatae.

Root-tubers 3-10 cm from corm, 2.5-4 cm long. Basal leaves narrowly lanceolate, falcate in some, 21-75 cm long, 7-30 mm wide, short ciliate. Scape glabrous, 0.6-1.8 m high, branched. Cauline leaves (3-)6-9, reduced upwards to bracts, the lower to 33 cm long. Flowers nutant to pendulous. Tepals pale yellow or cream, 7.5-9 mm long, narrowly elliptic, reflexed, inner ca 2 mm wide, outer ca 1 mm

wide. Filaments linear to narrowly clavate, scaled, 3-4 mm long. Anthers 4.5-5.5 mm long, connate; the cone not strongly tapered. Ovaries 1-2 mm long. Capsules broadly oblong, 6-8 mm long, 4-5 mm wide. In flower Jun-Aug. Chromosome number n=32 (Cruden 1907, 1910).

Type: MEXICO: YUCATAN: Ruta 180, K 110-111, ca 7 km NW Chichén-Itzá, roadside in tropical deciduous forest, 10-20 m, 27 Aug 1971, Cruden 1909 (Holotype: UC!; Isotypes: ENCB!, F!, GH!, K!, MEXU!).

Representative Specimens Examined: BELIZE: EL CAYO: Mountain Pine Ridge, San Agustin, Jul-Aug 1936, Lundell 6622 (MICH); MEXICO: CAMPECHE: Ruta 269, K 67-70, at Pomuch, ca 39 km N Ruta 180, 10-20 m, 28 Aug 1971, Cruden 1910 (K, MEXU, UC); YUCATAN: Chichén-Itzá, 10-20 m, 27 Aug 1971, Cruden 1907 (ENCB, UC); Maxcanú, 14 Sep 1865, Schott 634 (BM); QUINTANA ROO: Cobá, Jun-Jul 1938, Lundell & Lundell 7840 (MICH).

The pale yellow or cream-colored flowers are relatively small, and open in early afternoon. The scaled filaments distinguish it from the previous species. The only other species in the region with fused anthers is E. petenensis, which has white flowers. Without flowers this species is indistinguishable from E. campechiana.

ECHEANDIA CAMPECHIANA Cruden, sp. nov.

Radicitubera ab cormo 4-9 cm. Folia basalia 8-12, anguste oblanceolata, marginibus denticulatis. Scapus glaber. Folia caulina 3-7. Tepala flava, anguste elliptica, 8-11 mm longa, valde reflexa. Filamenta linearia, squamosa. Antherae liberae. Capsula non videtur.

Root-tubers 4-9 cm from corm, 2.5-4 cm long, non-tuberous part thick relative to other species. Basal leaves 8-12, narrowly oblanceolate, 35-65 cm long, (16-)20-35 mm broad, denticulate. Scape glabrous, 0.9-1.5 m high, branched. Cauline leaves 3-7, gradually decreasing in size upwards, lowest 13-23 cm long. Tepals 8-11 mm long, narrowly elliptic, inner to 3.5 mm wide, outer to about 2 mm wide, strongly reflexed, yellow. Filaments 5.5-6.5 mm long, linear, with few, small scales to many well developed scales, inserted between the bases of the anther sacs, the point of insertion not visible from the side. Anthers 2.7-3.5 mm long, free, dehiscing through an obovate opening at the apex of each anther sac. Ovaries 2-4 mm long. In flower Aug-Sep. Chromosome number n=24 (Cruden 1906, 1911).

Type: MEXICO: CAMPECHE: rocky area with various grasses and composites, Ruta 180, K 10-11, ca 10.4 km E Campeche, 30-40 m, 26 Aug 1971, Cruden 1906 (Holotype: UC!; Isotypes: ENCB!, F!, GH!, K!, US!).

Additional Specimens Examined: MEXICO: CAMPECHE: Ruta 180, ca 6.2 km E Campeche, 28 Aug 1971, Cruden 1911 (MEXU, UC).

ECHEANDIA PITTIERI Cruden, sp. nov.

Radicitubera juxta cormum. Scapus glaber. Folia basalia 8-11, anguste lanceolata. Folia caulina 3. Tepala alba. Filamenta recta, glabra. Antherae connatae. Capsula subglobosa 6.5-7.5 mm longa.

Root-tubers 1-1.5 cm long, 1.5-2 cm from corm. Basal leaves 8-11, (18-)29-41 cm long, (4-)11-20 mm wide, narrowly lanceolate, entire or short- ciliate. Scape 80- 115 cm high, glabrous, branched. Cauline leaves 3. Tepals 10-12.5 mm long, to 2 mm wide, narrowly elliptic, white. Filaments 3-4.5 mm long, linear, smooth. Anthers 5.5-7 mm long, connate, yellow. Ovaries 2-3 mm long. Capsules 6.5-7.5 mm long, 5 mm wide. In flower late Jul-Aug.

Type: PANAMA: CHIRIQUI: 5 mi S Boquete toward David, in savanna near rocky creek, 2800 ft, 26 Aug 1965, McDaniel 6810 (Holotype: MO!; Isotype: DUKE!).

Additional Specimens Examined: COLUMBIA: MAGDALENA: ridge E Manaure, 1500 m, 3 Sep 1944, Haught 4342 (US); VALLE DEL CAUCA: Cordillera Occidental, Hoya del Río Sanjuniquín, Naranjal, 1200 m, 8 Dec 1943, Cuatrecasas 15356 (US); PANAMA: CHIRIQUI: vicinity Boquete, Llanos Francia, 3300 ft, 25 Jul 1959, Stern, Chambers, Dwyer, & Ebinger 1166 (MO).

This species differs from E. leucantha Klotzsch (=E. prolixa Woodson), which has scaled filaments and tubers that develop well away from the corm.

I thank Gertrud Champe for polishing the latin diagnoses and the curators of the following herbaria for the loan of critical material: BM, CAS, DS, DUKE, ENCB, F, GH, K, LL, MICH, MO, NY, P, PR, TEX, U, UC, US.

NEW COMBINATIONS IN ECHEANDIA AND HAGENBACHIA (LILIACEAE)

Robert William Cruden

Department of Botany, University of Iowa
Iowa City, Iowa, 52240, USA

The new combinations proposed below are made at this time to provide names for studies of the flora of Mexico and Central America. Critical synonyms are given to clarify my concept of various taxa.

Echeandia formosa (Weatherby) Cruden, comb. nov.

Echeandia macrocarpa Greenman var. formosa Weatherby. Proc. Amer. Acad. Arts 45:392. 1910. Type: MEXICO: CHIAPAS: nr San Cristóbal, 7000-8000 ft, 18 Sep 1895, Nelson 3143 (Holotype: US!).

Echeandia vestita (Baker) Cruden, comb. nov.

Anthericum vestitum Baker, J. Linn. Soc., Bot. 15:307. 1876. Type: MEXICO: Veracruz to Orizaba, Muller 1331 (Holotype: K!).

A. crinitum Standley. Publ. Field Mus. Nat. Hist., Bot. Ser. 17:228-229. 1937.

Echeandia skinneri (Baker) Cruden, comb. nov.

Anthericum skinneri Baker. J. Linn. Soc., Bot. 15:318. 1876. Type: GUATEMALA: Skinner (Holotype: K!).

A. aurantiacum Baker. Bot. Jahrb. Syst. 15:318. 1876.

A. apodastanthum J. D. Smith. Bot. Gaz. (Crawfordsville) 19:265-266. 1894.

Echeandia ciliata (Kunth) Cruden, comb. nov.

Phalangium ciliatum Kunth. in Humb. Bonpl. & Kunth, Nov. Gen. Sp. 276, Tab. 676. 1816. Anthericum ciliatum Sprengel. Syst. Veg. 2:84. 1825. A. humboldtii Hemsley, Biol. Cent.-Amer., Bot. 3:374. 1886. A. sprengeli Rusby, Mem. Torrey Bot. Club 6:127. 1896. Type: Caracas, Humboldt (Isotype: P!).

Echeandia ramosissima (Presl) Cruden, comb. nov.

Phalangium ramosissimum Presl. Rel. Haenk. 2:127. 1827. Anthericum ramosissimum Schult. & Schult. Syst. Veg. 7:469. 1829. E. haenkeana Kunth. Enum. Plant. 4:629. 1843. Type: MEXICO: Acapulco (Lectotype: PR 243981A!; Isotype: PR 243981B!).

E. breviflolia Watson. Proc. Amer. Acad. 21:441. 1886.

E. nodosa Watson. Proc. Amer. Acad. 26:156 1891.

Hagenbachia panamensis (Standley) Cruden, comb. nov.

Anthericum panamense Standley. Field Mus. Nat. Hist. Publ. Bot. 22:327. 1940. A. macrophyllum Baker. Bot. Jahrb. Syst. 8:209. 1887, non A. Rich. Fl. Abyss. 2:334. 1851. Type: PANAMA: COCLE: hills N of El Valle de Antón, 1000 m, 14 Jul 1940, Allen 2195 (Holotype: F!).

SIGNIFICANT COLLECTIONS OF LOUISIANA PLANTS
XI. UNION PARISH

R. Dale Thomas & David C. Moore, Herbarium, Department of Biology, Northeast Louisiana University, Monroe, La. 71209-0502.

A survey and study of the vascular plants of Union Parish, Louisiana was made from June, 1982 to May, 1984. During this study specimens of 136 families, 511 genera, and 1105 species were collected, found to be listed in literature, or found on file in several Louisiana herbaria. An annotated plant list with notes on abundance and distribution within the parish is included in the thesis (Moore 1984).

Union Parish is located along the west side of the Ouachita River in north-central Louisiana at the Arkansas State Line. The physiography of the parish may be divided into three general areas: the floodplain of the Ouachita River, the terraces adjacent to the floodplain, and the upland hills area. The parish has a land area of 579,840 acres of which 457,938 acres are forested. The floodplains are covered with bottomland hardwoods forest. Pine forests and mixed oak - hickory - pine forests cover the terraces and hills. Timber and pulpwood production are the major sources of income within the parish. One state (Union) and two national (Upper Ouachita and D'Arbonne) wildlife refuges are located within the parish.

Several plants that are uncommon in Louisiana were collected in Union Parish. These include: Botrychium lunarioides (Michx.) Swartz, Castanea ozarkensis Ashe, Chaenorrhinum minus (L.) Lange, Corylus americana Walt., Cynoglossum zeylandicum (Vahl) Thunb., Cypripedium calceolus L. var. pubescens (Willd.) Correll (C. kentuckiensis), Cyrtomium fortunei J. Small, Dentaria laciniata Muhl., Evolvulus sericeus Sweet, Gentiana saponaria L., Geranium maculatum L., Heuchera americana L., Isotria verticillata (Willd.) Raf., Listera australis Lindley, Najas minor All., Quercus arkansana Sarg., Sanguinaria canadensis L., Scrophularia marilandica L., Seymeria cassioides (J. F. Gmel.) Blake, Silene stellata (L.) Ait., Silene virginica L., Stokesia laevis (Hill) Greene (as an escape), Trillium recurvatum Beck., Uvularia sessilifolia L., and Zepranthes candida (Lindl.) Herb. Five rare plants collected by others were not relocated during this study: Adiantum pedatum L. (Kral 1966), Erigeron pulchellus L. (LTU), Houstonia purpurea L. (LAF), Hydrangea arborescens L. (Kral 1966), and Saxifraga virginiensis Michx. (Kral 1966).

Asclepias hirtella (Pennell) Woodson was collected for the first time from Louisiana. The citation is:

> UNION PARISH, LA.: Opening in pine woods beside Union Parish Road 2202 five miles northwest of La. 143 and Linville, Sec. 24, T22N, R3E, R. Dale Thomas, D. C. Moore, and Aquatic Plants Class, 84694 and 1974, 28 July 1983.

Woodson (1954) listed the range of this species as "prairies, open woods, sandy or clay soil, spreading to fields, roadsides, and waste places. Southern Ontario; western West Virginia and Tennessee westward to southern Minnesota and Oklahoma." He listed it from eleven Arkansas counties although it was not listed from Louisiana by him or by Thomas and Allen (1982). The authors express appreciation to Dr. S. P. Lynch of Louisiana State University in Shreveport for his determination of this species.

LITERATURE CITED

Kral, Robert. 1966. Observations on the flora of the Southeastern United States with special reference to Northern Louisiana. Sida 2: 395-408.

Moore, David C. 1984. A preliminary survey of the vascular flora of Union Parish, Louisiana. Unpublished Masters of Science Thesis, Northeast Louisiana University, Monroe, 118 pp.

Thomas, R. Dale & Charles M. Allen. 1982. A preliminary checklist of the dicotyledons of Louisiana. Contributions of the Herbarium of Northeast Louisiana University 2: 1-130.

Woodson, R. E., Jr. 1954. The North American species of Asclepias L. Annals of the Missouri Botanical Garden 41(1): 1-211.

SIGNIFICANT COLLECTIONS OF LOUISIANA PLANTS
XII. WASHINGTON AND ST. TAMMANY PARISHES

R. Dale Thomas and David D. Taylor, The Herbarium, Department of Biology, Northeast Louisiana University, Monroe, La. 71209-0502.

A preliminary survey of the vascular flora of Washington and St. Tammany Parishes, Louisiana was made between August, 1982 and April, 1984. Vouchers collected during the study, augmented by vouchers on deposit in several Louisiana herbaria and literature citations, indicate that a flora of 156 families, 615 genera, and 1682 specific and subspecific taxa exists. The taxa in Washington Parish totaled 134 families, 490 genera, and 1167 specific and subspecific taxa. The taxa in St. Tammany Parish totaled 148 families, 578 genera, and 1461 specific or subspecific taxa. Several distribution records for the state and one national record are noted. An annotated plant list noting distribution and abundance in the study area is included in a thesis (Taylor 1984). The various habitats and common and rare plants are also discussed.

Washington and St. Tammany Parishes, with land areas of 676 square miles and 873 square miles, respectively, are located in the southeastern tip of Louisiana. Washington Parish is bounded on the north, and on the east by Mississippi and on the south by St. Tammany Parish. St. Tammany Parish is bounded on the east by Mississippi and on the south by Lake Pontchartrain. Tangipahoa Parish adjoins both parishes on the west.

The climate of the area is warm, humid and subtropical due largely to its low latitude and proximity to the Gulf of Mexico. The average number of frost-free days per year is 248-265. The elevation ranges from about 370 feet above sea level in Washington Parish to sea level on the southern edge of St. Tammany Parish. The vegetation ranges from pine forested hills to brackish to saline marshes. Large areas of bottomland hardwoods forest occur along the Bogue Chitto and Pearl Rivers. The Pearl River State Wildlife Management Area and the Bogue Chitto National Wildlife Refuge are now preserving large areas of this valuable forest type. The vegetation of both parishes, but especially that of St. Tammany Parish, is rapidly being destroyed by the spread of metropolitan New Orleans into the area.

The variety of habitats and of plants present in these two parishes has long attracted plant collectors. Several plants occur in Louisiana only in these two parishes, and many others are restricted to the area of the state east of the Mississippi River (The Florida Parishes). Thomas has collected extensively in the study area since 1966, and large numbers of specimens collected by others are on deposit in the other Louisiana herbaria.

A complete list of the plants thus far known from the parishes is included in the thesis (Taylor 1984). Specimens not found in the Herbarium of Northeast Louisiana University (NLU) have the literature citation or the location of the specimen given. A complete list of the species is also found in Taylor and Thomas (1985). The rare plants from the study area are listed below by parish. Those with a letter P after them indicate that they are on the February, 1986 "Louisiana Special Plant List" (Parker 1986).

Rare plants found in both Washington and St. Tammany Parishes include: Alysicarpus vaginalis (L.) DC., Aptera aphylla (Nutt.) Barnh., Arundinaria gigantea (Walt.) Muhl. ssp. tecta (Walt.) McClure, Asclepias humistrata Walt. (P), Asclepias lanceolata Walt., Asclepias michauxii Dcne., Aster adnatus Nutt., Aster linifolius L., Aster solidaginensis Michx. (P), Aster tortifolius Michx., Bigelowia nudata (Michx.) DC., Bulbostylis barbata (Rottb.) Clark ex Hook., Bulbostylis capillaris (L.) Clarke ex Hook., Burmannia capitata (Walt.) Mart. (P), Calamintha georgiana (R. M. Harper) Shinners (P), Calopogon tuberosus (L.) B.S.P., Carphephorus odoratissimus (J. F. Gmel.) Hebert, Carphephorus pseudoliatris Cass., Chamaelirium luteum (L.) DC. (P), Chrysopsis hyssopifolia Nutt. (P), Cleistes divaricata (L.) Ames (P), Clethra alnifolia L., Cnidoscolus stimulosus (Michx.) Gray, Collinsonis canadensis L., Coreopsis major Walt. forma oemleri (Ell.) Sherff., Coreopsis nudata Nutt. (P), Crotalaria purshii DC. (P), Crotalaria rotundifolia Walt. ex J. F. Gmel., Drymaria cordata (L.) Willd., Elephantopus elatus Bertol. (P), Epidendron conopseum R. Br., Gaylussacia dumosa (Andr.) Torr. & Gray, Gaylussacia mosieri (Small) Chapm., Gelsemium rankii Small, Gentiana saponaria L., Gentiana villosa L., Helianthus floridanus Gray, Helianthus heterophyllus Nutt., Helianthus microchepala Torr. & Gray, Helianthus radula (Pursh) Torr. & Gray, Hexastylis arifolia (Michx.) Small, Ilex amelanchier M. A. Curtis (P), Lachnanthes caroliniana (Lam.) Dandy (P), Lachnocaulon anceps (Walt.) Morong, Leucothoe axillaris (Lam.) D. Don, Leucothoe racemosa (L.) Gray, Liatris tenuis Shinners (P), Lilium catesbaei Walt. (P), Lilium michauxii Poir., Listera australis Lindl., Lobelia brevifolia Nutt., Lobelia floridana Chapm., Lupinus villosus Willd. (P), Lyonia lucida Lam., Macranthera flammea (L.) Penn. (P), Magnolia macrophylla Michx., Mayaca aubletii Michx. (P), Melanthium virginicum L., Mitrocarpus hirtellus (L.) DC., Osmanthus americanus (L.) Gray, Plantanthera nivea (Nutt.) Luer, Podostemum ceratophyllum Michx. (P), Polygala grandiflora Walt., Rhexia nashii Small (P), Rhynchospora chapmanii M. A. Curtis (P), Rhynchospora debilis Gale (P), Sabatia macrophylla Hook. (P), Seymeria cassiodes (J. F. Gmel.) Blake, Stenanthium gramineum (Ker.) Morong, Stokesia laevis (Hill) Greene (P), Tephrosia florida (F. G. Dietr.) C. E. Wood., Tephrosia spicata (Walt.) Torr. & Gray, Tofieldia racemosa (Walt.) B.S.P. (P), Trichomenes petersii Gray (P), Tridens chapmanii (Small) Chase (P), Vaccinium

darrowii Camp, Viburnum cassinoides L., and Wahlenbergia marginata (Thunb.) DC.

Rare plants found in Washington Parish but not in St. Tammany Parish include: Aristolochia tomentosa Sims, Botrychium alabamense Maxon (P), Botrychium lunarioides Michx., Buchnera americana L., Carya pallida (Ashe) Engelm. & Graebn. (P), Coreopsis major Walt. (P), Crotalaria intermedia Kotschy, Cyperus cuspidatus H.B.K. (P), Desmodium tortuosum (Sw.) DC., Drosera intermedia Hayne in Schrad. (P), Dulichium arundinaceum (L.) Britt., Echinacea purpurea (L.) Moench., Fuirena bushii Kral, Gaura filipes Spach, Geobalanus oblongifolius (Michx.) Small (P), Hypoxis longii Fern. (P), Isoetes louisianensis Thieret (I. engelmannii x I. melanopoda) (P), Kalmia latifolia L. (P), Lindera subcoriacea B. E. Wofford (P), Magnolia pyramidata Bart. ex Pursh. (P), Myrica inodora Bart. (P), Polansia dodecandra (L.) DC., Potamogeton epihydrus Raf. (P), Prenanthes altissima L. var. cinnamomea Fern., Psilocarya nitens (Vahl) Wood (P), Quercus laevis Walt. (P), Rudbeckia laciniata L. (P), Sanicula marilandica L. (P), Smilax herbacea L., Solidago gigantea Muhl., Thelypteris noveboracensis (L.) Nieuwl. (P), Tragia cordata Michx., and Utricularia juncea Vahl (P).

Rare plants found in St. Tammany Parish but not in Washington Parish include: Acacia smallii Isely, Acanthospermum australe (L.) Kuntze, Agalinis aphylla (Nutt.) Raf. (P.), Agalinis filicaulis (Benth.) Penn. (P), Agalinis linifolia (Nutt.) Britt. (P), Amorpha croceolanata Wats., Amorpha nitens L. (P), Andropogon mohrii (Hackel) Hackel ex Vasey (P), Arenaria lanuginosa (Michx.) Rohrb., Arthraxon hispidus (Thunb.) Makino, Asclepias longifolia Michx., Asclepias rubra L., Bartonia verna (Michx.) Muhl. (P), Bulbostylis ciliatifolia (Ell.) Fern., Calopogon pallidus Chapm. (P), Ceratophyllum muricatum Cham., Chasmanthium ornithorynchum (Steud.) Yates (P), Cirsium lecontei Torr. & Gray (P), Coelorachis rugosa (Nutt.) Nash, Coelorachis tesselata (Steud.) Nash (P), Cynanchum angustifolium Pers., Cypselea humifusa Turpin, Dyssodia tenuiloba (DC.) Robins., Eleocharis elongata Chapm. (P), Eriocaulon compressum Lam., Erigeron myrionactis Small, Eryngium yuccifolium Michx. var. synchaetum Gray ex Coult., Eulophia ecristata (Fern.) Ames (P), Euthamia graminifolia (L.) Nutt., Euthamia minor (Michx.) Greene, Fuirena scirpoidea Michx. (P), Fuirena simplex Vahl (P), Gutierrezia dracunculoides (DC.) Blake, Hackelochloa granularis (L.) Kuntze, Helenium brevifolium (Nutt.) Wood. (P), Helenium drummondii H. Rock, Holcus lanatus L., Hydrocotyle sibrothropoides Lam., Hyptis mutabilis (A. Rich.) Briq., Ilex cassine L. var. cassine (P), Ilex cassine L. var. myrtifolia (Walt.) Sarg. (P), Justicia americana (L.) Vahl (P), Kickxia elatine (L.) Dumort, Lilaeopsis caroliniensis Coult. & Rose, Limonium nashii Small, Lobelia inflata L. (P), Lobelia siphilitica Lam., Lophiola americana Pursh (P), Lycopodium cernuum

L. (P), Murdannia nudiflora (L.) Brenan, Odontonychia corymbosa Small (P), Oenothera humifusa Nutt. (P), Panicum tenerum Beyr. (P), Parkinsonia aculeata L., Pentodon pentandrus (Schum. & Thonn.) Vatke, Pinguicula lutea Walt. (P), Platanthera blephariglottis (Willd.) Lindl. (P), Polygala nuttallii Torr. & Gray (P), Polystichum tsus-simense (Hook.) J. Sm., Pteris multifida Poir., Pteris vittata L., Quercus minima (Sarg.) Small (P), Rhynchospora ciliaris (Michx.) Mohr (P), Rhynchospora miliacea (Lam.) Gray (P), Ruellia noctiflora (Nees) Gray (P), Rumex chrysocarpus Moris, Rumex mexicanus Meisn., Rumex paraguayensis D. Parodi, Sabatia arenicolia Greenm. (P), Sarracenia psittacina Michx. (P), Selaginella ludoviciana A. Braun (P), Serenoa repens (Bartr.) Small (P), Sium suave Gmel. (P), Smilax auriculata Walt., Solidago fistulosa Mill., Taxodium adscendens Brongn., Tephrosia hispidula (Michx.) Pers., Uniola paniculata L. (P), Utricularia purpurea Walt. (P), Vallisneria americana Michx., and Zizania aquatica L.

Citations for the state records collected during this study are as follows:

Catapodium rigidum (L.) C. E. Hubbard ex Dong.

ST. TAMMANY PARISH: Sandy roadbank of La. 433 in marsh at curve at Rigolets Estates one mile NW of U.S. 90, Sec. 11, T10S, R14E. R. Dale Thomas, David D. Taylor, and John W. McCoy 83612 & 3239, 17 May 1983. This specimen was determined by Charles M. Allen.

Liatris graminifolia Willd.

WASHINGTON PARISH: Infrequent in hardwood forest on bluffs about two milies west of Enon in Sec. 53, T3S, R11E. Charles M. Allen 8866, 4 November 1978. This specimen was verified by K. N. Gandhi.

Pterocarya stenoptera DC.

WASHINGTON PARISH: Large spreading-crowned tree near La. 21 (Main Street) at Railroad Street in Angie, Sec. 17, T1S, R14E. Large tree about 40 ft. tall. Cultivated but spreading other side of Railroad street. Many small plants one to four inches dbh in waste area at least 400 feet from main tree. R. Dale Thomas 84236, 14 June 1983. Duplicates were determined by Donald Stone and by Bill Hess. This is the first record of this species becoming established and spreading in the United States.

Rhynchospora pleiantha (Kukenth.) Gale

ST. TAMMANY PARISH: Open fields in swampy area south of U.S. 190 just east of La. 25 north of Covington, Sec. 43, T6S, R11E. R. Dale Thomas and Barbara G. Thomas 49299, 49302, 2 June 1976. Both collections were determined by James W. Kessler in 1981.

Rhynchospora stenophylla Carey ex Chapm.

WASHINGTON: Swampy area beside La. 10 east of Lawrence Creek three miles east of Franklinton, Sec. 29, T2S, R11E. R. Dale Thomas and Ken E. Rogers 29350, 13 May 1972. This is the same location as Thomas 29374 and as Rogers 8072 from the University of Tennessee. These specimens were determined by James Kessler in 1985. One at LAF was determined by John Owen Joyce in 1973 and the Rogers collection was determined by Ken E. Rogers in 1972. Neither of these species of Rhynchospora included in Thomas and Allen (1984). This species was collected in a habit containing several rare plants for Louisiana including Myrica inodora Bartr., Mayaca aubletti Michx., and Lindera subcoriacea B. E. Wofford.

Rumex conglomeratus Murray

ST. TAMMANY PARISH: Four locations: Along roadbank of U.S. 90 at Pearl River and Mississippi State Line, Sec. 29, T9S, R16E, R. Dale Thomas 84252, 15 June 1983; Roadbank and marsh beside La. 22 along east bank of Tchefuncte River at Madisonville, Sec. 25, T7S, R10E, R. Dale Thomas and Pat Pias 65176, 1 June 1979; Parking lot at Lake Ponchartrain west of Tchefuncte River at end of La. 1077 south of Madisonville, Sec. 2, T8S, R10E, R. Dale Thomas, David D. Taylor, and John McCoy, 83561 and 3188 and 83564 and 3190, 17 May 1983. All these specimens were determined by David D. Taylor. This species was not included in Thomas and Allen (1982).

Stipulicida setacea Michx.

ST. TAMMANY PARISH: Sandy area along east bank of West Middle Pearl River at second bridge on U.S. 90 east of U.S. 190 east of Slidell, Sec. 25, T9S, R15E. R. Dale Thomas, David D. Taylor, and John McCoy 83658 & 3285, 17 May 1983. The first collection was made at this site on 27 May 1982 (Thomas 81314). A large population of Odontonychia cormybosa Small is intermingled with the Stipulicida, and Hyptis mutabilis (L. C. Rich.) Briq. and Lantana montevidensis (Spreng.) Briq. are abundant at a nearby bridge. The Stipulicida specimen was verified by John Thieret.

LITERATURE CITED

Parker, Annette. 1986. Louisiana Special Plant List. Mimeographed unpublished list of 291 rarest native Louisiana vascular plants. Louisiana Natural Heritage Program, Baton Rouge. 6 pp.

Taylor, David D. 1984. A Preliminary Survey of the Vascular Flora of Washington and St. Tammany Parishes, Louisiana. Unpublished Masters of Science Thesis, Northeast Louisiana University, Monroe. 196 pp.

Taylor, David D. and R. Dale Thomas. 1985. A Preliminary Checklist of the Vascular Flora of Washington and St. Tammany Parishes, Louisiana. Contributions of the Herbarium of Northeast Louisiana University 6: 1-104.

Thomas, R. Dale and Charles M. Allen. 1982. A Preliminary Checklist of the Dicotyledons of Louisiana. Contributions of the Herbarium of Northeast Louisiana University 3: 1-130.

Thomas, R. Dale and Charles M. Allen. 1984. A Preliminary Checklist of the Pteridosperms, Gymnosperms, and Monocotyledons of Louisiana. Contributions of the Herbarium of Northeast Louisiana University 4: 1-55.

REVISION OF THE HAWAIIAN DIOPYROS (EBENACEAE)

HAWAIIAN PLANT STUDIES 120

Harold st. john

In the flora of any considerable area, one expects to find several genera that are technically difficult of classification. Such a one in Hawaii is Diospyros.

Earlier botanists accepted the species with trimerous flowers as in the genus Maba, these differing from Diospyros which had the flowers 2-, 4-, or 5- merous. This basis of separation is now considered arbitrary, and hence the two gerera are merged as Diospyros. Maba sandwicensis A. DC. (1844) was based on a collection by Gaudichaud from the Sandwich Islands. M. Hillebrandii Seem. (1866) was described from a plant of Oahu, based on Hillebrand 274, in the Kew Herbarium . For several decades these two species formed the concept of the genus in Hawaii, the trees called "lama" by the Hawaiians.

R. C. Bakhuizen van den Brink (1935-1955) monographed the group as Diospyros, covering the species of Malaysia, southern Asia, and the Pacific. In it he accepted D. ferrea (Willd.) Bakh. of southern India, and under it he had 52 varieties or forms, occurring from Madagascar to Hawaii. Fosberg (1939) accepted Bakhizen's concept of D. ferrea, but recognized that in the Hawaiian Islands it contained diverse kinds, and he classified them as five varieties and eight forms. His key to them has not proven practical. Consequently the author has reexamined them, and has produced the present treatment.

Recent monographic study was by Kostermans (1977) and he stated (p. 449), "The greatest headache was Bakhuizen's treatment of Diospyros ferrea, in which he has lumped so many species, than nobody could make head or tail of it any more." Consequently D. sandwicensis is restored to specific rank. Of Fosberg's minor taxa, nine are accepted, but two are reduced to synonymy. In addition to them the author here described eight new ones.Thus, D. sandwicensis is recognized as a species with numerous vafiations, and is a group difficult to classify. On the other hand, D. Hillebrandii remains as a single, clear unit.

Key to the Hawaiian Species of Diospyros

A. Back of calyx glabrous, but the acute lobes ciliate; blades above with deep pits between the raised reticulate veinlets; blades mostly oblongelliptic, the base rounded to subcordate. Kauai, Oahu. . . . . D. Hillebrandii.

A. Back of calyx appressed pilosulous,
  B. Blades above with deep pits between the raised reticulate veinlets; blades lanceolate,
    C. Petioles pilosulous; blades 3.5-9 cm long. Oahu. D. sandwicensis, var. Toppingii.
    C. Petioles arachnoid; blades 6-8.5 cm long. Kauai.. . . . . var. rugosa.
  B. Upper surface of blade plane or nearly so; the veinlets obscure or faintly reticulate,
    D. Blades below permanently pubescent,
      E. Blades glabrous above, lanceolate to elliptic, 1.2-1.3 x 1-1.7 cm; petioles ascending puberulous. Molokai. var. sclerophylla.
      E. Blades above appressed strigose to subglabrate, elliptic, 3.5-7.5 cm long; petioles puberulent and arachnoid. e. Maui, Lanai. . . . . var. Degeneri.
    D. Blades below glabrous or early glabrous,
      F. Petioles glabrous,
        G. Blades lanceolate, (3-) 5-7 (-9.5) cm. long. Oahu. . . . var. sandwicensis.
        G. Blades elliptic or ovate,
          H. Blades elliptic, (5-) 6-11 cm long. Oahu, w. Maui. . . . var. elliptica.
          H. Blades ovate, 4-7 cm long. Molokai, w. Maui. . . . . var. ovalis.
      F. Petioles pubescent,
        I, Petioles white arachnoid,
          J. Petioles only arachnoid,
            K. Blades elliptic or lanceolate,
              L. Blades elliptic,
                M. Blades 6-11 cm long,
                  N. Blade base rounded; blades 4.7-8.2 cm long. Oahu. . . . . var. oahuensis.
                  N. Blade base subcordate; blades 6-12 x 4.7-8.2 cm, Kauai. . . . . var. kauaiensis.
                M. Blades 2.5-5.5 cm long,
                  O. Blades 10-32 mm wide, elliptic. Molokai, Lanai. var. arachnoidea.
                  O. Blades 32-40 mm wide, broadley elliptic. Lanai. var. lanaiensis.
              L. Blades lance elliptic, 3-5.5 cm long. Hawaii. . . . . var. frameata.
            K. Blades lanceolate, 3-8 cm long. Kauai, Oahu, Hawaii. . . . var. rotundata.
          J. Petioles arachnoid and pubescent,
            P. Blades elliptic to ovate, 2.5-12 cm long. Molokai, Hawaii. var. pubescens.
            P. Blades lanceolate, 7-12 cm long. Kauai. . . . . var. kokeensis.

I. Petioles pubescent, but not arachnoid,
Q. Blades lanceolate, 3-9 cm long. Kauai, Oahu, Molokai, Hawaii. var. Wiebkei.
Q. Blades elliptic,
R. petioles appressed pubescent,
S. Petioles appressed puberulous,
T. Petioles sparsely minutely puberulous; blades 4-6 cm long. Hawaii. var. puberula.
T. Petioles densely puberulent; blades 6.5-11 cm long. Kauai. . . var. miloliiensis.
S. Petioles appressed pilose; blades 2-5.5 cm long, elliptic, obtuse. Oahu. . . . . var. obtusa.
R. Petioles diverging pubescent,
U. Petioles spreading puberulous; blades appressed pilosulous below, (1.7-) 3-5.5 cm long, elliptic or lance elliptic. Molokai. . . . . var. wailauensis.
U. Petioles densely ascending puberulent; blades glabrate below, 3-4 cm long, elliptic. Molokai, Hawaii. . . . . var. perpubescens.

Enumeration of Taxa

Diospyros sandwicensis (A. DC.) Fosb., var. sandwicensis, Bishop Mus., Occas. Papers 12(15): 8, 1936.
D. ferrea (Willd.) Bakh.Gard. Bull., Straits Settlem. 7: 162, 1932, var. sandwicensis (A. DC.) Bakh., Jard. Bot. Buitenz., Bull. III, 15: 58. 1937.
D. ferrea, var. sandwicensis,f. sandwicensis (A. DC.) Fosb., Bishop Mus., Occas. Papers 15(10): 125, 1939.
Maba sandwicensis A. DC. in DC., Prodr.6:242, 1844.
Ebenus sandwicensis (A. DC.) Ktze., Rev. Gen. 2: 408, 1841. Fog/ 5W
Holotype: in insul. Sandwich, Gaudichaud (P).
Range: Oahu.

var. arachnoidea, var. nov.
Diagnosis Holotype: Petiolis arachnoideis, laminis ellipticis glabratis.
Diagnosis of Holotype: Tree 6.6 m tall; petioles white arachnoid; blades 2-5.5 x 2.1-2.9 cm, coriaceous, elliptic, early glabrate above and below;

peduncles 3-4 mm long, ascending pilose; calyx 4-5 mm long, patelliform, appressed ascending pilose, the lobes convex; fruit 10-13 mm long, broadly ellipsoid.

Supplementary Description: Tree 3-7 m tall; blades 2-7 cm long; fruit yellow, becoming red.

Holotypus: Hawaiian Islands, Oahu Island, Waianae Mts., Makua, Piko Trail, wooded gulch, Nov. 25, 1932, H. St. John 12,249 (BISH).

Specimens Examined: Oahu, both mountain ranges, 10 collections. Molokai: Mahana, Rock 14,004. Lanai: St. John & Cowan 22,620, and seven others. Hawaii: Kapua, E. H. Bryan Jr. 750, and one other.

Discussion: The new epithet is the Latin adjective arachnoideus, cobwebby, and it is chosen with reference to the pubescence of the petioles.

Range: Oahu, Molokai, Lanai, and Hawaii.

var. Degeneri (Fosb.) comb. nov. Fig. 4r.

D. ferrea (Willd.) Bakh., var. Degeneri Fosb., Bishop Mus., Occas. Papers 15(10):129-130, 1939.

Lectotype: Hawaiian Islands, East Maui, Auahi, alt. 3,000 ft, Nov. 1910, Rock 8,665a (BISH). Fosberg listed this and another number as the type.

var. elliptica var. nov. Fig. 3p

Diagnosis Holotypi: Petiolis glabris, laminis 6-11 × 2-5.7 cm ellipticis glabris.

Diagnosis of Holotype: Small tree; petioles glabrous; blades 6-11 × 2-3.2 cm, coriaceous, elliptic, glabrous; pedicels 3-4 mm long, ascending pilose; calyx 4-5 mm long, ascending pilose, the lobes hemispheric; fruit 14-19 mm long, ellipsoid.

Supplementary Description: Tree 2-12 m tall; blades 2-5.7 cm wide.

Holotypus: Hawaiian Islands, Oahu Island, Punaluu, 1,900 ft alt., Nov. 30, 1929, H. St. John 10,079 (BISH).

Specimens Examined: Oahu, both mountain ranges, 19 collections.

Discussion: The new epithet is the Lain adjective ellipticus, elliptic, and it is given with reference to the shape of the blades.

Range: Oahu.

var. frameata var. nov. Fig. 3m.

Diagnosis Holotypi: Arbor, ramulis petiolis basibusque laminarum arachnoideis puberulisque, laminis 3-5.5 × 1.7-2.3 cm lanceo-ellipticis planis.

Diagnosis of Holotype: Tree; branchlets and petioles arachnoid and spreading puberulous; petioles 4-6 mm long, arachnoid; blades 3-5.5 × 1.7-2.3 cm, coriaceous,

lance elliptic, plane, arachnoid near the base on both sides; peduncles 1-2 mm long, ascending pilose; calyx 4-5 mm long, appressed ascending pilosulous, the lobes 2 mm long, broadly deltoid; fruit 14-16 mm long, ellipsoid.

Supplementary Description: Tree 3-8 m tall; blades 1.7-2.6 cm wide.

Holotypus: Hawaiian Islands, Hawaii Island, Manuka, Kau, 9-1927, G. W. Russ (BISH).

Specimens Examined: Hawaiian Islands, Hawaii Island, Kapua, on pahoehoe, kipuka s. of Hanakeaumoe, near the sea, Nov. 28, 1932, E. H. Bryan Jr. 762; N. Kona, just s. of 1801 lava flow, 1,000 ft elev., July 31, 1966, S. Carlquist 2,101; Puuwaawaa, rough lava, 600 m alt., Dec. 2, 1926, L. H. MacDaniels 319; all in (BISH).

Discussion: The new epithet is from the Latin noun framea, spear, and it is given with reference to the spear or lance-shaped blades.

Range: Hawaii.

var. kauaiensis (Fosb.) comb. nov. Fig. 4v.
D. ferrea (Willd.) Bakh., var. kauaiensis Fosb., Bishop Mus., Occas. Papers 15(10) 130-131, 1939.

Holotype: Hawaiian Islands, Kauai, Waimea, Keanamahuna Valley, 2,500 ft alt., Oct. 31, 1929, C. S. Judd (BISH).

Range: western Kauai, Kaholuamanu; Kukui Trail; Milolii; and Mahanloa, four collections.

var. kokeeensis var. nov. Fig. 2i.

Diagnosis Holotypi: Arbor, ramulis petiolisque arachnodeis, laminis 4-8.5 × 1.1-3.5 cm lanceolatis glabris coriaceis.

Diagnosis of Holotype: Tree; branchlets arachnoid; petioles 5-6 mm long, arachnoid; blades 4-8.5 × 1.1-3.5 cm, coriaceous, lanceolate, glabrous except that the midrib is arachnoid near the base; (branch sterile).

Holotypus: Hawaiian Islands, Kauai Island, w. of Kokee, Dec. 1960, Hans Hansen (Degener no.) 27,225 (BISH).

Discussion: The new epithet is formed from the name of the type locality, Kokee, and -ensis, the Latin adjectival place ending.

var. lanaiensis (Fosb.)comb. nov. Fig. 4q.
D. ferrea (Willd.) Bakh., var. Degeneri Fosb., f. lanaiensis Fosb., Bishop Mus., Occas. Papers 15(10): 130, 1939.

Holotype: Hawaiian Islands, Lanai Island, mountains near Koele, June 1913, C. N. Forbes 118.L. (BISH).

Specimens Examined: Hawaiian Islands, Lanai Island, edge of Maunalei, Sept. 1917, Forbes 376.L.; and eight others. Range: Lanai, dry scrub or forest, 1,000-2,000 ft alt., Kanepuu, and the mountain Lanaihale.

var. miloliiensis var. nov. Fig. 1c.

Diagnosis Holotypi: Arbor 5 m alta est, ramulis petiolisque dense ascendente puberulis, laminis 6.5-11 × 2.5-5 cm ellipticis glabratis supra moderatim reticulatis.

Diagnosis of Holotype: Tree 5 m tall; branchlets and petioles densely ascending puberulent; petioles 7-10 mm long; blades 6.5-11 × 2.5-5 cm, coriaceous, abundantly appressed puberulous but glabrate, elliptic, above moderately reticulate; pedicels 2-3 mm long, scaly and pilose; calyx 5-6 mm long, appressed pilose, the lobes 2.5-3 mm long, broadly ovate; corolla 8 mm long.

Holotypus: Hawaiian Islands, Kauai Island, Waimea Dist., Mahanloa Valley, dry forest, 2,000 ft elev., May 25, 1980, R. Gustafson 1,755 (BISH).

var. oahuensis var. nov. Fig. 3o.

Diagnosis Holotypi: Arbor est, ramulis petiolisque dense arachnoideis, laminis 4-9.3 × 2.9-4.6 cm ellipticis subacutis.

Diagnosis of Holotype: Tree; branchlets and petioles densely white arachnoid; petioles 4-7 mm long; blades 4-9.3 × 2.9-4.6 cm coriaceous, elliptic, subacute, the base rounded, plane; calyx 3.5-4 mm long, appressed pilosulous, the lobes broadly ovate, subacute.

Holotypus: Hawaiian Islands, Oahu Island, n. side of Kaluanui Valley, moderately rainy forest, March 18, 1939, O. Degener & Foster 12,303 (BISH).

Discussion: The new epithet is the name of the type locality, and -ensis, the Latin adjectival place suffix.

var. obtusa (Fosb.) comb. nov. Fig. 1d.

D. ferrea (Willd.) Bakh., var. sandwicensis (A. DC.) Bakh., f. obtusa Fosb., Bishop Mus., Occas. Papers 15(10: 127, 1939.

Holotype: Hawaiian Islands, Oahu Island, Koolau Mts. divide, Pupukea-Kahuku Trail, Hanakaoe, moist forest, 450 m alt., May 31, 1937, F. R. Fosberg & E. Y. Hosaka 14,000 (BISH).

Specimens Examined: Hawaiian Islands, Oahu Island, Laie-Malaekahana ridge, lower woods, 1,100 ft alt., April 15, 1933, H. St. John 13,053 - and 23 others.

Range: Oahu, lower slopes of the Koolau Range.

var. ovalis var. nov. Fig. 3k.

Diagnosis Holotypi: Arbor 6.6 m alta est, ramulis foliisque glabris, laminis 5-6.5 × 2.3-3.4 cm coriaceis ovatis varie elliptico-ovatis.

Diagnosis of Holotype: Tree 6.6 m tall; branchlets and petioles glabrous; petioles 3-5 mm long; blades 5-6.5 × 2.3-3.4 cm, coriaceous, ovate to elliptic ovate, plane, glabrous; pedicels 2-3 mm long, scaly and pilosulous; calyx 4 mm long, appressed pilose, the lobes broadly deltoid to suborbicular; fruit 11-13 mm long, ellipsoid.

Expanded Description: Blades 5-7 × 2.3-3.7 cm.

Holotypus: Hawaiian Islands, Molokai Island, n. of Halawa Valley, shrubby forest, Aug. 1, 1949, O. Degener & T. Murashige 20,118 (BISH).

Specimens Examined: Hawaiian Islands, Molokai Island, Halawa, dry rocky slope, 250 ft alt., Dec. 27, 1932, H. St. John et al. 12,715; and 2 others.

Maui: between Nahiku and Hana, old aa flow, July 4, 1961, O. & I. Degener 27,604.

Range: Molokai and Maui, lower forests.

The new epithet is the Latin adjective ovalis, egg-shaped, and it refers to the shape of the leaf blades.

var. perpubescens var. nov. Fig. 2h.

Diagnosis Holotypi: Arbor est, ramulis petiolisque ascendente puberulis, laminis 5-7.5 × 2-3.1 cm ellipticis subacutis glabratis.

Diagnosis of Holotype: Tree 3-5 m tall; branchlets and petioles densely ascending puberulent; petioles 3-6 mm long; blades 5-7.5 × 2-3.1 cm, coriaceous, elliptic, subacute, plane, at first appressed puberulent but glabrate; pedicels 2 mm long, scaly and pilosulous; calyx 4 mm long, appressed pilosulous, the lobes hemispheric; fruit 11-14 mm long, ellipsoid.

Expanded Description: Blades 2-3.3 cm. wide.

Holotypus: Hawaiian Islands, Hawaii Island, Punaluu, rocky pasture, July 25, 1926, O. Degener 30,201 (BISH).

Specimens Examined: Hawaii Island: Puuwaawaa, 1/2 mile mauka of Mamalahoa Hwy., dry forest, 1,950 ft elev., 6 Feb. ;972, G. Spence 22; and 5 others.

Molokai Island: Makakupaia, dry forehill gulch, Degener & Pekelo 27,598.

Range: Molokai and Hawaii, dry scrub forests.

var. pubescens (Skottsb.) comb. nov. Fig. 4u.

Maba sandwicensis A. DC., var. pubescens Skottsb., Göteb. Bot. Trädg., Meddel. 2: 257, 1926.

Diopyros ferrea (Willd.) Bakh., subsp. sandwicensis (A. DC.) Fosb., Bishop Mus., Occas. Papers 15(10): 128, 1939. ↑ var. pubescens (Skottsb.) Fosb.,

Maba sandwicensis A. DC., var. β Hbd., Fl. Haw. Is. 275, 1888.

Skottsberg based his Maba sandwicensis, var. pubescens on Hillebrand's var. β, and on two of his own collections from Hawaii, without designating a type. Fosberg (1939: 128) stated, "Hillebrand included plants from Kauai and Hawaii in this variety, but when Skottsberg gave it a name he cited only Hawaii specimens. Though he did not definitely reject the inclusion of the Kauai forms, I think he typified the variety by this limitation."

Hillebrand cited his var. β from Hawaii: Kona and Kau; Kauai, Waimea, and gave different petiole and blade measurements for the plants of each island. Thus it is seen that Hillebrand had two Hawaiian localities. Hillebrand's first set of specimens was destroyed in Berlin in 1944, however, there is a Hillebrand duplicate of var. Pubescens in the Bishop Museum, and it consists of detached fruit and numerous leaves, and the original ticket reads, "Maba, Kaū, Haw." [aii]. This might be an isotype, except for the fact that the leaves are of two sorts, so different that they probably were from two different collections. One sort was surely from Kau, and the other was probably from Kona, but which came from which area is uncertain. Fosberg did not specify any definite Hawaiian collection, so his typification is vague, and unsatisfactory. There is no Hillebrand specimen of tis plant in the British Museum or in Melbourne. Hence, the surviving Hillebrand specimens are in a state of confusion. To settle the problem, the follow-specimen, cited by Skottsberg, is here chosen as the lectotype of var. pubescens Skottsberg.

Lectotype: Hawaiian Islands, Hawaii Island, Kau, between Pahala and Naalehu, 21/9/1922, C. Skottsberg 605b (BISH).

Specimens Examined: Hawaiian Islands, Hawaii Island, North Kona, Flow of 1859, dry aa flow, 8-8-1936, F. R. Fosberg 42; Manuka Mauka, wooded kipuka, 1,300 ft elev., Dec. 26, 1931, H. St. John et al. 11,331; and 33 others.

Molokai: Punakou, Waiahewahewa Gulch, under Nesoluma, Erythrina, 450 ft elev., 5 April 1973, D. Herbst 2,973.

Range: Hawaii Island, 600-2,300 ft alt., in dry lower forests, Puna, Kau, South Kona, and North Kona Districts, and on Molokai, on Mauna Loa at 450 ft alt.

var, rotundata var. nov. Fig. 2f.

Diagnosis Holtypi: Arbor 8.3 m alta est, ramulis petiolisque arachnoideis, petiolis 5-7 mm longis, laminis 5-7 × 2-3 cm glabris lanceolatis.

Diagnosis of Holotype: Tree 8.3 m tall; branchlets and petioles arachnoid; petioles 5-7 mm long; blades

5-7 × 2-3 cm, coriaceous, glabrous, lanceolate; pedicels 3-4 mm long, scaly and pilose; calyx 4-5 mm long, the lobes 3 mm long, hemispheric, acute, appressed pilose; fruits 15-18 mm long, obovoid.

Expanded Description: Blades 2.7-8 × 1.2-3.5 cm, lanceolate to elliptic lanceolate.

Holotypus: Hawaiian Islands, Oahu Island, Niu Ridge, wooded hillside, Dec. 3, 1933, Bush & Topping (Degener no.) 3.700 (BISH).

Specimens Examined: Hawaiian Islands, Oahu Island, Koolau Range, Waimano, 1944, C. Wong 240; and 6 others.

Kauai: Napali Coast, w. side of Hanakoa Valley, moist lower forest, 500 ft alt., Dec. 31, 1947, H. St. John & E. J. Britten 23,223; and 2 others.

Maui: Hanakaoo Gulch, near Lahaina, scrubby slope, 2,000 ft alt., Nov. 27, 1950, O. Degener & H. A. Miller 21,130; and 5 others.

Range: Kauai, Oahu, and Maui, in lower forests.

var. rugosa var. nov. Fig. 2j.

Diagnosis Holotypi: Arbor est, ramulis petiolisque arachnoideis, petiolis 4-7 mm longis, laminis 6-8.5 × 1.9-2.7 cm reticulatis glabris lanceolatis.

Diagnosis of Holotype: Tree; branchlets and petioles arachnoid; petioles 4-7 mm long; blades 6-8.5 × 1.9-2.7 cm, coriaceous, reticulate above and below, glabrous, lanceolate; pedicels 3 mm long, scaly and pilosulous; calyx 5 mm long, appressed pilose, the lobes 2.5 mm long, broadly ovate deltoid; fruit 14 mm long, ellipsoid.

Holotypus: Hawaiian Islands, Kauai Island, 3/4 mile s. w. of Hokunui, dryish grassy summit ridge, Jan. 8, 1940, O. Degener & E. Ornonez 12,637 (BISH).

var. sclerophylla (Fosb.) comb. nov. Fig. 4s.

D. ferrea (Willd.) Bakh., var. pubescens (Skottsb.) Fosb., f. sclerophylla Fosb., Bishop Mus., Occas. Papers 15(10): 129, 1939.

Holotype: Hawaiian Islands, Molokai Island, Mauna Loa, June 1912, C. N. Forbes 6.Mo. (BISH), and isotype.

Specimens Examined: Molokai Island, near Waiahewahewa, arid region, April 19, 1928, O. Degener 11,998; and 2 others.

Range: Molokai, arid western part.

var. Toppingii (Fosb.) comb. nov. Fig. 1b.

D. ferrea (Willd.) Bakh., var. Toppingii Fosb., Bishop Mus., Occas. Papers 15(10): 129, 1939.

Holotype: Hawaiian Islands, Oahu Island, Waianae Mts., Nanakuli, Bush & Topping (Degener no) 11,134

(NY). Isotypes (BISH).

Specimens Examined: Hawaiian Islands, Oahu Island, two ridges s. of Pohakea Pass, forest, 500-750 m alt., 19 March 1931, E. Christophersen, Wilder & Hume 1,660; and 6 others, all from the Waianae Mts.

var. wailauensis (Fosb.) comb. nov. Fig. 3n.

D. ferrea (Willd.) Bakh., var. sandwicensis (A. DC.) Bakh., f. wailauensis Fosb., Bishop Mus., Occas. Papers 15(10): 128, 1939.

Holotype: Hawaiian Islands, Molokai Island, pali above peninsula w. of Wailau Valley, 150 m alt., 7-4-1933, F. R. Fosberg 9,658 (BISH).

Specimens Examined: Hawaiian Islands, Molokai Island, upper Waiahewahewa Gulch, 1,000 ft alt., 2/9/73, N. Pekelo Jr. 25; and 3 others.

Maui Island: Olowalu Valley, May 23, 1920, C. N. Forbes 2,480.M.

Range: Molokai and west Maui, lower dry forests.

var. Wiebkei (Fosb.) comb. nov. Fig. 3l.

D. ferrea (Willd.) Bakh., var. kauaiensis Fosb., f. Wiebkei Fosb., Bishop Mus., Occas. Papers 15(10: 131, 1939.

D. ferrea, var. sandwicensis (A. DC.) Bakh., f. ovata Fosb., Bishop Mus., Occas. Papers 15(10): 127, 1939.

D. ferrea, var. sandwicensis, f. subcoriacea Fosb., Bishop Mus., Occas. Papers 15(10): 127, 1939.

Holotype: Hawaiian Islands, Kauai Island, n. e. of Kipukai, dark moist woods, June 17, 1926, O. Degener & H. Wiebke 3,234 (NY). Isotype (BISH).

Kauai: ridge 3/4 mile n. of Laaukahi, Koloa, open forest, 850 ft alt., Dec. 24, 1947, H. St. John et al. 23,009; and 1 other.

Oahu: Manoa Cliff Trail, July 24, 1953, G. Pearsall; and 1 other.

Molokai: Wailau Valley, 400 ft alt., July 3, 1933, H. St. John et al. 13,233; and 1 other.

Hawaii: Puuwaawaa, 11-30-1926, L. H. MacDaniels; and 20 others.

Range: Kauai, abundant; scarce on Oahu and Molokai, and abundant on Hawaii.

When not otherwise assigned, all specimens are in (BISH).

var. puberula var. nov. Fig. 5x

Diagnosis Holotypi: Arbor est, ramulis petiolisque sparse adpresse puberulis, petiolis 2-4 mm longis, laminis 2.7-5 × 1.5-2.2 cm coriaceis ellipticis vel lancei-ellipticis obtusis supra glabris infra adpresse puberulis.

Diagnosis of Holotype: Tree; branchlets and petioles sparsely minutely appressed puberulous; petioles 3-4 mm long; blades 2.7-5 × 1.5-2.2 cm, elliptic or lance-elliptic, obtuse, coriaceous, above glabrous, below appressed puberulouspetioles 2-3 mm long, ascending puberulent; calyx 4 mm long, ascending puberulous, the lobes 2 mm long.

Holotypus: Hawaiian Islands, Hawaii Island, Pololu Valley, open forest, Feb. 19, 1952, O. Degener & A. Greenwell 21,894 (BISH).

Specimens Examined: Same locality, Degener & Wiebke 3,227; and two others.

Diospyros Hillebrandii (Seem.) Fosb., Bishop Mus., Occas. Papers 12(15): 9, 1936. Fig. 1a.
Maba Hillebrandii Seem., Fl. Viti. 151, 1866, holotype.
Ebenus Hillebrandii (Seem.) Kuntze, Rev. Gen. 408, 1891.

Holotype: Hawaiian Islands, Oahu, Dr. Hillebrand 274 (K). Isotype: Hawaiian Islands, Oahu, valley of Niu, Hillebrand (BISH).

Description: Tree; branches glabrous; leaves distichous; petioles 2-5 mm long, glabrous; blades 5.5-15 × 2.5-7 cm, coriaceous, glabrous, usually elliptic, rarely lanceolate, obtuse or subacute, smooth; bracts and calyx glabrous, coriaceous; calyx 3-lobed, the lobes broadly triangular, acute; corolla 7 mm long; stamens 9; fruit 18-24 mm long, obovoid, hairy only at the apex.

Range: Oahu, common in both mountain ranges.

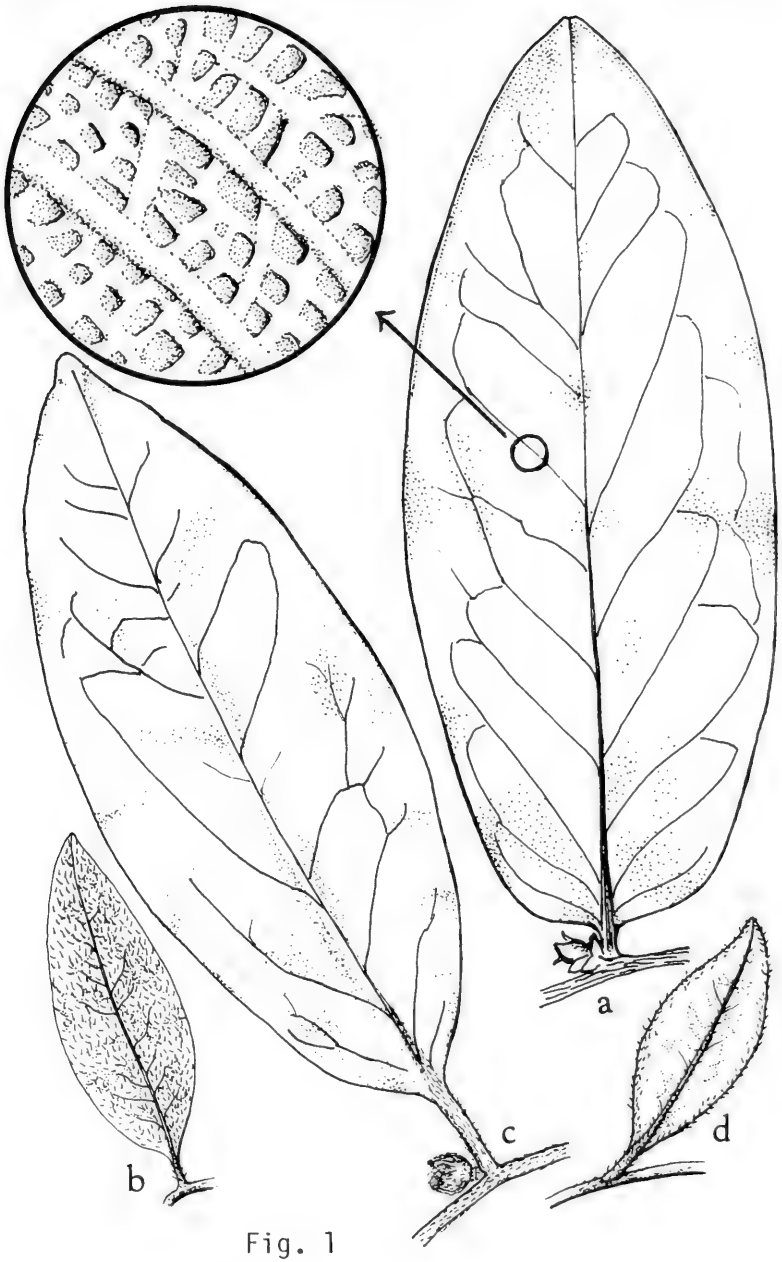

Fig. 1

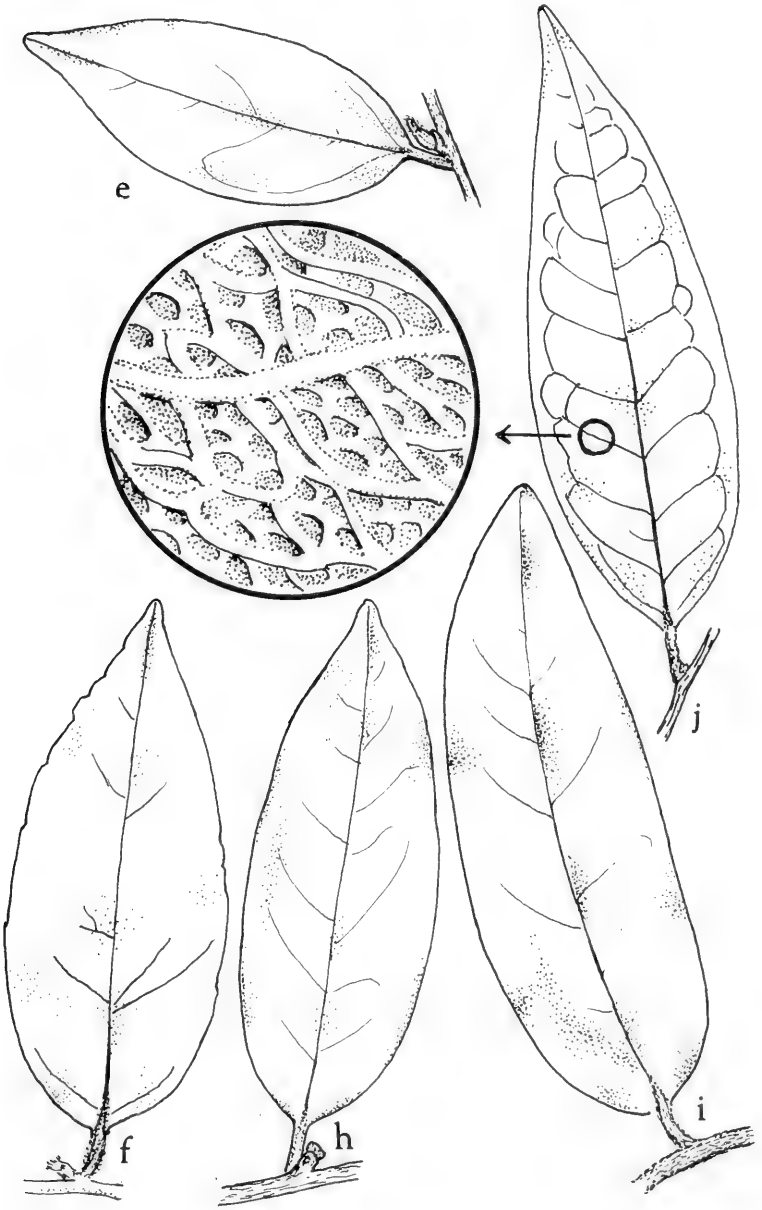

Fig. 2

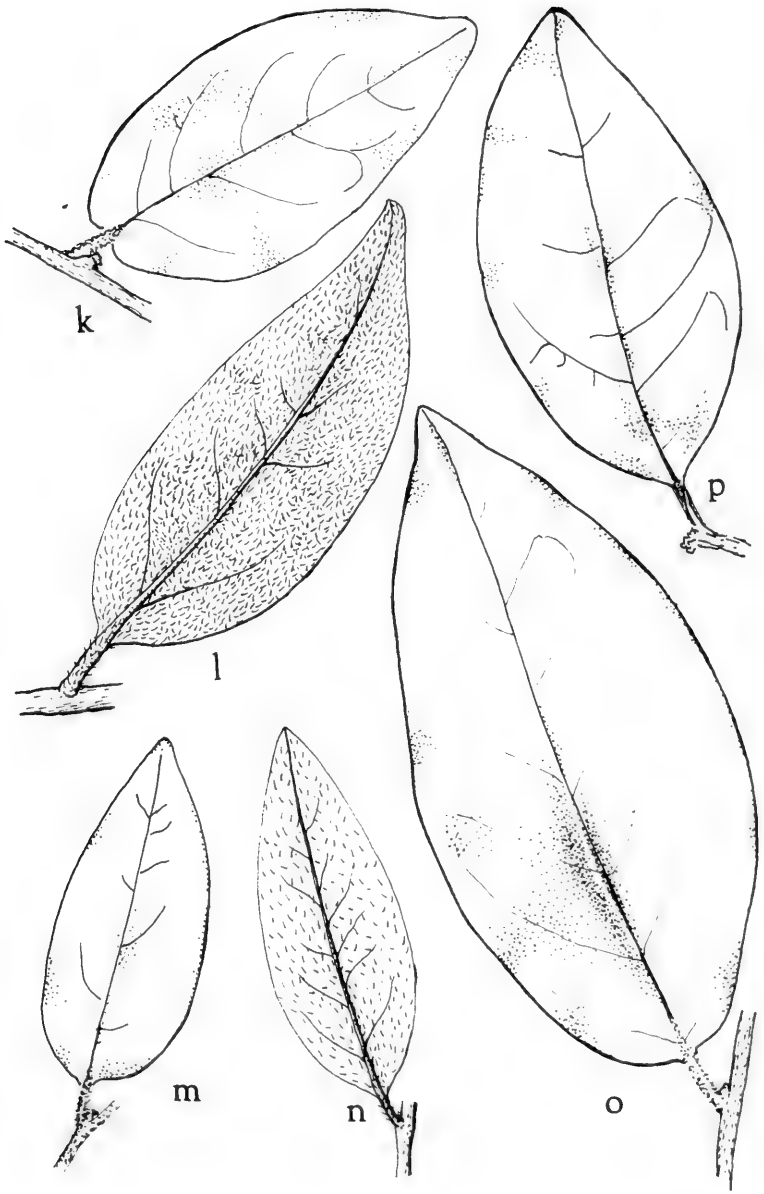

Fig. 3

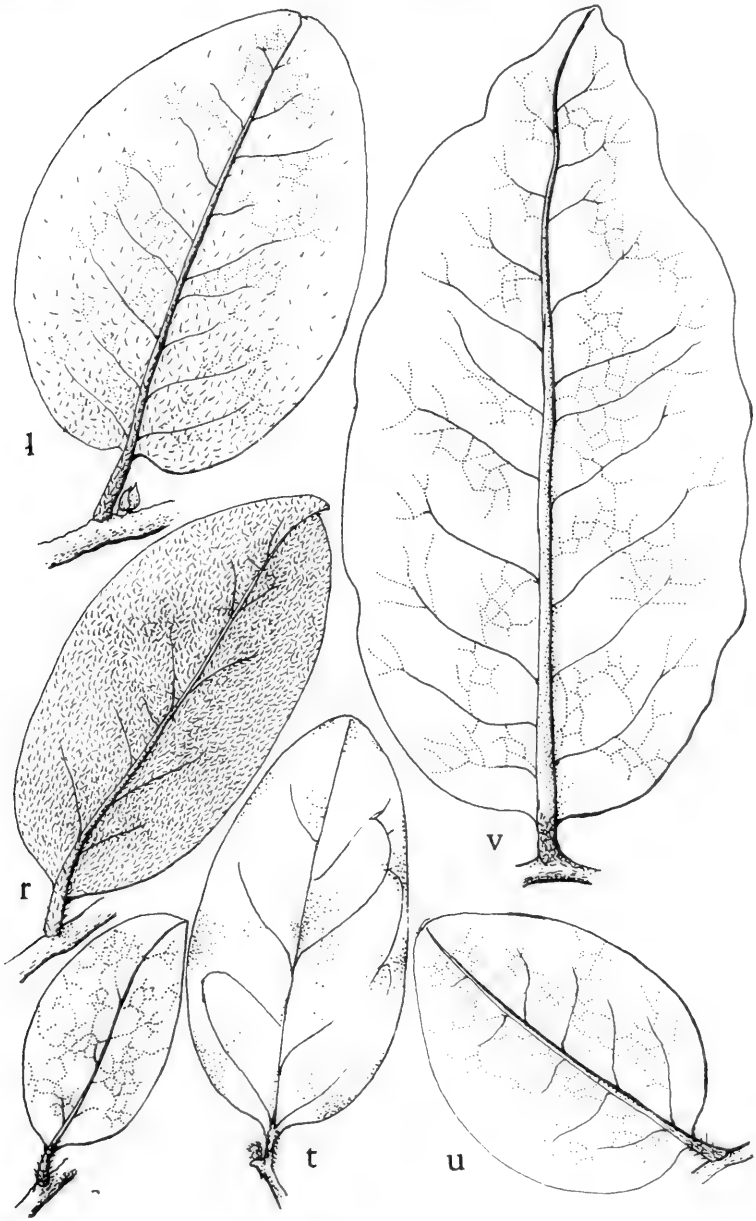

Fig. 4

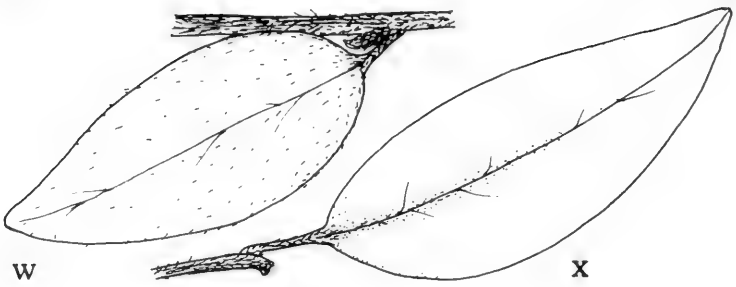

Fig. 5.

Legend

Fig. 1. a Disopyros Hillebrandii, from Herat 470, Pamole; b, D. sandwicensis, var. Toppingii, from type; c, var. miloliiensis, from type; d, var. obtusa, from type.

Fig. 2. e, D. sandwicensis, var. puberula, from type; f, var. rotundata, from type; g h, var. perpubescens, from thpe; i, var. Kokeeensis, from type; j, var. rugosa, from type.

Fig. 3. k, D. sandwicensis, var. ovalis from type; l, var. Wiebkei, from type. m, var. frameata, from type; n, var. wailauensis, from type; o, var. oahuensis, from type; p, var. elliptic, from type.

Fig. 4. q, D. sandwicensis, var. lanaiensis, from type; r, var. Degeneri, from lectotype; s, var. sclerophylla, from type; t, var. arachnoidea, from type; u, var. pubescens, from lectotype; v, var. kauaiensis, from type.

Fig. 5. w, D. sandwicensis, var. puberula, from type; x, var. sabdwucebsus, from Fosberg 9,689, Manoa.

Literature Cited

Bakhuizen van den Brink, R. C., 1936-55. Revisio Ebenacearum Malaysium. Buitenzorg Jard. Bot., Bull. iii, 15: 1-515, 92 pl.

De Candolle, Alphonso, 1844. Prodromus Systematis Regni Vegetabilis 8: 1-684.

Fosberg, F. R. 1939. Diospyros ferrea (Ebenaceae) in Hawaii. Bishop Mus., Occas. Papers 15(10):119-131.

Hillebrand, William, 1888. Flora of the Hawaiian Islands i-xcvi, 1-673, 4 maps.

Kostermans, A. J. G. H., Notes on Asiatic, Pacific, and Australian Diospyros. Blumea 23: 449-474,

Seemann, B. C. 1865-73. Flora Vitiensis, 1-453, pl. 1-100.

NOTES ON THE GENUS *CLERODENDRUM* (*VERBENACEAE*). XV

Harold N. Moldenke

CLERODENDRUM Burm.

Additional & emended bibliography: Skeat, Journ. Roy. Asiat. Soc. Straits 31: 34. 1898; Ridl., Agric. Bull. Straits Fed. Mal. St. 1: 219. 1902; C. B. Clarke in Schmidt, Bot. Tidsskr. 26: 173--174. 1904; Chakrabarti & Mondal, Acarologia 21: 396--400. 1980; Prasad, Mehta, Dave, & Suma, Indian Journ. Exp. Biol. 18: 1524--1525. 1980; Chakrabarti & Mondal, Biol. Abstr. 72: 343. 1981; Prasad, Mehta, Dave, & Suma, Biol. Abstr. 72: 597. 1981; Beattie, Evolut. Ecol. Ant-pl. Mut. 68. 1985; Clewell, Guide Vasc. Pl. Fla. Panhandle 510--511. 1985; Mold., Phytologia 59: 324--359. 1986.

CLERODENDRUM EXCAVATUM var. *CUNEATUM* (DeWild.) Thomas

Continuing DeWildeman's original (1909) description of this plant: "floribus.....breviter pedicellatis; pedicello 12--15 mm. longo, basi bracteolato; bracteis lineari-lanceolatis, margine ciliatis, 6 mm. circ. longis; calyce circ. 27 mm. longo, basi breviter tubuloso, lobis ovato-lanceolatis, acutis, circ. 22 mm. longis et 8 mm. longis [=latis], glabris sed margine ciliatis; corollis rubris, tubo 12 cm. circ. longo, glabro, infundibuliformi apice breviter inflato; staminibus exsertis."

According to experts on the current Code of Botanical Nomenclature (e.g., Dr. Rickett and Rogers), this variety should be credited only to Thomas. They claim that under the Code C. *excavatum* var. *cuneatum* DeWild. is invalid ("not published") because C. *excavatum* DeWild. is itself invalid (and "unpublished"), having been proposed without a single word of description. Var. *cuneatum* was obviously intended by DeWildeman as the typical variety of the species whose lengthy and entirely adequate description he intended to serve as the specific description. Thomas (1936), however, adopted var. *rotundatum* DeWild. as the typical variety, which he had the right to do under the present Code.

The variety seems to me to be a very weak one -- the leaf-blade shape character is poorly marked, but perhaps the red color of the corolla may indicate a color form status. In his original description DeWildeman cites only the type, but in his 1912 work he adds an unnumbered Deleval collection.

In speaking of his two varieties DeWildeman says "Nous réunissons ces deux varietés sous un même nom. Toutes deux présentent des tiges creuses, des glomérules florifères caulinaires, non terminaux, mais dans la forme des feuilles il y a des differences qui, à premiére vue, poussent à la séparation totale; cependant la morphologie générale des feuilles est si semblable dans les deux plantes que nous avons préféré les réunir un même nom spécifique, et sur deux vocables de variétés. Ce *Clerodendron* a des affinités avec le C. *grandifolium* GÜrke.....mais la disposition des inflorescences ter-

minales chez cette dernière espèce, fait reconnaitre trés aisement le C. *excavatum*, qui serait suivant certains une plante myrmécophile, suivant d'autres la tige creuse serait remplie d'eau. Nous n'avons pas trouvé de fourmis à l'intérieur des tubes creux qui formant les tiges."

It seems most probable that the *Laurent 1011* sheet in the Brussels herbarium is the actual sheet from which DeWildeman drew his leaf description, although in his publication he cites only *Laurent 1913* -- *1011* is marked "n.v." on the sheet in his handwriting.

The plant has been collected in wet forests and swamps, in flower in March. On *Laurent 1011* the corollas are described as "rose" and on *1913* as "red".

For var. *cuneatum* Thomas (1936) cites only *Laurent 1913* from Zaire and *Elbert 335* from eastern Cameroons.

Material of C. *excavatum* var. *cuneatum* has been misidentified and distributed in some herbaria as C. *angolense* Gürke and C. *excavatum* var. *rotundatum* DeWild.

Citations: ZAIRE: *Hendrickx 849* (Br); *Laurent 1011* (Br), *1913* (Br--type, Ld--photo of type, N--photo of type); *Sapin s.n.* [Bolofo] (Br). MOUNTED ILLUSTRATIONS: DeWild., Etud. Fl. Bas- Moyen-Congo pl. 11, fig. 1--3. 1909 (N).

CLERODENDRUM FARAFANGANENSE Mold., Amer. Journ. Bot. 38: 322--323. 1951.

Bibliography: Mold., Amer. Journ. Bot. 38: 322--323. 1951; Mold. in Humbert, Fl. Madag. 174: 153, 217--219, & 267, fig. 35 (2). 1956; Mold., Résumé 155 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 136. 1959; Mold., Fifth Summ. 1: 260 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 249 & 536. 1980; Mold., Phytologia 58: 188. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 217, fig. 35 (2). 1956.

A bush, about 1 m. tall; branches and branchlets slender, obtusely tetragonal, gray, glabrescent, more or less prominently lenticellate; twigs very slender, mostly compressed-tetragonal, sulcate between the angles and often slightly puberulent-strigillose in the channel, light-gray; leaf-scars rather large and prominent on the younger parts; nodes not annulate; principal internodes 1--4 cm. long; leaves decussate-opposite, numerous; petioles very slender, 3-5 mm. long, glabrous; leaf-blades chartaceous, often rather firm-textured when fully mature, rather uniformly bright-green on both surfaces, elliptic or oblanceolate, 2--5.5 cm. long, 0.9--2.4 cm. wide, apically obtuse to rather bluntly short-acuminate, marginally entire and usually slightly revolute, basally acute, glabrous and somewhat lustrous on both surfaces; midrib very slender, flat above, prominent beneath; secondaries very slender, 3--7 per side, divergent, arcuately joined close to the margins, mostly subprominulous above, prominulous beneath; vein and veinlet reticulation abundant, often subprominulous above, only the largest portions prominulous beneath; inflorescence axillary, 1-flowered; peduncles very slender, 5--8 mm. long, stramineous, glabrous; pedicels exactly similar to the peduncle in texture and color and usually equaling it in length,

glabrous; foliaceous bracts absent; bractlets usually limited to one pair at the apex of the peduncle, setaceous, 1 mm. long or less; calyx herbaceous, tubular, 1.8--2.5 cm. long, 5.5--9 mm. wide, glabrous, slightly zygomorphic, its rim 5-lobed, the lobes ovate, 3--4 mm. long, apically attenuate-subacuminate; corolla infundibular, vivid-rose or wine-color, usually curvate, externally very minutely puberulous, the tube broadly infundibular, gradually ampliate from above the calyx to the apex, 2.5--3.5 cm. long, its limb 5-parted, the lobes about 1 cm. long, apically obtuse; stamens and style exserted about 2 cm. from the corolla-mouth; fruiting-calyx and fruit not known.

This endemic species is based on *Decary 5153* from along roadsides in a forest at Midongy du Sud, in the province of Farafangana, Madagascar, collected on August 21, 1926, and deposited in the Paris herbarium. It has also been collected in full sun along open roadsides, flowering in August. The corollas are said to have been "rose vif" on *Decary 4981*.

A key for distinguishing this species from the other known Madagascar taxa will be found under *C. baronianum* Oliv. in the present series of notes.

Citations: MADAGASCAR: *Decary 4981* (N, P), *5153* (E--photo of type, F--photo of type, Ld--photo of type, N--photo of type, P--type), *10604* (P).

CLERODENDRUM FASCICULATUM Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 103. 1936.

Bibliography: B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 13, 40, 70, 93, & 103. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49 & 89. 1942; Hill & Salisb., Ind. Kew. Suppl. 10: 55. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 116 & 181. 1949; Mold., Résumé 144 & 449. 1959; Mold., Fifth Summ. 1: 235 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 225 & 536. 1980.

A shrub; branches glabrous; branchlets villous, with accessory buds; leaves decussate-opposite; petioles about 1 cm. long; leaf-blades ovate or ovate-oblong, 8--12 cm. long, 7--10 cm. wide, apically acuminate, marginally entire or sinuate, basally subcordate, glabrous above, pilose on the venation beneath; venation prominent beneath; inflorescence terminal, fasciculate, head-like; peduncles 0.3--2 cm. long; pedicels 1--3 mm. long, very villous; bracts small, subulate-filiform, 1--6 mm. long, villous; calyx tubular-campanulate, about 4 mm. long, basally pubescent-villous, 5-dentate to about ¼ its length, the teeth deltoid, apically acute; corolla whitish, its tube about 1.7 cm. long, externally glandulose with sessile glands, basally and apically dilated, the lobes 5, obovate, subequal, about 5 mm. long; stamens long-exserted, inserted below the mouth of the corolla-tube; filaments about 4 cm. long; anthers elongate, 2 mm. long; style 3.5--4 cm. long, subequaling the stamens, basally incrassate; stigma plainly shortly bifid; ovary 1.6 mm. long, 4-lobed, externally glabrous; mature fruit not known.

This species is based on *H. Meyer 1000* from the western slopes of the Russige Mountains in southern Ruanda, Tanganyika, collected in the summer of 1911, and deposited in the Berlin herbarium, now de-

stroyed, The species is known thus far to me only from the type collection and I know nothing more about it than is given in the meager bibliography (above).

CLERODENDRUM FASTIGIATUM (Hunter) H. J. Lam, Verbenac. Malay. Arch. 317 & 363 [as "*Clerodendron*"]. 1919; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 66, & 89. 1942.

Synonymy: *Volkameria fastigiata* Hunter ex Ridl., Journ. Roy. Asiat. Soc. Straits 53: 102--103. 1909. *Clerodendron fastigiatum* (Hunter) H. J. Lam, Verbenac. Malay. Arch. 317. 1919. *Clerodendron fastigiatum* H. J. Lam apud A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926.

Bibliography: Ridl., Journ. Roy. Asiat. Soc. Straits 53: 102--103. 1909; Prain, Ind. Kew. Suppl. 4, imp. 1, 248. 1913; H. Hallier, Meded. Rijks Herb. Leid. 37: 75. 1918; H. J. Lam, Verbenac. Malay. Arch. 317 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94, 109, & viii. 1921; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Fedde & Schust., Justs Bot. Jahresber. 47 (2): 245. 1927; Mold., Alph. List Inv. Names 56. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60, 66, & 89 (1942) and ed. 2, 138, 148, & 181. 1949; Prain, Ind. Kew. Suppl. 4, imp. 2, 248. 1958; Mold., Résumé 179, 198, 392, & 449. 1959; Mold., Fifth Summ. 1: 304 & 332 (1971) and 2: 733 & 865. 1971; Mold., Phytol. Mem. 2: 295, 322, & 536. 1980; Mold., Phytologia 54: 239 (1983) and 58: 404. 1985.

The original (1909) description of this species is: "*Volkameria fastigiata*, H. Unarmed; Leaves ovate, unequally serrate. Corymbs terminal, trichotomous, suffastigiata [sic]. Stem herbaceous; or perhaps somewhat shrubby. Leaves opposite, decussated, petioled, ovate, unequally serrate, wrinkled; above smooth, below slightly downy. Petioles short, slender, furrowed above, widely spreading. Corymbs terminal, trichotomous; peduncles brachiate, three cleft pedicels short, slender. Flowers large, white, sweet scented. Calyx five cleft, segments lanceolate, erect; when the fruit ripens reflected. Corolla tube long, straight; limb five cleft segments obtuse, inclining to one side. Stamens. Filaments thread form, the length of the corol, white; anthers small, deep yellow. Berry roundish, smooth. The plant was brought from Amboyna, and flowered before it was removed from the box in which it came." Prain (1913) mistakenly gives its native land as "Penang"; Fedde & Schuster (1927) give it as "Molukken".

Bakhuizen (1921) suggests that this species may possibly be conspecific with *C. viscosum* Vent., a species not known to me from either Penang or Amboina. Hallier (1918) claims that it is closely related to *C. calamitosum* L., *C. barba-felis* H. Hallier, *C. eriosiphon* Schau., *C. disparifolium* Blume, *C. macrophyllum* Blume [=*C. phyllomega* Steud.], *C. garrettianum* Craib, *C. griffithianum* C. B. Clarke, *C. klemmei* Elm., *C. mindorense* Merr., and *C. phlomidis* L. f.

Nothing is known to me of *C. fastigiatum* beyond what is given in its bibliography (above).

CLERODENDRUM FAULKNERI Mold., Phytologia 4: 47--48. 1952.

Bibliography: Mold., Phytologia 4: 47--48. 1952; Mold., Résumé

150 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Résumé Suppl. 13: 4. 1966; Mold., Fifth Summ. 1: 250 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 240 & 536. 1980.

A large bush, perennial rhizomatous herb, or subshrub; rhizome thick; branches rather stout, hollow, gray, striate, glabrous, the bark with a curious mesh-like texture under a handlens; branchlets slender or stout, hollow, often collapsing in drying, nigrescent in drying, glabrous; nodes not annulate; principal internodes 5--10 cm. long; leaves decussate-opposite, usually borne only on the young branchlets at time of anthesis; petioles obsolete or short and winged, usually merging so gradually into the lamina as to be difficult to distinguish; leaf-blades membranous, bright-green above, lighter beneath, oblanceolate, 12--14 cm. long, 2.5--4 cm. wide, apically rounded or subacute, marginally shallowly serrate from about the middle to the apex with low rounded teeth, basally long-attenuate into the petiole, glabrous on both surfaces; midrib slender, flat above, prominulous beneath; secondaries very slender, 4--6 per side, arcuate-ascending, indistinctly anastomosing beneath, flat or obscure above, prominulous beneath; veinlet reticulation sparse, mostly obscure above, flat beneath; inflorescence terminal, comprising a narrow-cylindric panicle composed of 5--10 pairs of dense fascicles of flowers; peduncles similar to the adjacent branchlet, mostly hollow, nigrescent in drying, glabrous, often very stout, 7--11 cm. long; sympodia similar to the peduncles in all respects, sometimes elongate to 7 cm. in fruit, glabrous, nigrescent, unbranched; pedicels filiform, about 5 mm. long, compressed, glabrous, issuing directly from the nodes of the inflorescence-axis, in fascicles of about 10; bractlets lanceolate, 7--12 mm. long, apically acuminate, glabrous; calyx campanulate, 5--6 mm. long, glabrous, deeply 4-lobed to about the middle, the lobes ovate-oblong, apically acute; corolla rich-purple and pale-green, strongly zygomorphic, about 1.5 cm. long; stamens long-exserted, about 2 cm. long, strongly arched; fruiting-calyx cupuliform or patteliform, only slightly incrassate, often reflexed or variously shrivelled, about 1.5 cm. wide, glabrous, deeply triangular-lobed to the middle or beyond; fruit drupaceous, about 7 mm. long and 10 mm. wide, deeply 4-lobed or sometimes only 2- or 3-lobed, externally glabrous, wrinkled, consisting of 4 (or by abortion 2 or 3) nutlets.

This species is based on *H. Faulkner Kew 115* [drawing 536] "moderately common in open forests and plantations" at the Namagoa Estate on the road from Lugela to Mocuba, Quelimane district, Mozambique, collected in December, 1948, and deposited in the Britton Herbarium at the New York Botanical Garden.

Collectors have encountered this plant in open woodlands and open forests of *Brachystegia boehmii* & *B. spiciformis* with tufts of *Oxytenanthera abyssinica* and a herbaceous layer of *Digitaria* and *Panicum*, in flower in November and December.

Obviously a member of the Subgenus *Cyclonema*, material of this species has been misidentified and distributed in some herbaria as *Clerodendron myricoides* (Hochst.) R. Br.

The corolla is said to have been "bluish, with a reddish lower

lip" on *Mendonça 1365*

Citations: MOZAMBIQUE: Cabo Delgado: *Torre & Paiva 9636* (Ul). Niassa: *Hornby 1106* (Ul). Quelimane: *H. Faulkner Kew 115* [drawing 536] (N--type, N--isotype). Zambezia: *F. A. Mendonça 1365* (Ul).

CLERODENDRUM FILIPES Mold., Amer. Journ. Bot. 38: 323. 1951.

Bibliography: Mold., Amer. Journ. Bot. 38: 323. 1951; Mold. in Humbert, Fl. Madag. 174: 153, 217, 220--221, & 267, fig. 35 (4). 1956; Mold., Résumé 155 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Fifth Summ. 1: 260 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 249 & 536. 1980; Mold., Phytologia 58: 188. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 217, fig. 35 (4). 1956.

A shrub, to 4 m. tall; branches and branchlets very slender, twiggy, obtusely tetragonal, often prominently lenticellate, grayish, glabrate; twigs mostly very short, very minutely and obscurely puberulous or glabrescent; nodes not annulate; principal internodes mostly much abbreviated, 1--6 mm. long on the twigs, elongate to 6 cm. on older wood; leaf-scars prominent on the twigs, white, with elevated margins; leaves decussate-opposite, persistent; petioles very slender, 1--5 mm. long, very minutely puberulous; leaf-blades thin-chartaceous or submembranous. often rather fragile, rather dark-green and shiny above, lighter beneath, lanceolate, 2.5--7 cm. long, 1--2.5 cm. wide, apically long-acuminate or subcaudate, marginally entire, basally acute or slightly subacuminate, glabrous on both surfaces; inflorescence axillary, usually borne at the very uppermost nodes, 1- or 2-flowered; peduncles filiform, 3--7.5 cm. long, minutely puberulent; pedicels filiform, 5--10 mm. long, very minutely puberulent; foliaceous bracts absent; bractlets 1 or 2 at the apex of the peduncle, setaceous, 1 mm. long or less; calyx herbaceous, obconic-tubular, 1.5--1.8 cm. long, mostly 4--5 mm. wide, glabrous, not venose, brunnescent in drying, its rim 5-lobed, the lobes ovate, 4--5 mm. long, apically attenuate-acute, after anthesis enlarged to almost 3 cm. long and 1.7 cm. wide, broadly obconic, basally venose-wrinkled; corolla hypocrateriform, dark-red, its tube narrow-cylindric, somewhat over 2.5 cm. long, externally glabrate, the limb 5-parted, 1--1.5 cm. wide, the lobes 5--7 mm. long, apically obtuse; stamens and style exserted 5--8 cm. from the corolla-mouth; fruit not known.

This endemic Madagascar species is based on *Perrier 10199* from woods, at 800 m. altitude, in the eastern part of the Maningory basin, Madagascar, collected in July, 1912, and deposited in the Paris herbarium. Decary reports encountering it at the borders of forests.

A key for distinguishing this species from its Madagascar congeners will be found under *C. baronianum* Oliv. in the present series of notes.

Citations: MADAGASCAR: *Decary 18371* (P); *Perrier 10199* (E--photo of type, F--photo of type, Ld--photo of type, N--isotype, N--photo of type, P--type).

CLERODENDRUM FINETII Dop in Lecomte, Notul. Syst. 4: 12 [as "*Clerodendron*"]. 1920; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 89. 1942.

Synonymy: *Clerodendron finetii* Dop in Lecomte, Notul. Syst. 4: 12. 1920.

Bibliography: Dop in Lecomte, Notul. Syst. 4: 12. 1920; A. W. Hill., Ind. Kew. Suppl. 6: 49. 1926; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497. 1927; Dop in Lecomte, Fl. Gén. Indo-chine 4: 851 & 870. 1935; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 59. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 136 & 181. 1949; Mold., Résumé 175 & 449. 1959; Mold., Fifth Summ. 1: 299 (1971) and 2: 865. 1971; Mold., Phytologia 31: 395. 1975; Mold., Phytol. Mem. 2: 288, 385, & 536. 1980.

A shrub; branches subtetragonal, pubescent; nodes annulate with a band of interpetiolar twisted hairs; leaves decussate-opposite; petioles 4--5 mm. long, pubescent, apically alate; leaf-blades membranous, elliptic, 15--18 cm. long, 5--7 cm. wide, apically short-acuminate, marginally irregularly and weakly sinuate or sinuate-dentate and ciliate, basally attenuate and decurrent into the petiole, sparsely white-pilose above, softly pubescent beneath; midrib prominent; secondaries very slender, 14--16; veins and veinlets irregular, the reticulation rather distinct; inflorescence large, paniculate, foliose, terminal or subterminal, to 40 cm. long and 15 cm. wide, pubescent, the ramifications di- or trichotomous, the cymes racemiform; bracts foliaceous; bractlets subulate; pedicels 3--6 mm. long; calyx turbinate, herbaceous, green, 5--6 mm. long, externally somewhat velutinous and glandulose, the tube 1.5 mm. long, the lobes oval, 2.5--4.5 mm. long, 2 mm. wide, apically acuminate; corolla white, glabrous, its tube filiform, 1.5--2 cm. long, the lobes oblong, 6--8 mm. long, apically obtuse; stamens long-exserted; anthers oblong; style slender; stigma shortly bifid; ovary externally glabrous.

This species is based on an unnumbered Lecomte & Finet collection from Sakhandal island, Pnom-penh, Angkor-thom, Cambodia. A key to help distinguish it from other Indochinese taxa of this genus will be found under *C. hahnianum* Dop in the present series of notes. Nothing is known to me about it beyond what is stated in its bibliography (above).

CLERODENDRUM FISCHERI GÜrke, Engl. Bot. Jahrb. 18: 172 [as "*Clerodendron*"]. 1893; B. Thomas. Engl. Bot. Jahrb. 68: [Gatt. Clerod] 37, 64, & 93. 1936.

Synonymy: *Clerodendron fischeri* GÜrke, Engl. Bot. Jahrb. 18: 172. 1893.

Bibliography: GÜrke, Engl. Bot. Jahrb. 18: 172. 1893; Engl., Abhandl. Preuss. Akad. Wiss. 1894: 27. 1894; GÜrke in Engl., Pflanzenw. Ost-Afr. C: 340. 1895; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 294 & 306. 1900; Prain, Ind. Kew. Suppl. 4, imp. 1, 101 (1901) and imp. 2, 101. 1941; Mold., Alph. List Inv. Names 19. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49, 51, & 89. 1942; H.

N. & A. L. Mold., Pl. Life 2: 59. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 116, 120, & 181. 1949; Mold., Résumé 144, 150, & 449. 1959; Prain, Ind. Kew. Suppl. 4, imp. 3, 101. 1959; Dale & Greenway, Kenya Trees Shrubs 582 & 584. 1961; Mold., Résumé Suppl. 13: 4 (1966) and 15: 8. 1967; Gillett, Numb. Check-list Trees Kenya 46. 1970; Mold., Fifth Summ. 1: 235, 250, 251, & 454 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 225, 230, 240, & 536. 1980; Mold., Phytologia 58: 303, 422, 435, & 438 (1985) and 59: 259. 1986.

A strong woody shrub or undershrub, 0.3--3 m. tall; branchlets pubescent or puberulent; sap colorless; leaves decussate-opposite; petioles about 1 cm. long; leaf-blades coriaceous, oblong or ovate-subrotund, 10--15 cm. long, 5--9 cm. wide, apically acute, marginally entire, basally attenuate into the petiole, reticulate-veined, deep-green, sparsely pubescent above, more densely subvillous with very long hairs beneath; venation conspicuously impressed above and prominent beneath; inflorescence capitate, bracteate; flowers regular, fragrant with a musky odor, sessile; bracts and bractlets membranous, lanceolate, apically long-acuminate, basally attenuate into the stalk, subvillous, the outer bracts to 15 mm. long and 4--5 mm. wide; calyx campanulate, mauve, 1.9--2.1 cm. long, externally subvillous, 5-parted almost to the base, the tube very short, the lobes membranous, ovate, 8--10 mm. wide, apically acuminate, reticulate-venose; corolla white or creamy-white, elongate-tubular, externally sparsely pubescent with glanduliferous hairs, the tube slender, incurved, 9--13 cm. long, apically inflated, the lobes 5, unequal, obovate, about 1.2 cm. long; stamens and style very long-exserted.

This species is based on *Fischer 483* from the coast of Zanzibar, and *Holst 2194* and *Stuhlmann 3492* from Tanganyika; of these Thomas (1936) has designated the Fischer collection as the type. Gürke (1893) comments that "Von dem nahe verwandten C. *capitatum* Schum. et Thonn. ist diese Art hauptsächlich durch die grossen, sehr dicken, rundlichen Blätter mit stark hervortretenden Adern verschieden." In his 1895 work he says: "Verwandt mit C. *capitatum*, aber mit viel dickeren, grösseren B[lätter], auch stärker behaart, und mit längeren, ebenfalls weissen Bl[üteh]....Ein 2--2,5 m hoher Strauch in Buschlichtungen und auf fruchtbarem Boden."

Baker (1900) cites *Fischer 483*, *Holst 2194* & *2910*, and *Stuhlmann 3492* from Tanzania. Thomas (1936) cites *Elliot 115*, *Fischer 483*, *Holst 2194*, *Schlechter 12249*, and *Schlieben 6119* from Tanzania. Dale & Greenway (1961) cite *Jeffery K.140* from Kenya.

Collectors have found C. *fischeri* growing in sandy or red-sandy soil in secondary forests, forest patches, clearings, in the substrate of open deciduous forests, and on sand and brown soil of grassland between forests and coppices, often only "scattered", at 160--400 m. altitude, in flower in March, May, July, August, and October, and in fruit in July.

The corollas are described as "white" on *Barbosa 1289*, *Faulkner 254*. *Schlieben 1898* & *6119*, and *Tanner R.T.2009* and "creamy-white" on *Cedro 292*; Engler (1894) refers to them as "yellowish-white", asserting that the plant occurs "vereinzelt auf fruchtbaren Boden".

It may be worth mentioning that the Gürke (1893) reference in the

literature of this species is often [e.g., by Prain (1901)] incorrectly cited by the misleading volume titlepage date of "1894".

A key for distinguishing C. *fischeri* from at least some of it immediate relatives will be found under C. *discolor* (Klotzsch) Vatke in the present series of notes.

Material of C. *fischeri* has been misidentified and distributed in some herbaria as C. *capitatum* (Willd.) Schum. & Thonn. and C. *robustum* Klotzsch. On the other hand, the *Peter 21076*, distributed as C. *fischeri*, actually is C. *capitatum* var. *conglobatum* (J. G. Baker) Thomas.

Citations: TANZANIA: Tanganyika: *Schlieben 1898* (Br), *6119* (B, Br, Ld--photo, Mu, N, N--photo, S); *Tanner RT.2009* (B, Ba, Ca--170362, Mi, N). MOZAMBIQUE: Lourenço Marques: *Torre 6774* (Ul). Manica e Sofala: *Barbosa 1289* (Ul); *Garcia 469* (Ul). Moçambique: *Cedro 292* (Af); *Exell, Mendonça, & Wild 608* (Ul); *H. G. Faulkner 172* (Af), *254* [drawing 403] (Af); *F. A. Mendonca 1241* (Ul); *Torre 610* (Ul). Niassa: *Ruis Monteiro 24* (Ld, Ul). Quilimane: *H. Faulkner Kew 469* (N).

CLERODENDRUM FISCHERI var. *ROBUSTUM* (Klotzsch) Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 64. 1936.

Synonymy: *Clerodendron robustum* Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot. 1]: 259. 1861. *Clerodendrum robustum* Klotzsch apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 64 in syn. 1936.

Bibliography: Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot. 1]: 259. 1861; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. C: 340. 1895; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 305. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1900; Menzel, Beitr. Geolog. Erforsch. Deutsch. Schutzgeb. 18: 30. 1920; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 64 & 95. 1936; Mold., Alph. List Inv. Names 19. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49, 51, & 89, 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 116, 120, & 181. 1949; Mold., Résumé 144, 150, 268, & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Résumé Suppl. 15: 8. 1967; Mold., Fifth Summ. 1: 235, 251, & 454 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 225, 240, & 536. 1980; Mold., Phytologia 58: 422, 435, & 438. 1985.

This variety differs from the typical form of the species in having the leaves and calyxes only sparingly pilose.

The variety is based on an unnumbered Peters collection from Querimba, Mozambique, collected in 1847. Thomas (1936) cites also *Braun 1237* and *Busse 2611* from Tanganyika.

Gürke (1895) asserts that this taxon is "Von C. *capitatum* durch die dicken lederartigen B[lätter] verschieden", but, actually, the leaf-blades are also described as coriaceous in the typical form.

Collectors have encountered C. *fischeri* var. *robustum* along roadsides and in abandoned cultivated fields. It is described as a scandent shrub with white corollas, flowering in May. A note com-

municated to me personally by Sir George Taylor at Kew, dated June 13, 1966, affirms that "There seems to be little doubt as to the identity of this gathering [*Leach & Rutherford-Smith 10945*], of which the Kew duplicate has fully matured flowers, although there is no authenticated material in Kew for comparison".

Menzel (1920) reports finding this plant fossilized in Pleistocene tufa in the Cameroons. Baker (1900) avers that it, as well as *C. stenanthum* Klotzsch and *C. mossambicense* Klotasch, are conspecific with *C. capitatum* (Willd.) Schum. & Thonn. I regard *C. mossambicense* as a valid species, with *C. stenanthum* a synonym.

It may be mentioned here that Thomas (1936) cites the original Klotzsch (1861) publication as "1862". Also, the Schumann (1900) work is sometimes cited as "1902".

Material of *C. fischeri* var. *robustum* has been misidentified and distributed in some herbaria as *C. swynnertonii* S. Moore. On the other hand, the *Peter 25298*, distributed as *C. fischeri* var. *robustum*, actually is *C. capitatum* var. *cephalanthum* (Oliv.) J. G. Baker, *Peter 25091* is *C. capitatum* var. *conglobatum* (J. G. Baker) Thomas, and *Barbosa 1289* is typical *C. fischeri* Gürke.

Citations: MOZAMBIQUE: Niassa: *Leach & Rutherford-Smith 10945* (Ld, Ul).

CLERODENDRUM FISTULOSUM Becc., Malesia 2: 35 & 314 [as "*Clerodendron*"]. 1884; H. Hallier, Meded. Rijks Herb. Leid. 37: 76. 1918.

Synonymy: *Clerodendron inflatum* Becc., Malesia 2: 211. 1884. *Clerodendron fistulosum* Becc., Malesia 2: 35 & 314, pl. 4. 1884. *Claredendrum fistulosum* Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40 sphalm. 1978.

Bibliography: Becc., Malesia 2: 35, 47--51, 211, 291, 314, & 340, pl. 4. 1884; Bower, Proc. Phil. Soc. Glasgow 18: 323. 1887; Schimp., Wechselbez. Zwisch. Pfl. Ameisen. 1888; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Heim, Assoc. Franç. Avanc. Sci. Bordeaux 1: 51. 1895; Ridl., Journ. Bot. Brit. 33: 42 & 43. 1895; Heim, Ann. Rep. Smithson. Inst. 1896: 432, pl. 18. 1898; Becc., Nelle Foreste Born. 542 & 643. 1902; J. C. Willis, Dict. Flow. Pl., ed. 2, 309. 1903; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 496. 1906; J. C. Willis, Dict. Flow. Pl., ed. 3, 317. 1908; Miehe, Abhandl. Sachs. Gesel. Wiss. Math.-phys. Kl. 32: 312--361. 1911; H. Hallier, Meded. Rijks Herb. Leid. 37: 75--76. 1918; H. J. Lam, Verbenac. Malay. Arch. 311 & 363. 1919; DeWild., Compt. Rend. Hebdomad. Seanc. Mem. Soc. Biol. 72: 582 & 583. 1920; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 85, 109, & viii. 1921; E. D. Merr., Bibl. Enum. Born. Pl. 516. 1921; Bequaert in Wheeler, Bull. Amer. Mus. Nat. Hist. 45: 591. 1922; DeWild., Pl. Bequaert. 2: 260 & 261. 1922; J. C. Willis, Dict. Flow. Pl., ed. 5, 149. 1925; Stapf, Ind. Lond. 2: 238. 1930; Wangerin, Justs Bot. Jahresber. 52 (1): 392--393. 1933; Fedde, Justs Bot. Jahresber. 52 (1): 777. 1934; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 7. 1936; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 496. 1941; Mold., Suppl. List Inv. Names 2. 1941; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 65 & 89. 1942; Uphof, Bot.

Rev. 8: 574. 1942; E. D. Merr., Pl. Life Pacif. World 97, 98, & 273, fig. 90. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; H. N. & A. L. Mold., Pl. Life 2: 44--46, pl. 8, fig. 2 & 3. 1948; Mold., Alph. List Cit. 2: 567 (1948) and 3: 764. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 145, 146, & 181. 1949; J. C. Willis, Dict. Flow. Pl., ed. 6, 149. 1951; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 496. 1959; Mold., Résumé 192, 193, 263, 265, & 449. 1959; Emberger in Chadefaud & Emberger, Traité Bot. 2: 829 & 830. 1960; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Dilmy, Govt. Sarawak Sympos. Ecol. Res. Humid Trop. Veg. 218. 1965; Grout de Beaufort & Schnell, Mém. Inst. Fond. Afr. Noire 75: 40. 1966; Rendle, Classif. Flow. Pl., ed. 2, 2: 505. 1967; Ashton, Biol. Journ. Linn. Soc. 1/2: 193. 1969; Mold., Fifth Summ. 1: 322, 444, & 447 (1971) and 2: 865. 1971; Janzen, Biotropica 6: 253. 1974; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40. 1978; Mold., Phytol. Mem. 2: 313, 383, & 536. 1980; Mold., Phytologia 57: 346 (1985), 58: 217 (1985), and 59: 357. 1986.

Illustrations: Becc., Malesia 2: pl. 4. 1884; Heim, Assoc. Franç. Avanc. Sci. Bordeaux 1: 51. 1895; Heim, Ann. Rep. Smithson. Inst. 1896: 432/433, pl. 18. 1898; E. D. Merr., Pl. Life Pacif. World 98, fig. 90. 1945; H. N. & A. L. Mold., Pl. Life 2: 45, pl. 8, fig. 2 & 3. 1948.

A subshrub, about 1 m. tall, at first glance appearing to be glabrous throughout but actually very minutely glandular-pubescent under a handlens; stems erect, simple, straight, stiff, brittle, often reddish; internodes enlarged, clavate, inflated, hollow, basally attenuate, apically with 2 opposite holes and bilaterally compressed, with corky margins, mostly housing ants; leaves decussate-opposite, short-petiolate, sometimes one of each pair aborted; petioles 3--7 mm. long, very minutely glandular-puberulent; leaf-blades herbaceous, narrowly ovate or ovate-lanceolate to subovate-oblong, rarely lanceolate-elliptic, 15--30 cm. long, 6--10 cm. wide, apically attenuate-acuminate, marginally entire, basally sometimes obtuse to subtruncate, sometimes attenuate and acute, glabrescent and slightly shiny-green above, densely glandular-punctulate beneath and there less shiny, lighter green, and sometimes purplish or even blood-red, and (especially on young leaves) with larger, opaque, and nectariferous glands along the midrib; venation very minutely glandular-puberulent; secondaries 8 or 9 per side, arcuately anastomosing near the margins; inflorescence terminal, corymbosely cymose, abbreviated, compact, sparingly branched, the branches bracteate, few-flowered, very minutely glandular-puberulent; pedicels 8--10 mm. long, very minutely glandular-puberulent; flower-buds dull-green, with deep-red calyx-tips; calyx during anthesis deeply 5-parted, at first with only the tips of the lobes dull-red, later the entire calyx thus, externally glabrous, the lobes lanceolate, apically long-acuminate; corolla hypocrateriform, white, externally glabrous, its elongate tube 8--9 cm. long, glabrous, apically hardly dilated, the lobes broadly linear or spatulate; fruiting-calyx shiny, red.

This member of Subgenus *Siphonanthus* is based on *Beccari 45, 330,* & *3574* from Kutcin, Sarawak. Beccari (1884) gives a very long and

detailed description in Italian, comparing its myrmecophily with that of *Endospermum, Cecropia,* and *Acacia cornigera.* The ant that occupies the stems of *Clerodendrum fistulosum* is *Colobopsis clerodendri* Emery, illustrated by Beccari on p. 51 of his above-cited work (fig. 2 & 3).

Bower (1887) says "Of the myrmekophilous plants cited by Beccari that most nearly corresponding to *Humboldtia* is *Clerodendron fistulosum,* a new species; here also the internodes are swollen, and hollowed, and inhabited by ants, which gain access to the interior by the slit-like holes, two of which are situated, one on either side, at the upper end of each internode. Beccari is of the opinion that both the swollen form of the internodes and the first origin of the holes have become inherited characters of the species, as an adaptation to the requirements of the protecting ants. Somewhat similar slit-like holes are to be found in *Myristica myrmecophila*...The form of the orifice in this case also would suggest that the initiative in their formation is taken by the plant."

Heim (1898) describes the host and the tenants as follows: "The *Clerodendrum fistulosum* is a verbenaceous plant visited and inhabited by ants. Its straight stem, about a meter in height, has internodes that all appear enlarged. Each enlargement has at its summit, just below the insertion of the leaf of the internode above (one of the two opposite leaves of each internode having aborted), an orifice bounded by a projecting rim. The ants are attracted to the surface of the plant by little nectaries situated on the inferior surface of the leaves near the median nervure. It is not yet known if these internodes with their apical openings are absolutely constant features. Beccari supposed that the irritation produced by ants may cause a notable increase in the internodes and in the size of their cavity. The openings may have been in the first place the work of ants, though the cavities do not inter-communicate, for the ants that inhabit this *Clerodendron* belong to an eminently perforating genus (*Colobopsis*). It would appear, however, that at the present time these openings are produced without the intervention of ants, that a lesion has become hereditary. The services rendered by ants to the *Clerodendron* are, first, a protection against herbivora. Delpino saw a plant of this genus (*C. fragans*) defended by armies of ants as soon as anyone attempted to gather its flowers. Then these myrmecophilous features may assist the *C. fistulosum* in its struggle for existence with neighboring species. The irritation produced by the ants may perhaps cause a notable increase in the internodes and their more effective lignification, the subherbaceous plant being thus enabled to struggle with more advantage against rival species in the midst of tropical vegetation largely of a ligneous character. If this is the case we may suppose that primitively individuals inhabited by ants survived in preference to those which were not so inhabited, and natural selection consequently fixed these myrmecophilous features. The swelling of the internodes and the perforations, at first accidental characters, became normal."

An opposing view is held by Uphof (1942) who notes that in this species and *C. phyllomega* var. *myrmecophilum* (Ridl.) Mold. "In the

upper part of [the] internodes just below the leaves 2 thin-walled layers in the parenchyma can easily be pierced by the ants and it is at these places that they force entrance into the hollow chambers. There is no doubt that the ants here find protection; it is, however, not known of what advantage they are to the plant."

Hallier (1918) cites *Hallier B.1433* and *Haviland & Hose 589* from Borneo and asserts that he brought living plants of the former collection to Buitenzorg. He comments that the plant is a "Halbstrauch von 1--2 Fuss Höhe, stets mit Ameisen. Die Fisteln trocken und spröde, wie Schilfhalme, nicht weich, wie beim Lembuh = *Macaranga*, oft trübroth angelaufen. Ihre Löcher, ursprünglich wohl Lentizellen, mit Korkrand und unterhalb oder seltener auch interpetiolar über den Blattpaaren. Erwachsene Blätter oberseits schwach glänzend grün, unterseits schwächer glänzend, hellgrün oder oft bluthroth, drüsig punktiert und längst der Nerven jüngerer Blätter zahlreiche Nektarien; deren Skret wahrgenommen. Kelch der Knospen matt, grün mit trübroth angehauchten Spitzen, später ganz trübroth und matt, zur Fruchtzeit glänzend roth. Kronröhre der Knospe weiss, die keulenförmige Spitze hellgrün. Bei den Dajaken Pĕngâlĕs oder Pĕrĕkăp tádjie [genannt]. Heilmittel gegen Berr-berri; die Blätter werden fein gemacht und damit der kranke Körpertheil eingerieben; die Fisteln werden zu Asche verbrannt und dann eingerieben."

Wangerin (1924) summarizes the work of DeWildeman (1920) as follows: "Enthält auch einige einleitende Hinweise auf die Myrmekophilie der Gattung [*Clerodendrum*]. Insbesondere wird dabei auf eine Verschiedenheit der Struktur hingewiesen, die darin besteht, dass bei *C. fistulosum* die Höhlungen der einzelnen Stengelglieder an den Knoten durch Querwände voneinander getrennt sind, während bei verschiedenen afrikanischen Arten solche fehlen und ein einheitlicher, von unten bis oben durchgehender Hohlraum vorhanden ist. Im Ünrigen sind noch nicht bei allen afrikanischen Arten, welche Höhle Stengel besitzen, auch wirklich Ameisen als Inwohner festgestellt worden." In other words, it seems that in some African species the chambered stem may not actually be used by ants at all - thus rendering credence to Heim's theory.

Collectors have encountered *Clerodendrum fistulosum* in dry sandy soil of xerophyllous woods, flowering in December. Janzen (1974) refers to it as "rare". The *Mjoberg 208* is said to represent a topotype collection.

Citations: GREATER SUNDA ISLANDS: Kalimantan: *Boschproefstation s.n.* [29.8.31] (Bz--19258); *Buwalda 7643* (Bz--72901); *H. Hallier B. 1433* (Bz--19267, Bz--19269 in part, Ca--236916, Ca--265180); *Mondi 290* (Bz--19265, Bz--19268, Bz--19269 in part, Bz--25502), *295* (Bz--19264, Bz--19266, Ld--photo, N--photo); *Polak 175* (Bz--19263); *Schuitemaker 108* (Bz--19255), *109* (Bz--19256), *VIII* (Bz--19257); *Teijsmann 7927* (Bz--19261), *s.n.* (Bz--19259, Bz--19260). Sarawak: *Dabong 527* (Ph); *Hose 615* (Ph); *Mjoberg 208* (Bz--19262, Ca--234203, N); *Native collector 1076* (W--1174088), *1372* (W--1174111). MOUNTED ILLUSTRATIONS: Becc., Malesia 2: pl. 4. 1884 (Ld).

CLERODENDRUM FLAVUM Merr., Philip. Journ. Sci. 30: 424--425 [as "*Clerodendron*"]. 1926; Mold., Known Geogr. Distrib. Verbenac.,

ed. 1, 62 & 89. 1942.

Synonymy: *Clerodendron flavum* Merr., Philip. Journ. Sci. 30: 424--425. 1926.

Bibliography: E. D. Merr., Philip. Journ. Sci. 30: 424--425. 1926; A. W. Hill, Ind. Kew. Suppl. 8: 54. 1933; Fedde & Schust, Justs Bot. Jahresber. 54 (2): 747. 1934; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 62 & 89 (1942) and ed. 2, 141 & 181. 1949; Mold., Résumé 183 & 449. 1959; Mold., Fifth Summ. 1: 315 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 306 & 536. 1980.

An erect shrub, about 1 m. tall; branches terete, grayish, glabrous; ultimate branchlets densely pubescent with dirty-brown hairs; leaves decussate-opposite, somewhat crowded near the tips of the branchlets; petioles 2--6 cm. long, rather densely pubescent; leaf-blades membranous, olivaceous, subelliptic to broadly elliptic, 15--30 cm. long, 10--16 cm. wide, apically broadly acute, marginally entire, basally rounded, the upper surface smooth, the lower surface slightly paler and distinctly puberulent on the venation and with widely scattered, small, discoid glands; inflorescence terminal, paniculate, erect, densely many-flowered, about 15 cm. long and wide, rather densely pubescent with dirty-brown hairs, the primary inflorescence-branches to 8 cm. long and spreading or somewhat ascending, the lower ones sometimes subtended by greatly reduced leaves (bracts) not over 1.5 cm. long; bractlets and bracteoles small, deciduous, the latter scarcely 1 mm. long; calyx about 8 mm. long, externally sparingly pubescent or puberulent, the 5 lobes lanceolate, about 6 mm. long, 1.5 mm. wide, apically acuminate, slenderly 3-veined, externally with scattered, small, often rather obscure, discoid glands; corolla yellow, the tube slender, 1.6 cm. long, glabrous or slightly puberulent, the lobes spreading, subequal, oblong-obovate, about 1 cm. long and 5 mm. wide, apically broadly rounded; stamens exserted about 2 cm., red when fresh, glabrous.

This species is based on *Ramos & Edaño Philip. Bur. Sci. 43899* from forests along small streams near the summit of Mount Daho, at about 700 m. altitude, in the Sulu Archipelago, Philippine Islands, collected in September, 1924. Merrill (1926) says that this is "A species remarkable for its yellow flowers, manifestly belonging in the group with *Clerodendron williamsii* Elm., but differing in very numerous characters. It is clearly more closely allied to *Clerodendrom myrmecophyllum* [sic] Ridl. of the Malay Peninsula and Borneo than it is to *C. williamsii* Elm."

The corollas are said to have been "orange-vermillion" on *Ebalo 685*, who found the plant in flower in November.

Citations: PHILIPPINE ISLANDS: Mindanao: *Ebalo 685* (Mi).

CLERODENDRUM FLORIBUNDUM R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511. 1810.

Synonymy: *Clerodendrum florabundum* Hassall, Ann. Mag. Nat. Hist. 9: 550. 1842. *Clerodendron floribundum* R. Br. apud Voigt, Hort. Suburb. Calcut. 473. 1845. [not *C. floribundum* Hort., 1847, nor Lindl., 1977, nor K. Sch., 1980]. *Clerodendron floribunda* R. Br. apud F. Muell., Fragm. Phyt. Austral. 9: 5. 1875. *Siphonanthus floribundus* Britten in Banks & Soland., Illustr. Austral. Pl. 2:

[Bot. Cook Voy.] 75, pl. 239. 1901. *Siphonanthus floribunda* J. Britten apud Prain, Ind. Kew. Suppl. 4, imp. 1, 166. 1913. *Siphonanthus floribunda* [R. Br.] J. Britton apud Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95 in syn. 1921. *Clerodendron floribundum* N. E. Br. ex Mold., Prelim. Alph List Inv. Names 19 in syn. 1940. *Clerondendron floribundum* R. Br. ex Menninger, 1958 Price List [2] sphalm. 1958. *Clerodendrom floribundum* R. Br. ex Menninger, 1960 Price List Flow. Trees [3] sphalm. 1960. *Siphonanthus floribunda* (R. Br.) Britten ex Mold., Fifth Summ. 1: 622 in syn. 1971. *Clerodendron floribundeum* R. Br. ex Mold., Phytol. Mem. 2: 385 in syn. 1980. *Siphonanthus floribundas* Britten ex Mold., Phytol. Mem. 2: 437 in syn. 1980.

Bibliography: R. Br., Prod. Fl. Nov. Holl., imp. 1, 1: 510--511 (1810) and imp. 2 [Isis 1819:] 153. 1819; Pers., Sp. Pl. 3. 362. 1819; Steud., Nom. Bot. Phan., ed. 1, 207 & 578. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 758 & 759. 1825; Lindl., Edwards Bot. Reg. 12: pl. 1035 in textu. 1826; Loud., Hort. Brit., ed. 1, 247 (1830) and ed. 2, 247. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; G. Don in Sweet, Hort. Brit., ed. 3, 549 & 550. 1839; Steud., Nom. Bot. Phan., ed. 2, 1: 382 & 383. 1840; Hassall, Ann. Mag. Nat. Hist. 9: 550. 1842; D. Dietr., Syn. Pl. 3: 616--617. 1843; Voigt, Hort. Suburb. Calcut. 473. 1845; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 105 & 106. 1858; F. Muell., Fragm. Phyt. Austral. 6: 152. 1868; Benth. & F. Muell., Fl. Austral. 5: 61 & 63--64. 1870; F. Muell., Descrip. Notes Papuan Pl., imp. 1, 5: iii & 90. 1875; F. Muell., Fragm. Phyt. Austral. 9: 5. 1875; Schomb., Fl. S. Austral. 52. 1875; Edgeworth, Pollen, ed. 1, 26 (1877) and ed. 2, 26. 1879; F. Muell., First Census 103. 1882; F. M. Bailey, Syn. Queensl. Fl. 381. 1883; F. M. Bailey, Proc. Roy. Soc. Queensl. 1: 71. 1884; Palmer, Proc. Roy. Soc. N. S. Wales 17: 108. 1884; F. M. Bailey, Queensl. Woods 93. 1883; F. Muell., Sec. Syst. Cens. Austral. Pl. 1: 173. 1889; K. Schum. & Hollr., Fl. Kais. Wilhelmsl. 122. 1889; F. M. Bailey, Cat. Indig. Nat. Pl. Queensl. 36. 1890; Tate, Handb. Fl. Extratrop. S. Austral. 158 & 254. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560 & 561. 1893; Moore, Handb. Fl. N. S. Wales 357. 1893; Tepper, Bot. Centralbl. 54: 260. 1893; Engl., Pflanzenw. Ost-Afr. A: 124. 1895; Tate in Horn, Sci. Exp. Cent. Austral. 3: 175. 1896; F. M. Bailey, Queensl. Woods 106. 1899; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 525. 1900; F. M. Bailey, Queensl. Fl. 4: 1182--1184. 1901; Banks & Soland., Illustr. Austral. Pl. 2: [Bot. Cook Voy.] 75, pl. 239. 1901; F. M. Bailey in Meston, Expl. Bell.-Ker (Parliam. Rep.) 14. 1904; Lauterb. in K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Schutzgeb. Südsee 371 & 372. 1905; F. M. Bailey, Queensl. Agric. Journ. 27: 67. 1911; F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913; Prain, Ind. Kew. Suppl. 4, imp. 1, 166. 1913; H. J. Lam, Verbenac. Malay. Arch. 258 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95, 108, 109, & viii. 1921; H. J. Lam in Lauterb., Engl. Bot. Jahrb. 59: 95--96. 1924; Domin, Bibl. Bot. 22 (89): 1112. 1928; Francis, Austral. Rainfor. Trees, ed. 1, 336. 1929; C. A. Gardn., Enum. Pl. Austral. Occid. 3:

112. 1931; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1073. 1932; Mold., Geogr. Distrib. Avicenn. 37. 1939; Mold., Prelim. Alph. List Inv. Names 19. 1940; Mold., Alph. List Inv. Names 16, 17, 19, 34, & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 67, 69, 72, & 89. 1942; Mold., Alph. List Cit. 1: 71, 206, & 250. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6 & 7. 1947; Mold., Alph. List Cit. 2: 457 & 482 (1948), 3: 698, 761, 763, 863, & 912 (1949), and 4: 1110, 1119, 1179, & 1205. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 149, 152, 158, & 181. 1949; Menninger, 1950-1951 Offering 300 Diff. Flow. Trop. Trees [3]. 1950; Francis, Austral. Rainfor. Trees, ed. 2, 367. 1951; Menninger, 1953 Cat. Flow. Trop. Trees 33. 1953; Menninger, 1954 Price List [9] (1954), 1956 Price List [4] (1955), 1958 Price List [2] (1958), and 1959 Price List [5]. 1958; Prain, Ind. Kew. Suppl. 4, imp. 2, 166. 1958; Mold., Résumé 200, 207, 208, 215, 260--263, 266, 267, 271--274, 322, 344, & 449. 1959; R. Br., Prod. Fl. Nov. Holl., imp. 2, 1: 511. 1960; Menninger, 1960 Price List Flow. Trees [3]. 1960; Mold., Résumé Suppl. 2: 8. 1960; Willaman & Schubert, Agr. Res. Serv. U. S. Dept. Agr. Tech. Bull. 1234: 236. 1961; Beard, Descrip. Cat. W. Austral. Pl., ed. 1, 91. 1966; Stearn, Notes Rec. Roy. Soc. Lond. 24: 83. 1969; Beard, Descrip. Cat. W. Austral. Pl., ed. 2, 113. 1970; Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971; Mold., Fifth Summ. 1: 335, 345, 349, 358, 438, 439, 441, 442, 444, 450, 452, 460, 461, 463, 464, & 467 (1971) and 2: 576, 622, 865, 971, & 973. 1971; T. B. Muir, Muelleria 2: 166. 1972; Gibbs, Chemotax. Flow. Pl. 3: 1754 (1974) and 4: 2080. 1974; Mold., Phytologia 28: 448. 1974; L. H. & E. Z. Bailey, Hortus Third 285. 1976; Mold., Phytologia 36: 39 & 42 (1977) and 37: 22. 1977; Hocking, Excerpt. Bot. A.30: 421 (1978) and A.33: 87--88. 1979; F. Muell., Descrip. Notes Papuan Pl., imp. 2, 5: 90 & iii. 1979; Mold., Phytol. Mem. 2: 325, 334, 339, 349, 384, 385, 388, 390, 391, 424, 437, & 536. 1930; Francis, Austral. Rain-for. Trees, ed. 4, 367. 1981; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 411 & 456--457. 1983; Mold., Phytologia 59: 114, 122, 123, 344, & 347. 1986.

Illustrations: Banks & Soland., Illustr. Austral. Pl. 2: [Bot. Cook Voy.] pl. 239. 1901.

A small tree, to 6.5 m. tall, large shrub or subshrub, 1--2 m. tall, or shrubby climber, slender, mostly erect, free-flowering; stems usually several, smooth, greenish-yellow, speckled; bark light-gray or brown, corky, furrowed, rough and longitudinally fissured on the trunk, smooth and light-brown on the branches; leaves decussate-opposite, succulent; petioles very slender, 2--6.5 cm. long, mostly quite elongate, usually glabrous or nearly so; leaf-blades firmly chartaceous, often noticeably bicolored, bright- or dull-green above, paler beneath, mostly broadly elliptic, 6--16 cm. long, 2.5--6 cm. wide, apically acute or short-acuminate, marginally entire or subundulate, basally acute, usually glabrous on both surfaces or very minutely pilosulous on the venation beneath, densely punctate beneath; inflorescence axillary, cymose or corymbiform or the upper ones often aggregated in a sometimes subumbelloid panicle, lax, its ramifications glabrous or minutely puberulous, the ultimate ones 3-flowered; peduncles slender, 2.5--5.5 cm. long, glabrous or nearly so; bracts

foliaceous, lanceolate or elliptic, stipitate, 1.5--2.5 cm. long, 0.5--1 cm. wide, glabrous or nearly so on both surfaces, the stalk 2--3 mm. long; bractlets about 5 mm. long, sessile; pedicels slender, 3--5 mm. long, very minutely puberulous; flowers pleasantly scented, often insect-galled; calyx campanulate, about 9 mm. long, glabrous or nearly so, the teeth 5, lanceolate, about as long as the tube, apically acute; corolla hypocrateriform or infundibular, white, its tube slender, about 3.5 cm. long, the lobes ovate, about 7 mm. long; stamens inserted about 2/3 the distance above the base of the corolla-tube, exserted about 2.3 cm.; style slender, about 5.8 cm. long; stigma bidentate or shortle bifid; ovary externally glabrous; fruiting-calyx large, bright- or dark-red; fruit drupaceous, about 1.5 cm. in diameter when mature, purple or purplish-black to black.

This extremely variable and polymorphic species is based on an unnumbered Robert Brown collection from "Littora Novae Hollandiae intra tropicum", deposited in the British Museum herbarium. It is native to Australia and New Guinea, but cultivated in Australia, South Africa, Sri Lanka, India, Florida, and probably elsewhere, mostly for ornament or as specimen plants. Francis (1929) gives its natural distribution as northern New South Wales to the Cape York Peninsula, inland in northwestern Queensland, North Australia, and Papua. Domin (1928) gives its distribution as northwestern and northern Australia, Queensland, northern New South Wales, and South Australia, also New Guinea (the wide-leaved variety *latifolium*) -- "Neu Guinea (teste F. v. Mueller, die breitblättrige Varietät); auch Schumann und Lauterbach (1901).....führen die Art aus Neu Guinea an, doch wird die betreffende Form in Nachträgen 371 (1905) als eine selbständige Art (*C. rhytidophyllum* Schum.) abgetrennt.....Species admodum variabilis, *C. attenuatum* R. Br. et *C. medium* R. Br. amplectens; varietas *ovatum* (= *C. ovatum* R. Br., *C. cardiophyllum* F. v. Muell. et verosimiliter *C. floribundum* var. *latifolium* F. v. Muell. Fragm. IX.5, 1875) a typo specei longius distat." It is possible that the New Guinean material cited below actually represents the segregated and obviously very closely related *C. rhytidophyllum*, now regarded by me as conspecific with *C. porphyrocalyx* Lauterb. & K. Schum., which see. I eagerly await the revisionary treatment of Australian *Clerodendrum* taxa now being undertaken by Dr. Munir. Schumann & Lauterbach originally (1889, 1900) cited *Hollrung 631* from New Guinea as *C. floribundum* and Lam (1919) cites *Schlechter 18903* from New Guinea, but both of these collections are now regarded by me as misidentifications.

Collectors have encountered *Clerodendrum floribundum* in the wet edges of savanna forests, along railroad tracks, in the margins of high forests, on sandstone hills and rock piles, at the edges of lakes and creeks, in light scrub formations, in open grassy places, and in the yellow-red clay soil of *Eucalyptus* woodlands, at 300--800 m. altitude, in flower in February, March, May to August, and December, and in fruit in May, August, and September. Everist describes it as a "fairly common slender erect tree about 10 feet tall" or as a "shrub with several erect stems to 7 feet tall in shallow yellow loam on limestone outcrops"; White reports it "common in light rainforests". Lazarides & Story refer to it as "rare in deep sandy soil with *Eucal-*

yptus polycarpa and *Heteropogon contortus*; Wilson found it growing on "slopes of sandy residual with *Eucalyptus miniata* and *Acacia* sp." Perry describes it as a "straggly low tree 10 feet tall common in stony heavy-textured soil on a volcano", as an "erect 4--6-foot shrub growing from the [fallen] trunk of a tree (*Eucalyptus similis*), and "growing on creek banks with *Eucalyptus camalduensis*". Lazarides refers to the species as an "occasional erect shrub 4 feet tall in coarse red sandy soil with *Salsola kali*"; Millar & Holttum describe it as a "small tree, 20 feet tall".

Curiously, the species is described as a "scandent shrub" by Clemens and as a "small shrubby climber" by Womersley.

Only one common name, "bundle-flowered clerodendrum", and one vernacular name, "thurkoo", have been reported.

Insect-galled inflorescences are to be seen on *Flecker 14164*, while on *White 12163* the collector reports "practically every flower [is] galled".

The corollas are said to have been "white" on *Everist 3320*, *Lazarides 5214*, *Maconochie 572*, *McKee 1777*, *Millar & Holttum 15785*, and *Perry 3612*, but on *Wilson 293* the "flowers" are said to have been "bright-red" [probably a reference to the fruiting-calyxes, not the corollas].

It is worthwhile noting here, in view of the polymorphic habit of this taxon, that Brown's original (1810) description of the type is merely "foliis elliptico-lanceolatis glabris, calycis laciniis acutiusculis tubo brevioribus corollisque glabris. (T.) v.v."

The Banks & Solander collection, cited below, is said to have been the basis for the picture published in the Illust. Bot. Cook's Voyage pl. 239. The unnumbered Robert Brown collection from North Australia, cited below, in the Columbia University herbarium, is inscribed "*Clerodendron floribundum* var.", so obviously does not represent the type collection.

On the unnumbered Clemens collection from Jericho, collected on May 1, 1940, there is an inscribed comment reading: "2 types of flowers in each cluster". *Lazarides 5214* and *Lazarides & Story 73* each have a photograph of the plant in situ accompanying the specimen, while *Wilson 293* is accompanied by 3 in situ photographs. Wilson, by the way, refers to the plant as a "7-foot shrub with gray-pruinose leaves".

Gibbs (1974) reports that the HCl/methanol test gave negative results when applied to this plant, while the Ehrlich test gave doubtfully positive (olive-brown) results when applied to the leaves.

Schumann & Hollrung (1889) claim that *Hollrung 631* is the first record for the species outside of Australia ["Neu-Holland"]. They comment that "Die vorliegenden Exemplare sind nicht ganz streng mit der vorstehenden Art [*C. floribundum*] in ihren reinsten Formen in Uebereinstimmung zu bringen, sie geht offenbar durch die dichteren Blüthenstände und die spärliche Bekleidung derselben zu *C. tomentosum* über; solche Formen hat bereits Bentham mehrfach erwähnt. Wahrscheinlich sind beide Arten in eine zu vereinigen, wozu auch trotz der etwas längeren Corolle *C. Cunninghamii* Bth. gehörten dürfte."

It should be noted that the *C. floribundum* Hort. and *C. floribun-*

dum Lindl., referred to in the synonymy (above), are regarded by me as synonyms of *C. emirnense* Bojer, while *C. floribundum* K. Sch. is *C. porphyrocalyx* Lauterb. & K. Schum. The *C. ovalifolium* (A. L. Juss.) Bakh. (1921), sometimes regarded as the valid name for the taxon we call *C. floribundum*, actually belongs in the synonymy of *C. floribundum* var. *latifolium* F. Muell. and cannot legally replace *C. floribundum* because it is antedated by the *C. ovalifolium* of A. Gray (1862). *Clerodendrum ovatum* R. Br. and *C. cardiophyllum* F. Muell. also belong in the synonymy of *C. floribundum* var. *latifolium* F. Muell., as do also *Clerodendron floribundum* var. *ovatum* (R. Br.) Domin and *Ovieda ovalifolia* A. L. Juss. *Clerodendrum attenuatum* R. Br., also often included questionably in the synonymy of typical *C. floribundum*, is regarded by me as *C. floribundum* var. *attenuatum* (R. Br.) Mold., *C. medium* R. Br. is regarded by me as *C. floribundum* var. *medium* (R. Br.) Mold., and *C. coriaceum* R. Br. is *C. floribundum* var. *coriaceum* (R. Br.) Mold., which see.

Menninger (1960) mistakenly refers to *C. floribundum* as a "Cuban white-flowered tree". In 1950 he was offering 8--15-inch seedlings to the horticultural trade for $1 US; in 1954 he offered 15-inch plants for $2 US and in 1955 1--4-foot seedlings were selling at $1 US per foot. He refers to the plant as having "pretty foliage".

It should also be noted here that Lam (1924) cites the date of Brown's original description of this species as "1827" instead of 1810. Domin, in his 1928 work (sometimes cited as "89 (6)" or "89 (22)"), cites the Schumann & Lauterbach work as "1901" instead of 1900.

Material of typical *C. floribundum* has been misidentified and distributed in some herbaria as *C. album* Ridl., *C. coriaceum* R. Br., *C. fallax* Lindl., *C. inerme* R. Br., and *C. tomentosum* R. Br. On the other hand, the *Clemens s.n.* [Mt. Glorious, Jan. 1945], *Schlechter 18903*, and *White 12163*, distributed as typical *C. floribundum*, are regarded by me as *C. cunninghamii* Benth., while *Blake 23495*, *Clemens s.n.* [17 March 1946], and *White 8675* & *9526* are *C. floribundum* var. *latifolium* F. Muell., *Clemens 43441* is *C. glabrum* E. Mey., *Brown s.n.* is *C. populneum* Beer & Lam, *Hollrung 613* is *C. porphyrocalyx* Lauterb. & K. Schum., and *Cunningham 389* is not verbenaceous and is probably a *Cordia* sp.

Citations: NEW GUINEA: Papua: *Armit s.n.* [Aroa River 1884] (Mb), *s.n.* [British New Guinea 1895] (Mb); *Chalmers s.n.* [S.E. New Guinea 1878] (Mb), *s.n.* [1880] (Mb); *D'Albertis s.n.* (Mb); *Goldie s.n.* [Port Moresbey] (Mb); *Lames s n.* (Mb); *W. MacGregor s.n.* [Rigo] (Mb); *Womersley 8766* (Ng--16901). Territory of New Guinea: *Millar & Holttum 15785* (W--2518367). West Irian: *McKee 1777* (Ng--16871). AUSTRALIA: New South Wales: *Boorman s.n.* [Dorrigo 12.1909] (Vt); *Herb. Prager 18681* (Gg--32013); *Vicary s.n.* [1836-7] (S); *W. W. Watts s.n.* [Richmond River 1902] (Vt). Northern Territory: *R. Brown s.n.* (C); *Lazarides 5214* (W--2374818); *Maconochie 572* [Herb. N. T. 13643] (N); *R. Schomburgk s.n.* [North Coast] (W--75177); *F. Schultz 120* (L); *I. B. Wilson 293* (W--2927657, W--2927658). Queensland: *M. S. Clemens s.n.* [January 1945] (N), *s.n.* [Jericho, May 1, 1946] (F--photo, Ld--photo, Mi, N, N--photo, Or--55923, Si--photo), *s.n.* [Springdale, May 8, 1946]

(Or--56344), *s.n.* [Double Island Point, 16 October 1946] (Mi); *A. Dietrich s.n.* [Brisbane, 1863-65] (B); *G. E. DuRietz 4252* (S); *Everist 2108* (I), *3320* (N, W--2157997); *Flecker 14164* (N); *Helms 1040* (W--1271438), *1449* (W--1348907); *Lazarides & Story 73* (W--2518673); *Mac Gillivray 2207* (La); *Michael 987* (Bz--20116); *F. Mueller s.n.* (Pd); *R. A. Perry 1100* (W--2156493), *3586* (W--2277813), *3612* (W--2277818); *Richmond s.n.* [Yalleroi] (Or--55926); *C. T. White [Kajewski] 1130* (N, S), *6310* (N). South Australia: *R. Schomburgk s.n.* [S. Australia] (Br). Western Australia: *Gulliver 27* (Ld--photo, N--photo, P); *Herb. Mus. Nac. Hist. Nat. Chile 16049* (Sg). State undetermined: *Banks & Solander s.n.* [1770] (W--1276764); *R. Brown s.n.* (L, L); *Verreaux 650* (N--photo). AUSTRALIAN ISLANDS: Bathurst: *Cunningham 289* (N). Fisherman: *Chalmers s.n.* [1880] (Mb). CULTIVATED: Australia: *M. S. Clemens 42729* (Mi). Natal: *H. Forbes 1014* (Na--35602); *Natal Herb. 9289* (Ld--photo, N--fragment, N--photo, Na, S--photo). Sri Lanka: *Moldenke, Moldenke, & Jayasuriya 28154* [Roy. Bot. Gard. Perad. 32.67] (Ld, N, Pd, W--2764422). LOCALITY OF COLLECTION UNDETERMINED: *Karta 286* (Mb). MOUNTED ILLUSTRATIONS: F. Bauer Icon. 957 (V), 957a (V).

CLERODENDRUM FLORIBUNDUM var. *ANGUSTIFOLIUM* Mold., Phytologia 37: 22. 1977.

Bibliography: Mold., Phytologia 37: 22. 1977; Hocking, Excerpt. Bot. A.30: 421. 1978; Mold., Phytol. Mem. 2: 334 & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 456 & 457. 1983.

This variety differs from the typical form of the species in its leaf-blades being narrowly elliptic, mostly about 4--7 cm. long and 1--3 cm. wide, apically acuminate, and basally acute or subacuminate.

The variety is based on *C. T. White 8675* from Tarrens Creek, northern Queensland, Australia, collected on March 19, 1933, and deposited in the B. A. Krukoff Herbarium at the New York Botanical Garden. The collector notes that in the type locality it is a fairly common shrub in rocky places, the flowers being "faintly scented" and the corollas white. The corollas are also said to have been white on *Blake 23495* and *White 9526*.

Collectors describe this plant as a shrub or small slender tree, to 6 m. tall, the bark light-gray and fissured, and the leaf-blades dull-green above and paler beneath. They have found it growing in "light dune scrub", in flower in March, May, and October. Material has been distributed uniformly determined as typical *C. floribundum* R. Br.

Citations: AUSTRALIA: Queensland: *S. T. Blake 23495* (Ac, Ld, N, N); *M. S. Clemens s.n.* [Jericho, 17 March 1946] (Ca--81171, N, N, S), *s. n.* [Jericho, Apr. 3, 1946] (Mi), *s.n.* [Springvale ranch, April 15, 1946] (Or--55924, Or--55925); *C. T. White 8675* (N--type, N--isotype, N--isotype), *9526* (Ca--8194, N. N).

CLERODENDRUM FLORIBUNDUM var. *ATTENUATUM* (R. Br.) Mold., Phytologia 39: 236. 1978.

Synonymy: *Clerodendrum attenuatum* R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511. 1810. *Clerodendron attenuatum* R. Br. apud Spreng. in

L., Syst. Veg., ed. 16, 2: 759. 1825 [not C. *attenuatum* DeWild., 1920].

Bibliography: R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511 (1810) and imp. 2 [Isis 1819:] 152. 1819; Steud., Nom. Bot. Phan., ed. 1, 207. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825; Loud., Hort. Brit., ed. 1, 247. 1830; Loud., Hort. Brit., ed. 2, 247. 1832; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; G. Don in Sweet, Hort. Brit., ed. 3, 550. 1839; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; D. Dietr., Syn. Pl. 3: 616. 1843; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 105. 1847; F. Muell., Fragm. Phyt. Austral. 6: 152. 1868; Benth. & F. Muell., Fl. Austral. 5: 64. 1870; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95, 108, & viii. 1921; Domin, Bibl. Bot. 89: 1112, 1928; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1073. 1932; Mold., Alph. List Inv. Names 16. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Inv. Names Suppl. 1: 7. 1947; Mold., Résumé 260 & 271. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Mold., Fifth Summ. 1: 439 & 460. 1971; Mold., Phytologia 39: 236. 1978; Hocking, Excerpt. Bot. A.33: 88. 1979; Mold., Phytol. Mem. 2: 334, 390, & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 457. 1983.

This variety is said to differ from the typical form of the species in its leaf-blades being basally attenuated and the calyx externally puberulent. Brown's original (1810) description is merely: "foliis ellipticis subundulatis acutis basi attenuatis utrinque glabris, calycibus pubescentulis: laciniis acutissimis aequantibus, corollis glabris".

The variety is based on an unnumbered specimen collected by Robert Brown in the Port Jackson area of New South Wales, Australia. Sweet (1830) claims that it was introduced into cultivation in England from New South Wales in 1824. He and Loudon (1830) both call it the "attenuated clerodendrum". Domin (1928) is of the opinion that it is not sufficiently distinct to warrant nomenclatural separation from typical C. *floribundum* R. Br. and he may well be correct.

Nothing is known to me of this plant beyond what is stated in its meager bibliography (above).

CLERODENDRUM FLORIBUNDUM var. *CORIACEUM* (R. Br.) Mold., Phytologia 39: 236. 1978.

Synonymy: *Clerodendrum coriaceum* R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511. 1810. *Clerodendron coriaceum* R. Br. apud Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825 [not C. *coriaceum* Poit., 1816].

Bibliography: R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511 (1810) and imp. 2 [Isis 1819:] 153. 1819; Steud., Nom. Bot. Phan., ed. 1, 207. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825; Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840; D. Dietr., Syn. Pl. 3: 616--617. 1843; Voigt, Hort. Suburb. Calcut. 473. 1845; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Benth. & F. Muell.. Fl. Aus-

tral. 5: 64. 1870; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95, 108, & viii. 1921; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1073. 1932; Mold., Alph. List Inv. Names 17. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Inv. Names Suppl. 1: 7. 1947; Mold., Résumé 262 & 272. 1959; Jacks. in Hook. f. & Jacks., imp. 3, 1: 560. 1960; Mold., Fifth Summ. 1: 442 & 461. 1971; Hocking, Excerpt. Bot. A.33: 88. 1979; Mold., Phytol. Mem. 2: 334, 391, & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 456 & 457. 1983.

This variety is said to differ from the typical form of the species in its petioles being tomentose and its leaf-blades being subcoriaceous in texture and tomentose beneath. Brown's original (1810) description is merely "foliis ovatis acutis subcordatis subtus reticulato-venosis subrugosis petiolisque tomentosis, pedunculis axillaribus terminalibusque trichotomis".

The variety is based on an unnumbered Robert Brown collection from near the Endeavour River and Bay of Inlets in the "Littora Novae Hollandiae, Queensland, Australia.

Nothing is known to me of this plant beyond what is stated in its bibliography (above).

CLERODENDRUM FLORIBUNDUM var. *LATIFOLIUM* F. Muell., Fragm. Phyt. Austral. 9: 5 [as "*Clerodendron*" and "*latifolia*"]. 1875; Mold., Phytol. Mem. 2: 385. 1980.

Synonymy: *Ovieda ovalifolia* A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 76. 1806. *Clerodendrum ovatum* R. Br., Prodr. Fl. Nov. Holl., imp. 1, 511. 1810. *Clerodendrum ovatum* α R. Br., Prodr. Fl. Nov. Holl., imp. 1, 511. 1810. *Clerodendrum ovatum* β R. Br., Prodr. Fl. Nov. Holl., imp. 1, 511. 1810. *Clerodendron ovatum* R. Br. apud Spreng. in L., Syst. Veg., ed. 16, 2: 758. 1825 [not *C. ovatum* Poir., 1816]. *Clerodendron ovatum* Schau. in A. DC., Prodr. 11: 671. 1847. *Clerodendron ovatum* Schau. in A. DC., Prodr. 11: 671. 1847. *Clerodendron cardiophyllum* F. Muell., Fragm. Phyt. Austral. 3: 144--145. 1863. *Clerodendron floribundum* var. *latifolia* F. Muell., Fragm. Phyt. Austral. 9: 5 ["varietatem *latifoliam*"]. 1875. *Clerodendron ovalifolium* (A. L. Juss.) Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95. 1921 [not *C. ovalifolium* A. Gray, 1862, nor Engl., 1895]. *Clerodendron floribundum* var. *ovatum* (R. Br.) Domin, Bibl. Bot. 89: 1112. 1928. *Cleroaendron ovatum* α R. Br. ex Mold., Phytologia 36: 42 in syn. 1947. *Clerodendron ovatum* β R. Br. ex Mold., Phytologia 36: 42 in syn. 1947. *Clerodendrum ovalifolium* (A. L. Juss.) Bakh. apud J. S. Beard, Descrip. Cat. W. Austral. Pl., ed. 2, 113. 1970.

Bibliography: A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 76. 1806; R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 511 (1810) and imp. 2 [Isis 1819:] 153. 1819; Steud., Nom. Bot. Phan., ed. 1, 207 & 578. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 758. 1825; Steud., Nom. Bot. Phan., ed. 2, 1: 383. 1840; Voigt, Hort. Suburb. Calcut. 473. 1845; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; F. Muell., Fragm. Phyt. Austral. 3: 144--145 (1863) and 6: 152. 1868; Benth. &

F. Muell., Fl. Austral. 5: 64. 1870; F. Muell., Fragm. Phyt. Austral. 9: 5. 1875; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 560 & 561 (1893) and imp. 1, 2: 386. 1894; F. M. Bailey, Queensl. Fl. 4: 1184. 1901; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95, 108, 110, viii, & ix. 1921; Domin, Bibl. Bot. 89: 1112. 1928; C. A. Gardn., Enum. Pl. Austral. Occid. 3: 112. 1931; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1073. 1932; Mold., Alph. List Inv. Names 16, 19, & 34. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560 & 561 (1946) and imp. 2, 2: 386. 1946; Mold., Alph. List Inv. Names Suppl. 1: 7. 1947; Mold., Résumé 261, 267, 273, & 322. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560 & 56; (1960) and imp. 3, 2: 386. 1960; J. S. Beard, Descrip. Cat. W. Austral. Pl., ed. 1, 91 (1966) and ed. 2, 113. 1970; Mold., Fifth Summ. 1: 441 & 452 (1971) and 2: 576. 1971; T. B. Muir, Muelleria 2: 166. 1972; Mold., Phytologia 36: 42. 1977; Mold., Phytol. Mem. 2: 334, 384, 385, 388, 424, & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 456. 1983.

This variety is said to differ from the typical form of the species in its broader ovate leaf-blades. Brown's original (1810) description is merely "foliis ovatis acutis: adultis glabris petiolo vix duplo longioribus, pedunculis axillaribus terminalibusque". It is based on an unnumbered Robert Brown collection from the Endeavour River and Bay of Inlets area in "Littora Novae Hollandiae". Queensland, Australia. He describes two forms without special designation nomenclaturally or as to place of collection: α "Folia calycesque glabri" and β "Folia calycesque pubescentes".

Mueller's *Clerodendron cardiophyllum* was much more adequately described (1863): "Glabrum, foliis orbiculari-cordatis oppositis chartaceis integerrimis petiolo duplo triplove longioribus reticulato-venosis, paniculis terminalibus, floribus longiuscule pedicellatis; bracteolis lineari-setaceis, calycis quinquefidi lobis fere deltoideis acutis, corollae glabrae tubo praelongo. In virgultis *Acaciae aneurae* (Mulga Scrub) Australiae centralis; J. Macd. Stuart. Ad paludas Daly Waters; F. Waterhouse. Folia fragminum plantae suppetentium 2--3" longa. Calyces floriferi circiter 2'" longi, fructiferi 3'" metenties. Bracteolae fere 1'" longae. Corolla pollice paulo longior. Stamina conspicue exserta. Antherae circiter 1'" longae. Fructus maturi ignoti."

It is worth pointing out that the C. *ovatum* of Poiret, referred to in the synonymy (above) is a synonym of C. *inerme* (L.) Gaertn.; C. *ovalifolium* of Engler is a synonym of C. *glabrum* E. Mey. and C. *ovalifolium* of Gray is *Faradaya ovalifolia* (A. Gray) Seem.

Steudel (1840) lists C. *ovatum* R. Br. as follows: "*ovatum*. R. Br.ħ Coromand. N. Holl. S. 12. *Ovieda ovalifolia*. Juss." What the "Coromand." signifies here is difficult to guess. The Coromandel Coast is a coastal area of southeastern India, but this plant does not occur there. However, the C. *ovalifolia* of Poiret, a synonym of C. *inerme* (L.) Gaertn., does occur there.

Curiously, Beard (1970) keeps what he calls *Clerodendrum floribundum* R. Br. and C. *ovalifolium* (A. Juss.) Bakh. apart as two separate and valid species.

[to be continued]

NEOTROPICAL MYRSINACEAE — XIX

Cyrus Longworth Lundell

Director, Plant Sciences Laboratory
The University of Texas at Dallas
Richardson, Texas 75083-0688

GRAPHARDISIA (Mez) Lundell, Phytologia 48: 139. 1981

GRAPHARDISIA COIBANA Lundell, sp. nov. — Frutex, 3 m.; ramuli crassiusculi, glabri; folia subcoriacea, petiolata, petiolo 5—20 mm. longo; lamina anguste oblanceolata, 12.5—25 longa, 3.5—6 cm. lata, apice acuminata vel caudato-acuminata, acumine ad 3.5 cm. longa, basi angusta, attenuata, longilineata, nigropunctata; inflorescentia terminalis, ad 10 cm. longa, 15 cm. lata, glabra; flores 5-meri, corymbosi; pedicelli graciles, 1.5—2 cm. longi; sepala alba, ovato-elliptica vel elliptica, ad 8 mm. longa, 4—5 mm. lata, hyalina, parce lineata, apice rotundata, margine epunctata et lata, intus eglandulifera; fructus subglobosus, ca. 5 mm. diam.

Panama: Prov. Veraguas, Playa Rosario, northern tip of Coiba Island, in forest, Aug. 26, 1970, Robin Foster 1600 (holotype, LL; isotype, F), shrub, 3 m., sepals white, pedicels pink, ripe fruit dark red. John D. Dwyer 1612 (F) and 2363 (MEXU, NY) are two additional collections (paratypes) from Coiba Island.

G. coibana is notable for its thick narrowly oblanceolate leaves rather abruptly caudate-acuminate at apex and the long slender attenuate base decurrent on the petiole. Its inflorescence and wide openly lineate thin sepals suggest a relationship to G. Seibertii (Standl.) Lundell, a species of middle altitudes in Panama and Costa Rica, which has altogether different leaves.

GRAPHARDISIA NICARAGUENSIS Lundell, sp. nov. — Arbor parva vel frutex; ramuli crassiusculi, glabri; folia chartacea, petiolata, petiolo ca. 1 cm. longo; lamina oblanceolata, 12—23 cm. longa, 4—7 cm. lata, apice subabrupte acuminata, basi anguste cuneata, lineata; inflorescentia terminalis, ad 12 cm. longa, 15 cm. lata, glabra; flores 5-meri, corymbosi; pedicelli graciles, ad 2 cm. longi; sepala obovata vel obovato-elliptica, ad 8 mm. longa, 4 mm. lata, apice rotundata, dense nigrolineata, margine nigropunctata, basi parce papillosa; fructus subglobosus, dense nigropunctatus, ca. 6 mm. diam.

Nicaragua: Dept. Zelaya, bosque lluvioso y brenoso de Montana Esquipulas, alt. 130 m., Nov. 22, 1951, Paul J. Shank & Antonio Molina R. 4719 (holotype, F; isotype, US; xerox & fragment, LL), arbol, 2—6 m.; same collectors and locality 4783 (F).

George R. Proctor et al. 27151 (NY) from Dept. Bluefields of Nicaragua is a paratype.

The rather thin leaves are oblanceolate and oblongish with a long acuminate apex and cuneate base. The lineate punctation of blades is slender and rather obscure. The most distinctive feature is the calyx which is sparsely lepidote at base within. The sepals are very notable in being obovate or elliptic, rounded at apex, and very black punctate to the very edge of the margin.

The relationship of Graphardisia nicaraguensis appears to be with Graphardisia opegrapha (Oerst.) Lundell. The latter has very slender, black lineate, shorter sepals.

GRAPHARDISIA OBTUSATA Lundell, sp. nov. — Arbor parva, 3 m.; ramuli graciles, glabri; folia petiolata, petiolo ad 1 cm. longo; lamina subchartacea, lanceolata, 7.5—12.5 cm. longa, 3—4 cm. lata, apice acuminata, basi acuta, nigrolineata, integra; inflorescentia terminalis, sessilis, paniculata, parva, ca. 4 cm. longa, 7 cm. lata; flores 5-meri, corymbosi; pedicelli graciles, ad 1.5 cm. longi; sepala lanceolata, 5—6 mm. longa, 2—3 mm. lata, apice obtusata, dense lineatopunctata, intus basi papillosa; fructus subglobosus; stylus ca. 4.5 mm. longus.

Panama: Prov. Darien, Rio Tuquesa, at middle Tuquesa Mining Company camp called Charco Peje, tropical wet forest, ca. 250 m. alt., July 8, 1975, S. Mori 7034 (holotype, LL), small tree, 3 m. tall, 4 cm. dbh.

A taxon with affinity to Graphardisia subcoriacea (Lundell) Lundell, it has longer narrower obtusate sepals more densely punctate medially, and thinner leaves. The sepals are obscurely papillate at base within.

GRAPHARDISIA OXYPHYLLA Lundell, sp. nov. — Frutex, 4 m.; ramuli crassiusculi vel graciles; folia petiolata, petiolo marginato, canaliculato, ad 9 mm. longo; lamina glabra, ovato-lanceolata, 15—26 cm. longa, ad 9 cm. lata, apice acuminata, basi acuta, dense punctata, integra; inflorescentia terminalis, paniculata, ad 10 cm. longa et lata, pedunculata; flores 5-meri, corymbosi et umbellati; pedicelli graciles, ad 1.6 cm. longi; sepala ovato-elliptica, 5—6 mm. longa, 3.5—4 cm. lata, apice rotundata, rubro-lineata, intus basi parce papillata; petala late elliptica, ad 6.5 mm. longa, ad 5 mm. lata, basi connata ca. 2 mm., intus glandulifera, apice rotundata, parce lineato-punctata; stamina ca. 3.5 mm. longa; filamenta 1—1.5 mm. longa, glabra; antherae ad 2.7 mm. longae, lanceolatae, poris apicalibus dehiscentes; stylus ca. 4.5 mm. longus.

Panama: Prov. Chiriqui, 2.5 km. from Questa Piedra along Rio Monte Road, at stream, in forest, June 27, 1977, J. P. Folsom 3975 (holotype, LL), shrub of 4 m., calyx and pedicels white, 5-lobed, corolla pale pink.

Although the sepals are described as white by the collector, after drying they are reddish-lineate, with space between the

medial lines, and punctate laterally with wide margin. On the basis of the features of the calyx, the relationship appears to be with Graphardisia Seibertii (Standl.) Lundell.

The large sharply acuminate leaves have short thick canaliculate petioles. The relatively small flowers have very broad petals which appear to be fringed in post-anthesis condition. The filaments apparently are glabrous.

GRAPHARDISIA PURPUREA Lundell, sp. nov. — Frutex, ramuli graciles; folia membranacea, glabra, petiolata, petiolo canaliculato, 1—1.4 cm. longo; lamina integra, reticulata, glabra, lineata, oblanceolata, 8—15 cm. longa, 3—5.5 cm. lata, apice subabrupte acuminata, basi acuminata; inflorescentia terminalis, parvissima, paniculata, 2.5—3 cm. longa, purpurea, bracteata; flores 5-meri, corymbosi; pedicelli 4—6.5 mm. longi; sepala libera, obovata, ca. 5 mm. longa, 3 mm. lata, apice rotundata, basi angustata, subintegra, lamina lineata et parvipunctata; fructus subglobosus, ad 4.5 mm. diam.

Panama: Prov. Chiriqui, 6 miles N of Concepcion, Aug. 4, 1960, John E. Ebinger 751 (holotype, US; xerox & fragment, LL), shrub, 4 ft. tall, bracts purple, fruit green.

Graphardisia purpurea is notable for its small infructescence with large purple bracts, each bract subtending a pedicel in fruit. It has short pedicels, obovate thin sepals narrowed and free to the base, and rather conspicuously lineate punctation medially which is small apically. Its entire leaves have slender petioles, and both surfaces of the thin blade are finely reticulate.

The taxon appears to be related to Graphardisia Wagneri (Mez) Lundell, a species with conspicuously crenulate leaves, and much longer pedicels up to 1 cm. long.

GRAPHARDISIA SERANOANA Lundell, sp. nov. — Frutex, 3 m.; ramuli crassiusculi, glabri; folia petiolata, petiolo ad 5 mm. longo, marginato; lamina chartacea, dense nigrolineata, lanceolata, 8—13.5 cm. longa, 3—5.5 cm. lata, apice acuminata, basi subcuneata, integra; inflorescentia terminalis, late paniculata, ad 7 cm. longa, 10 cm. lata, glabra; flores 5-meri, corymbosi; pedicelli graciles, 1—2 cm. longi; sepala obovato-elliptica vel elliptica, 4—4.5 mm. longa, 3—3.5 mm. lata, apice rotundata, intus basi parce papillata, parce nigrolineata et punctata; corolla ad 7 mm. longa, intus basi glandulifera; petala connata ca. 2 mm., late ovato-elliptica, ad 6 mm. lata, apice rotundata, 2- vel raro 3-lineata, parce punctata; antherae ca. 3 mm. longae, lanceolatae, poris apicalibus dehiscentes; filamenta subnulla, basi glandulifera; ovarium glabrum.

Panama: Prov. Chiriqui, road from Volcan to Rio Serano; road that turns eastward 7.2 km. from Rio Serano, 3.2 km. along side road, June 29, 1977, J. P. Folsom 4029 (holotype, LL), shrub of 3 m., flowers pink-white.

Closely related to Graphardisia subcoriacea (Lundell) Lundell of Cocle Province, El Valle de Anton, Panama, Graphardisia seranoana differs in its short marginate petioles, sepals openly lineate and punctate, petals 2- or rarely 3-lineate and with scattered lateral punctation, and slightly larger subsessile anthers borne in the short thick tube at base of corolla. Graphardisia subcoriacea has sepals with dense medial black lines and denser lateral punctation, giving a black medial area as contrasted with the open linear glands of the other taxon. Also, Graphardisia subcoriacea has petals strictly 2-lineate, not 2- or rarely 3-lineate as in Graphardisia seranoana. These differences along with the subsessile anthers and marginate petioles distinguish the species.

GRAPHARDISIA SKUTCHII (Morton) Lundell, comb. nov. Ardisia Skutchii Morton, Journ. Wash. Acad. Sci. 27: 309. 1937.

GRAPHARDISIA USTUPOANA Lundell, sp. nov. — Frutex, 3 m.; ramuli graciles, glabri; folia petiolata, petiolo ad 8 mm. longo, canaliculato; folia subcoriacea, petiolata, petiolo ad 8 mm. longo, canaliculato; lamina oblongo-lanceolata vel lanceolata, 8.5—13.5 cm. longa, 3—4 cm. lata, apice acuminata, basi acuta, margine subintegra; inflorescentia terminalis, parva, paniculata, 3—4.5 cm. longa, glabra; flores 5-meri, corymbosi; pedicelli ad 2 mm. longi, graciles; sepala dense nigrolineata et punctata, ciliolata, anguste oblanceolata, ad 8 mm. longa, 3—3.5 mm. lata, intus basi parce papillata, apice rotundata.

Panama: Prov. San Blas, on mainland in front of Ustupo, overhanging river, Nov. 10, 1975, W. G. D'Arcy 9535 (holotype, LL), shrub 3 m. tall, bracts purplish white, fruit red.

Of probable affinity to Graphardisia subcoriacea (Lundell) Lundell, Graphardisia ustupoana differs in its longer oblanceolate sepals which are uniquely ciliolate. Only the calyx is present in the holotype, and flowers at anthesis are needed to better determine the relationships of the taxa.

GRAPHARDISIA WEBERBAUERI (Mez) Lundell, Wrightia 7: 46. 1982. Ardisia Weberbaueri Mez, Fedde, Rep. Nov. Spec. 3: 97. 1906. Graphardisia Vigoi (Lundell) Lundell, Phytologia 48: 140. 1981. Ardisia Vigoi Lundell, Wrightia 6: 94. 1979.

Ardisia Weberbaueri Mez is represented in the Herbarium of Field Museum by a fragment of the type, Weberbauer 1809, which contains a single flower. This flower matches the holotype flowers of Ardisia Vigoi Lundell, also from Peru, Jose Schunke Vigo 8384 (LL).

This species is the southernmost representative of the genus.

SPECIES EXCLUDED FROM GRAPHARDISIA

Two other species from South America, Ardisia albovirens Mez, Ule 9682, probably from Brazil, and Ardisia nigrovirens Macbr.,

Williams 5081 (holotype, F) from Peru, which I referred to Graphardisia (Wrightia 7: 46. 1982), appear to be species of Ardisia as described. The anthers in Ardisia nigrovirens Macbr. (see Vigo 1442) are longitudinally dehiscent, while those of Graphardisia are dehiscent by apical pores.

PARATHESIS (A.DC.) Hooker f., Bentham & Hooker f., Gen. 2: 645. 1876

PARATHESIS BARUANA Lundell, sp. nov. — Arbor; ramuli graciles, minute puberuli vel tomentelli; folia minute puberula, petiolata, petiolo 1—1.2 cm. longo; lamina chartacea, oblongo-lanceolata vel anguste elliptica, 8—10 cm. longa, 2.5—4 cm. lata, apice acuta vel subacuminata, basi acuta, perpunctata, margine crenulata; inflorescentia axillaris, apice paniculata, minute puberula, ad 5.5 cm. longa, longe pedunculata; flores 5-meri, corymbosi vel umbellati, minute tomentelli; sepala anguste triangularia, acuminata, ad 1.5 mm. longa, extus minute puberula; pedicelli 5—7 mm. longi; fructus subglobosus, ad 7 mm. diam., nigropunctatus.

Panama: Prov. Chiriqui, roadside to 10 km. below summit of El Baru, W. G. D'Arcy 11050 (holotype, LL), flowers pinkish, fruits reddish, tree.

Parathesis baruana resembles P. subulata Lundell of Guatemala and Chiapas, differing notably in having conspicuously crenulate mostly elliptic leaves. Its blades are densely black punctate and with short linear glands dispersed throughout. The pubescence is minute and varies from puberulent to tomentulose. The leaves are glabrous except for the puberulent petiole and midvein.

BOOK REVIEWS

Alma L. Moldenke

"THE NAMES OF PLANTS" by D. Gledhill, viii & 159 pp., 7 b/w multi-fig. & 5 tab. Cambridge University Press, Cambridge, London & New York, N. Y. 10022. 1985. $34.50 clothbound & $9.95 paperbound.

"Producing an interesting text which is equally as acceptable to the amateur gardener as to the botanist", this small-sized valuable expensive book is "an account of the way in which the naming of plants has changed with time and why the changes were necessary" today when the names of "all plants must conform to internationally agreed standards". The author then explains how this code was established and how it functions. A glossary or meanings for about 5,000 Latin or Latinized specific and other scientific plant epithets comprises the bulk of this book. It makes an excellent adjunct text for courses in systematic botany and a handy desk copy for texonomic and systematic professional and teaching botanists and their graduate students.

"MICROFUNGI ON LAND PLANTS -- An Identification Handbook" by Martin H. Ellis & J. Pamela Ellis, iii & 818 pp., 206 b/w multi-fig. pl. Macmillan Publishing Company, New York, N. Y. 10022. 1985. $75.00.

Although this book was prepared by a husband-wife team now retired from the Commonwealth Mycological Institute, it is equally valuable in the United States, Canada and many other of the earth's places that have turned hospice to voluntary and involuntary introduction of plants and soils over the past few centuries. The book keys out, describes, gives hosts for over 3,300 species of fungi, and has over 2,000 carefully prepared drawings. The fungi are organized as plurivores or specific feeders on root, bark, leaf litter, trees, shrubs, woody climbers, herbs, pteridophytes, and as parasites on rusts and powdery mildews. There are both host and fungus indexes. This publication will be highly valuable to many mycologists, teachers, students, and researchers as well as to field ecologists for years to come. It is therefore an important book to add to university and laboratory research library shelves.

"THE EVOLUTIONARY ECOLOGY OF ANT-PLANT MUTUALISMS" by Andrew J. Beattie, x & 182 pp., 12 b/w fig. & 20 tab. Cambridge University Press, Cambridge, London & New York, N. Y. 10022. 1985. $24.95.

Because of its slight size, one might get the first impression

that here is just a brief survey, but it is fortunate for readers that it is far more than that. The book is concisely written and is well documented with 30 pages of pertinent bibliography dating from 1883 to 1984 and listing several publications by Dan Janzen. The fossil record places ant and angiosperm rise, adaptive radiation and dominance in the mid-Cretaceous without interplay in pollination but in non-floral vegetative structures -- roots, stems, and leaves. Later some ant specialists developed mutualisms as in myrmecotrophy, seed and fruit dispersals, but so little in pollination in comparison with other hymenopterans. This book should appeal to a wide range of naturalists, students, teaching and professional biologists, especially botanists, ecologists and entomologists.

"BELLAMY'S NEW WORLD -- A Botanical History of America" by David Bellamy, 192 pp., 57 color photo., 36 b/w photo., 20 draw./diag., 18 maps & 2 tab. Parkwest Publications, New York, N. Y. 10025. 1983. $24.95.

Recently I read a fascinating article on "cactus cops" protecting these spectacular plants from thieves in our deserts, found out that it was only the first chapter in this book, and promptly wrote to the publishers for a review copy. The subsequent chapters also read enticingly about other separate sections of our country and their plant life nature and changes since exploration and early settlement days as seen by the author travelling throughout so much of the U. S. and as shared to a great part of the world by the British Broadcasting Television Series. And so the beautiful color illustrations and the attention-holding conversational style text are explained. It is a wonderful book for folks with any interest in plant life who have, will or can't travel throughout so much of our vast country.

"COLD-BLOODED ANIMALS" by Maurice Burton in the World of Science Series, 64 pp., 120+ color photos., 5 fig. & 2 b/w photos. Facts on File Publications, New York, N. Y. 10016. 1986. $9.95.

The author is a former curator at the British Museum (Natural History), an important hand in several of the excellent British TV nature films (so explaining some of the superb color photographs in the book) and the author of other books (reviewed previously and appreciatively in this journal) as the excellent "Systematic Dictionary of Mammals". He discusses how invertebrates, fishes, amphibians and reptiles manage their activities heated only by the temperature of their environments. He also explains how certain homeothermal birds and mammals become "cold-blooded" during certain stages (hibernation, resting) when they turn down their thermostats to conserve energy. In the glossary "metamorphosis" is equated with a life stage rather than a process. This book should appeal to a wide range of ages and interests. It surely belongs in personal, school and public libraries, as do the two following books in this series.

"THE WORLD BEFORE MAN" by David Lambert & Andrew Currant in the World of Science series, 64 pp., 120 color photos., 6 charts, 3 draw., 1 map, 1 b/w draw., & 2 maps, Facts on File Publications, New York, N. Y. 10016. 1986. $9.95.

Author Lambert specializes in writing on scientific subjects and author Currant is a curator of fossil mammals in the British Museum (Natural History). The wonderful and profuse illustrations must come from nature TV films and museum sources. With short, interesting, logical text readers are informed as to what fossils are, where and how fossils formed during different geological ages in different kinds of places, in different continental locations, and how they are reconstructed today from protist types of life, through plants, invertebrates and vertebrates including prehuman types.

"HOW DOES IT WORK" by Chris Cooper & Jane Insley in the World of Science series, 64 pp., 120+ color photos., 30 draw. & 5 b/w photos, Facts on File Publications, New York, N. Y. 10016. 1986. $9.95.

Like the two books reviewed above, this one has easily informative, quick-reading text for adult and young readers and excellent modern illustrations about aeroplane and submarine locomotion, electric power at command, and examining our senses through new inventions that enhance our survival and enrich our lives.

"THE BIOPHYSICAL BASIS OF EXCITABILITY" by Hugo Gil Ferreira & Michael W. Marshall, xxiv & 484 pp., 130 b/w fig. & 11 tab. Cambridge University Press, Cambridge, London & New York, N. Y. 10022. 1985. $80.00.

This study is a most helpful adjunct to specific treatises and the modern textbooks on "biophysics, cell biology and electrophysiology of excitable cells" because its achieved aim "is to describe the origins and derivations of the principles upon which these and other books are based". The text covers such topics as ions in solution, diffusion within and through membranes, membrane action potential and noise, and synaptic potentials. The second half of the book consists of "appendices which deal with many of the key concepts from a fairly basic level". The mathematic part reviews algebra, calculus, trigonometry, Sterling and Wallace formulas and probability theory. The second part presents harmonic analysis of stochastic signals, Fourier expansion and integrals. The third part deals with physical chemistry of free energy and junction potentials. This text presents with effective explanations "existing knowledge in a way that clearly explains the basic principles underlying excitability in biological tissues". Overpriced?

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TAXONOMIC REARRANGEMENTS PROPOSED FOR A FLORA OF SAN DIEGO COUNTY, CALIFORNIA

R. Mitchel Beauchamp
Pacific Southwest Biological Services, Inc.
Post Office Box 985
National City, California 92050

Compilation of a floral inventory of San Diego County, California has revealed the need for several names which are consistent with the majority of the listing. Fifteen nomenclatural adjustments are proposed below to create a record of valid publication.

APIACEAE

Eryngium aristulatum Jepson ssp. **parishii** (Coulter & Rose) Beauchamp, stat. nov.

Basionym: Eryngium parishii Coulter & Rose, Contr. U.S. Natl. Herb. 7:57. 1900.

Type: Oceanside, San Diego County, California, S.B. Parish 4436, 1897 (US).

Synonyms: Eryngium Jepsonii Coulter & Rose var. Parishii (Coulter & Rose)Jepson, Madrono 1:107. 1923; Eryngium aristulatum Jepson var. Parishii (Coulter & Rose)Mathias & L. Constance, Amer. Midl. Naturalist 25:386. 1941.

ASTERACEAE

Isocoma acradenia Greene ssp. **eremophila** (Greene)Beauchamp, comb. nov.

Basionym: Isocoma eremophila Greene, Leafl. Bot. Observ. Crit. 1:171. 1906.

Type: Southwestern part of the Colorado Desert, California, Orcutt, Nov. 1, 1890 (US).

Synonyms: Haplopappus acradenius (Greene)Blake ssp. eremophilus (Greene)Hall, Publ. Carnegie Inst. Wash. 389:233. 1928; Aplopappus a. var. e. (Greene)Munz, Manual of Southern California Bot. 523. 1935.

Isocoma veneta (H.B.K.)Greene var. **furfuracea** (Greene)Beauchamp, comb. nov.

Basionym: Biglovia furfuracea Greene, Bull. Calif. Acad. Sci. 1:87. 1885.

Type: Collection without a cited location (UC)

Synonym: Isocoma decumbens Greene, ex C.F. Baker, West Amer. Plants 2:12. 1903, or Leafl. Bot. Observ. Crit. 1:172. 1906; Haplopappus venetus ssp. furfuraceus (Greene) Hall, Publ. Carnegie Inst. Wash. 389:226. 1928. Aplopappus v. var. f. (Greene)Munz, Manual of Southern California Bot. 523. 1935.

ASTERACEAE (continued)

Isocoma veneta var. oxyphylla (Greene) Beauchamp, comb. nov.
Basionym: Isocoma oxyphylla Greene, Leafl. Bot. Observ. Crit. 1:171. 1906.
Type: Jamul Valley back of San Diego, Palmer 134, 1875 (US).
Synonym: Haplopappus venetus ssp. oxyphyllus (Greene) Hall, Publ. Carnegie Inst. Wash. 389:225. 1928; Aplopappus venetus var. oxyphyllus (Greene) Munz, Manual of Southern California Bot. 523. 1935.

CAMPANULACEAE

Downingia concolor Greene ssp. brevior (McVaugh) Beauchamp, stat. nov.
Basionym: Downingia concolor Greene var. brevior McVaugh, Mem. Torrey Bot. Club 19(4):20. 1941.
Type: Cuyamaca Lake, San Diego County, California, L. Abrams 3851 (NY).

CELASTRACEAE

Euonymus occidentalis Nuttall ex Torrey ssp. parishii (Trelease) Beauchamp, stat. nov.
Basionym: Euonymus parishii Trelease, Trans. Acad. Sci. St. Louis 5:354. 1889.
Type: San Jacinto Mountains, Riverside County, S.B. & W.F. Parish 957.
Synonym: Euonymus occidentalis Nuttall ex Torrey var. parishii (Trelease) Jepson, A Manual of the Flowering Plants of California 610. 1925.

CUPRESSACEAE

Cupressus arizonica Greene ssp. stephensonii (C.B. Wolf) Beauchamp, stat. nov.
Basionym: Cupressus Stephensonii C.B. Wolf, Madrono 1(1):125, 1948.
Type: Upper limits of King Creek, a tributary of the South Fork of the San Diego River, Cuyamaca Mountains, San Diego County, at about 4000 ft. elevation, C.B. Wolf 9467 (RSA).
Synonyms: Cupressus arizonica Greene var. stephensonii (C.B. Wolf) Little, Madrono 18(6):164. 1966

FABACEAE (Papilionoideae)

Lupinus densiflorus Bentham ssp. **lacteus** (Kellogg) Beauchamp, stat. nov.
Basionym: Lupinus lacteus Kellogg, Proc. Calif. Acad. Sci. 5:37. 1873.
Type: "On Oak Creek hillsides, Kern County, 14 miles from Tejon Pass, Mr. S. Brennan, Jr. (Specimen presumably lost in the fire in 1906).
Synonyms: Lupinus densiflorus Bentham var. lacteus (Kellogg) C.P.Smith, Bull. Torrey Bot. Club 45:181. 1918. Lupinus arenicola Heller, Muhlenbergia 2:75. 1905, Type: "Near the first crossing of the creek west of Caliente, Kern County, Heller 7609, April 7, 1905.

Lupinus excubitus M.E. Jones ssp. **medius** (Jepson) Beauchamp, stat. nov.
Basionym: Lupinus albifrons Bentham ex Lindley var. medius Jepson, A Flora of California 2:252. 1936.
Type: Mountain Springs Grade summit, San Diego County, California, Jepson 11815 (JEPS).
Synonyms: Lupinus excubitus M.E. Jones var. medius (Jepson) Munz, Aliso 4(1):92. 1958; Lupinus gravi S. Watson var. medius (Jepson) C.P. Smith, Species Lupinorum 28. 1938.

Lupinus excubitus M.E. Jones ssp. **austromontanus** (Heller) Beauchamp, stat. nov.
Basionym: Lupinus austromontanus Heller, Muhlenbergia 2:69. 1905.
Type: Tehachapi, Kern County, California, Heller 7825.
Synonyms: Lupinus excubitus M.E. Jones var. austromontanus (Heller) C.P. Smith in Jepson, A Manual of the Flowering Plants of California 532. 1925; Lupinus albifrons Bentham ex Lindley var. austromontanus (Heller) Jepson, A Flora of California 2:252. 1936.

Thermopsis macrophylla Hooker & Arnott ssp. **semota** (Jepson) Beauchamp, stat. nov.
Basionym: Thermopsis macrophylla Hooker & Arnott var. semota Jepson, A Flora of California 2:245. 1936.
Type: Spencer Valley, San Diego County, California, R.D. Alderson (JEPS).

HYDROPHYLLACEAE

Phacelia douglasii (Bentham) Torrey ssp. **cryptantha** (Brand) Beauchamp, stat. nov.
Basionym: Phacelia Douglasii (Bentham) Torrey var. cryptantha Brand in Engler, Pflanzenreich 4(251):114. 1913.
Type: San Diego, San Diego County, California, M.E. Jones 3085 (POM).
Synonyms: Phacelia palmeri Vasey & Rose, Proc. U.S. Natl. Mus. 11:532. 1888, non Phacelia palmeri S. Watson, 1871.; Phacelia stellaris Brand in Engler, Pflanzenreich 4(251):123. 1913. Proposed as a new name for Phacelia palmeri Vasey & Rose.

LIMNANTHACEAE

Limnanthes gracilis Howell ssp. **parishii** (Jepson)Beauchamp, stat. nov.
Basionym: Limnanthes versicolor (Greene) Rydberg var. Parishii Jepson, A Flora of California 2:412. 1936.
Type: Stonewall Mine, Cuyamaca Mountains, San Diego County, California, S. B. Parish 4416 (JEPS).
Synonym: Limnanthes gracilis Howell var. parishii (Jepson) C.T. Mason, Univ. Calif. Publ. Bot. 25:490. 1952.

RHAMNACEAE

Ceanothus greggii A. Gray ssp. **perplexans** (Trelease)Beauchamp, stat. nov.
Basionym: Ceanothus perplexans Trelease in A. Gray, Synoptical Flora of North America 1(1):417. 1897.
Type: Southwestern California.
Synonym: Ceanothus Greggii A. Gray var. perplexans (Trelease)Jepson, A Manual of the Flowering Plants of California 623. 1925.

ROSACEAE

Rubus glaucifolius Kellogg ssp. **ganderi** (Bailey)Beauchamp, stat. nov.
Basionym: Rubus ganderi Bailey, Gentes Herb. 5:893. 1945.
Type: North Peak, Cuyamaca Mountains, San Diego County, California, Frank F. Gander A208 (POM).
Synonym: Rubus glaucifolius Kellogg var. ganderi (Bailey)Munz, Aliso 4(1):92. 1958.

Studies on *Mikania* (Compositae)-XIII

W.C.Holmes
Biology Department, Northwestern State University
Natchitoches, LA 71497 USA

Following are additional records preliminary to a treatment of the *Mikania* of Mexico.

Mikania aromatica Oerst., Overs. Dansk. Selsk. Forh. 10.1863, is cited by Kew Index as Brazilian However, Williams (1975), states that "a photograph of the original specimen in Copenhagen shows this is the rather common Mexican (Vera Cruz, Oaxaca, Chiapas) and Central American species, extending from Guatemala to Costa Rica. The heads of the inflorescences are contracted into globose glomerules; ... Kew Index is incorrect in giving this species as Brazilian. The Costa Rican *M. tonduzii* Rob. perhaps is to be referred to this species."

Examination of the type specimen provided no information as to the origin of *Mikania aromatica*. It appeared identical to the Brazilian *M. smilicina* DC and was annonated as such by F.W. Klatt. The only other data on the label includes the name *Mikania aromatica* Oersted and the abandoned before published name of *Mikania* in combination with the specific epithet of the *Neea* species mentioned below. Personal communication with (Mrs.) A.Fox Maule, Curator of Type Specimens at Copenhagen, documents the type locality of this plant.

"Whereas Oersted's description is in Latin the report of how he got the plant is in Danish which may be the cause of the confusion. Oersted's own collections are from Central America (Costa Rica and Nicaragua) and from the Antilles. The collector of the *Mikania* was, however, the Danish botanist and zoologist P.W.Lund who lived most of his life in Lagoa Santa, Minas Geraes, Brazil. He had made experiments in making tea from another plant, *Neea theifera* Oerst., mixed with the *Mikania*. He sent both specimens to a friend in Denmark, who submitted the plants to Professor Scharling, the chemist, for chemical examination, and to Professor Oersted for description. The paper is a joint publication in the proceedings of the Royal Danish Scientific Society."

Mikania aromatica is, therefore, from that location in Brazil and is considered synonomous with *M. smilicina*. The plants referred to as *M. aromatica* by Williams (1975) and Nash and Williams (1976) should correctly be called *Mikania tonduzii* B.L.Robins. *Heyde & Lux 3430*, cited by Nash and Williams as the type (of *M. aromatica* ?) is actually the type of *Willughbaea globosa* Coult (= *Mikania globosa* Coult.). This plant of Guatemala and Oaxaca, Mexico is considered a distinct species.

Mikania tehuacanensis W.Holmes, *sp. nov*

Suffrutex volubilis. Foliis late ovatis, ca. 4 x 3 cm, apice acuminatis, basi subcordatis vel truncatis, marginibus subintegris ad crenato-dentatis. Capitulescentiis corymbosis. Capitulis 10-10.5 mm longis. Corollis ca. 5.2 mm longis, dentibus limbi oblongo-linearis, ca. 3.2 mm longis. Achaenis ca. 3 mm longis. Pappi setis ca. 60, 5-6 mm longis, scabridis.

Shrubby vine to 2 m long. Stems terete, striate, densely hispid; internodes to 12 cm long. Leaf blades broadly ovate, ca. 4 x 3 cm, apices acuminate, margins subentire to crenate-dentate, hispid-ciliate, bases subcordate or truncate to an acute insertion, upper surfaces nearly glabrate, lower surfaces hispid, densely so on the nerves, palmately 3 or 5 nerved from the base. Petioles 2.5-3 cm long, thin, hispid. Capitulescence a corymb, 5-7 cm wide and 4-6 cm high, borne on hispid branchlets 6-8 cm long; ultimate branchlets 1-4 mm long, hispid; bracts similar to leaves but smaller and with acute bases. Heads 10-10.5 mm long; subinvolucral bracts elliptic to oblanceolate, 8-9 mm long, hispid, nerved, more markedly so on the abaxial side, apices acute to acuminate Phyllaries broadly elliptic, 8-9 mm long, the outer pair hispid, apices acuminate, margins hispid-ciliate, inner pair glabrate, apices long acuminate, sparcely hispid, margins slightly hispid-ciliate above the middle. Corollas ca. 5.2 mm long, tube ca. 2.2 mm long, throat apparently lacking, teeth oblong-linear, ca. 3 mm long, apices acuminate, glandular and pubescent with several jointed hispid hairs, inner basal surfaces of teeth papillose with hirsute glanular hairs. Achenes ca. 3 mm long, sparingly puberulent. Pappus bristles ca. 60, 5-6 mm long, white, the margins scabrid.

Type: Mexico. Puebla, Tehuacán area, above Teotitlan del Camino on the road to Huautla from the lower edge of the oak-pine forest to the top of the ridge, 2000-3250 m, 3 Aug 1961, *Smith, Peterson, & Tejeda 4144* (holotype: GH; isotype: F).

The new species is distinctive in having a corolla lacking a well defined throat. At maturity the corolla teeth are oblong-linear and greater in length than the tube. The plant resembles *Mikania cristata* B.L.Robins., but lacks the enlarged and crested stipular-enations characteristic of that species

Literature Cited

Williams, L.O. 1975. Tropical American Plants XVII. Fieldiana: Botany 36: 77-110.

Nash, D.L. & L.O.Williams. 1976. Flora of Guatemala. Fieldiana: Botany 24, pt. 12: 1-603.

A REVIEW OF SOME OF THE SPECIES OF LEPANTHES FROM VENEZUELA (ORCHIDACEAE).

Carlyle A. Luer
3222 Old Oak Drive
Sarasota, FL 33579

The orchid flora of the coastal mountains of Venezuela is more or less isolated and distinct from the orchid flora of the Cordillera del Merida, the mountains of western Venezuela that are contiguous with the Eastern Cordillera of Colombia. In the high mountains of the adjacent departments of Santander and Norte de Santander we have found numerous species of pleurothallids that have been found in neighboring areas of Venezuela and illustrated by G. C. K. Dunsterville in Venezuelan Orchids Illustrated. Very few species from the coastal range have been seen or recorded from the Eastern Cordillera of Colombia.

As of this date 49 specific epithets (encompassing about 44 species) have been attributed to the genus Lepanthes in Venezuela. Of these, 41 have been superbly illustrated by Mr. Dunsterville in Venezuelan Orchids Illustrated, 13 with erroneous determinations, nine of which are undescribed species. One has recently been described from neighboring Colombia; the remaining seven are described below.

* The species from the coastal mountains identified in Venezuelan Orchids Illustrated and the Flora of Venezuela as L. wageneri Rchb. f., is one of the variable and widely distributed variations (or populations) in the L. turialvae-complex. Exactly how to treat this complex is not yet resolved, but, of course, the simplest solution would be to include all the variations in one variable species. I have drawn numerous plants from Costa Rica, Panama, Colombia and Ecuador, each of which varies from the other in seemingly inconsequential details. To give each a specific epithet seems impractical at this time. Those populations that vary to a significant degree, however, should be recognized.

Lepanthes wageneri does occur in western Venezuela. It was described from Aspasica in the Eastern Cordillera of Colombia, and it is relatively frequent through Colombia and Ecuador. In Venezuelan Orchids Illustrated it is identified as the Costa Rican L. decipiens Ames & Schweinf., and in the Orchidaceae by Foldats in the Flora of Venezuela it is identified as the Costa Rican L. barbae Schltr.

* Dunsterville's drawing of the species from the high mountains of western Venezuela identified as L. aquila-borussiae Rchb. f., is a form of L. rabei Foldats. This species is frequent and variable in the high mountainous paramos of adjacent Colombia. Lepanthes aquila-borussiae was described from a collection near Caracas in the coastal mountains. Among Dunsterville's drawings the species found near Caracas identified as the Guatemalan L. stenophylla Schltr. seems to fit Reichenbach's meager description and sketches.

* The illustration of the species from the western Venezuelan mountains identified as the Ecuadorian L. pteropogon Rchb. f., confused us for years. We had found it in neighboring Colombia, but never in Ecuador. The true L. pteropogon was described from a collection by Jameson from around Quito. Believing that I knew what L. pteropogon should look like, the true L. pteropogon was described by me as L. pollex. It is still a common species around Quito. The misidentified Colombian and Venezuelan species is probably L. ruscifolia Rchb. f. which was described from a collection by Schlim from the Cordillera del Merida. Lepanthes ruscifolia may also include L. dunstervilleorum Foldats, depending upon how much variation will be acceptable,

* The species in Venezuelan Orchids Illustrated and the Flora of Venezuela identified as the Guatemalan L. samacensis Ames was recently described from the Eastern Cordillera of Colombia as L. cercion Luer & Escobar. The sepals of L. samacensis are ciliate, those of L. cercion are not.

* The species identified in the Flora of Venezuela as the Central American L. ciliisepala Schltr. was recently discovered in the Eastern Cordillera of Colombia and described by Luer & Escobar as L. antennifera.

Lepanthes biappandiculata Luer, sp. nov.

Planta mediocris caespitosa, racemo congesto disticho foliis grandibus latis breviore, sepalis late ovatis breviter acuminatis, petalis transverse bilobis, lobo superiore oblongo rotundato, lobo inferiore late subfalcato, labello bilaminato, laminis ovatis, connectivis corporeque latis, sinu transverse bilobo cum appendicibus duobus pubescentibus.

Plant medium in size, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 4-10 cm long, enclosed by 8-12 pale, long-ciliate, lepanthiform sheaths. Leaf erect, thinly coriaceous, elliptical, 5-7 cm long, 2.4-2.7 cm wide, the obtuse apex lightly acuminate, the base cuneate into the petiole. Inflorescence a congested, distichous, successively flowered raceme up to at least 8 mm long, borne behind the leaf by a filiform peduncle ca. 15 mm long; floral bracts echinate, 2 mm long; pedicels 1.5 mm long; ovary 1.5 mm long; sepals yellow-green, glabrous, carinate, broadly ovate, the obtuse apices shortly acuminate, the dorsal sepal 4 mm long, 4 mm wide, connate to the lateral sepals for 1.5 mm, the lateral sepals oblique, 4 mm long, 2.25 mm wide, connate 1 mm; petals dull orange with the border purple, minutely pubescent, transversely bilobed, 1.3 mm long, 3.3 mm wide, the upper lobe oblong with the end rounded, the lower lobe smaller, obliquely triangular-falcate with the apex narrowly rounded; lip orange-brown, suffused with purple, bilaminate, the blades ovate, microscopically pubescent, 1.6 mm long, the connectives and body broadly

cuneate, connate to the base of the column, the sinus broadly bilobed, pubescent, with 2 small, oblong, ciliate, appendices externally in the sulcus, one behind the other; column stout, 1.5 mm long, the anther dorsal, the stigma ventral.
Etymology: From the Latin biappendiculatus, "with two appendices," referring to the two external appendices.

Type: Venezuela: State of Miranda: epiphytic in forest near Guatopo, Apr. 1961, G. C. K. Dunsterville 619 (MO); C. Luer illustr. 11519.

This species was identified in the Flora of Venezuela as L. ruscifolia Rchb. f. and in Venezuelan Orchids Illustrated, as the Ecuadorian L. papyrophylla Rchb. f. The latter was described from a collection by Jameson near Quito. To date, L. papyrophylla is one of the two "old species" from Ecuador that have not yet been rediscovered, but from Reichenbach's description and Lindley's sketches confirming the acute sepals and petals, and deeply sulcate lip, it is obvious that this species from Eastern Venezuela is not the same.

Although unusual, a pair of appendices, one behind the other, seen externally on the body of the lip of this species has been seen in extremely few other species (e.g. L. eumeces Luer).

Lepanthes calocodon Luer, sp. nov.

Species haec L. chelonioni Luer & Escobar affinis, sed sepalis intus glabris, caudis sepalorum lateralium angustioribus, laminis labelli oblongis glabris tantum apice incurvatis longiciliatis, et columna graciliore differt.

Plant small, epiphytic, caespitose; roots slender. Ramicauls slender, erect, 2-4 cm long, enclosed by 3-5 minutely ciliate, lepanthiform sheaths. Leaf erect, coriaceous, elliptical, obtuse, 1.5-2 cm long, 1-1.2 cm wide, the base cuneate into a petiole ca. 1.5 mm long. Inflorescence a loose, flexuous, flexible, few- but large-flowered, successively flowering raceme up to 5 cm long including the filiform peduncle ca. 2.5 cm long; floral bracts lightly echinate, 1.5-2 mm long; pedicels 3-4 mm long; ovary carinate-papillose, 1.5 mm long; sepals dark red-purple, carinate, glabrous, minutely short-ciliate, the dorsal sepal ovate-triangular, concave, 15 mm long, 10 mm wide expanded, connate to the lateral sepals for 4 mm to form a cupped flower, the apex acute, acuminate, the lateral sepals ovate-triangular, concave, oblique, 15 mm long including the tails, connate 8 mm, 13 mm wide expanded together, the subacute apices contracted into tails 5 mm long; petals dark purple, transversely bilobed, 0.75 mm long, 6.5 mm wide, the upper lobe minutely short-pubescent, narrowly triangular, the lower lobe longer, long-pubescent, triangular-filiform; lip dark purple, bilaminate, the blades glabrous, narrowly oblong, 4 mm long expanded, the apices rounded, long-ciliate, incurved beyond

and below the stigma, the connectives broadly cuneate, connate to the column near the middle, the sinus obtuse with an oblong, shortly pubescent appendix; column slender, 3 mm long, the anther dorsal, the stigma ventral.

Etymology: From the Greek calocodon, "a beautiful bell," referring to the appearance of the flower.
Type: Venezuela: State of Tachira: epiphytic in dwarf forest near the pass between Zumbador and Quenequea, alt. 2500 m, M. J. O'Connor, Oct. 1969, G. C. K. Dunsterville 1120 (MO), C. Luer illustr. 11516.

This species was identified as the Ecuadorian L. capitanea Rchb. f. in Venezuelan Orchids Illustrated. Lepanthes capitanea was described from a collection by Jameson near Lloa, very near to Quito. It is fairly frequent in the mountains of central Ecuador, but it has never been seen elsewhere. The flower is flat, completely different from the concave, bell-shaped flower of the present species.

Lepanthes calocodon is very closely allied to L. chelonion from the nearby mountains of Colombia, but L. calocodon is distinguished by the sepals glabrous within, narrower tails of the lateral sepals, and long, oblong blades of the glabrous lip with long-ciliate apices that curve inward beyond the very slender column.

Lepanthes glochidea Luer, sp. nov.

Planta parva caespitosa, racemo subdenso paucifloro quam folio anguste ovato breviore, sepalis anguste ovatis acutis ciliatis, petalis transverse bilobis, lobis longi-attenuatis ciliatis, labello minuto bilaminato ciliato, appendice linguiformi.

Plant small, epiphytic, caespitose; roots filiform. Ramicauls slender, erect, 4-6 cm long, enclosed by 6-8 microscopically scabrous, lepanthiform sheaths. Leaf erect, thinly coriaceous, more or less suffused with purple, narrowly ovate, acute, 2.5-3.5 cm long, 0.6-0.8 cm wide, the base cuneate into a 1 mm long petiole. Inflorescence a subdense, successively few-flowered raceme up to 8 mm long, borne behind the leaf by a filiform peduncle 5-8 mm long; floral bract glabrous, 1-1.5 mm long; pedicel 1 mm long; ovary 1 mm long; sepals yellow, suffused with purple, ciliate, ovate, acute, lightly acuminate, the dorsal sepal 3.4 mm long, 1.5 mm wide, connate to the lateral sepals for 0.5 mm, the lateral sepals 1-veined, 3.6 mm long, 1.2 mm wide, connate 0.8 mm; petals yellow-orange, ciliate, transversely bilobed, 0.5 mm long, 2.5 mm wide, the lobes similar, narrowly triangular, attenuate; lip orange, bilaminate, the blades narrowly ovate, pubescent, 0.8 mm long, the connectives broadly cuneate, connate to the base of the column, the body concave with an obtuse sinus, the appendix long-ligulate, decurved over long cilia on the convex, external surface of the body; column 0.8 mm long, the anther dorsal, the stigma ventral.

Etymology: From the Latin (Greek) glochideus, "with points," referring to the pointed sepals and petals.

Type: Venezuela: State of Trujillo: epiphytic in cloud forest between Bocono and Guaramacal, alt. ca. 2500 m, Mar. 1961, G. C. K. Dunsterville 605 (MO), C. Luer illustr. 11518.

In Venezuelan Orchids Illustrated and the Flora of Venezuela this species was identified as the Ecuadorian L. millei Schltr., which is frequent in the high forests of the central part of that country. Although the loose, flexuous racemes of L. millei were originally described as being commonly shorter than the obtuse, elliptical leaf, the racemes are often found growing much longer. The racemes of L. glochidea are less than half the length of the acute, narrowly ovate leaf. In addition, the sepals of L. millei are entire, the petals are not ciliate, and the appendix is reduced to a minute, obtuse angle in the sinus.

Lepanthes navicularis Luer, sp. nov.

Planta parva caespitosa, folio anguste ovato, racemo brevi subdenso, sepalis ovatis subacutis, petalis pubescentibus transverse bilobis obtusis, lobo inferiore minore, labello bilaminato, laminis breviter pubescentibus ovatis, connectivis latis, appendice crassa naviculari.

Plant small, epiphytic, caespitose; roots slender. Ramicauls slender, erect, 4-9 cm long, enclosed by 6-7, minutely ciliate-scabrous, lepanthiform sheaths. Leaf erect, coriaceous, narrowly ovate, acute, 3-4.5 cm long, 1-1.2 cm wide, the base cuneate into the petiole 1.5-2 mm long. Inflorescence a sub-dense, successively few-flowered raceme up to 7 mm long, borne behind the leaf by a filiform peduncle 5-8 mm long; floral bracts glabrous, 1.5 mm long; pedicels 1.5 mm long; ovary 1 mm long; sepals pale yellow-brown, suffused medially with purple, ovate, subacute, more or less minutely subdenticulate, the dorsal sepal 2.5 mm long, 1.7 mm wide, connate to the lateral sepals for 0.5 mm, the lateral sepals oblique, 1-veined, 2.5 mm long, 1.1 mm wide, connate 0.75 mm; petals yellow, the upper lobe suffused with red, minutely pubescent, transversely bilobed, 0.8 mm long, 1.9 mm wide, the upper lobe oblong with the apex obtuse to rounded, the lower lobe obliquely triangular with the apex rounded; lip red-purple, minutely pubescent, bilaminate, the laminae ovate, 1.2 mm long, the apices narrowly obtuse, the bases broadly rounded, the connectives broadly cuneate, connate to the base of the column, the body thick with the sinus protruding as an acute, triangular, prowlike appendix; column 1 mm long, the anther dorsal, the stigma ventral.

Etymology: From the Latin navicularis, "boat-shaped," referring to the appearance of the appendix.

Type: Venezuela: State of Merida: epiphytic in cloud forest, La Carbonera, alt. ca. 2000 m, July 1962, G. C. K. Dunsterville 713 (MO), C. Luer illustr. 11517.

This species was identified as the Costa Rican L. lindleyana Oerst. & Rchb. f. in Venezuelan Orchids Illustrated and the Flora of Venezuela. Although similar, this species may be distinguished by the subdense inflorescence with smooth floral bracts and short pedicels appressed to the rachis, and a thick, triangular appendix. Reichenbach described the rachis of L. lindleyana as "bene bipectinati" indicating that the raceme was congested with two dense rows of pedicels. His drawing also shows the floral bract to be echinate.

Lepanthes ophiostele Luer, sp. nov.

Planta mediocris caespitosa, racemis subdensis foliis anguste ovatis plus minusve aequilongis, sepalis ovatis acutis, petalis bilobis pubescentibus, lobis triangularibus aequilongis, labello bilaminato breviter ciliatis, laminis lunatis, connectivis et corpore latis ad columnam angustissimam elongatam super medium connatis, et appendice oblonga pubescenti.

Plant medium in size, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 7-10 cm long, enclosed by 7-8 tightly fitting, minutely scabrous, lepanthiform sheaths. Leaf erect, thinly coriaceous, narrowly ovate, acute, 4-6 cm long, 1.5 cm wide, the base cuneate into a twisted petiole 3 mm long. Inflorescence a subdense, successively many-flowered raceme up to 5 cm long, borne behind the leaf by a filiform peduncle 8-20 mm long; floral bracts and pedicels 1-1.5 mm long; ovary 1 mm long; sepals pale yellow-brown, entire, carinate, ovate, acute, the dorsal sepal lightly concave, 3.5 mm long, 2 mm wide, connate to the lateral sepals for 0.5 mm, the lateral sepals 1-veined, oblique, 3.5 mm long, 1.3 mm wide, connate 1.2 mm; petals orange, red at the base, minutely ciliate-pubescent, transversely bilobed, 0.6 mm long, 2.5 mm wide, the lobes triangular, acute, about equal in size; lip red, orange toward the margins, bilaminate, the blades 1.5 mm long, minutely pubescent, oblong-lunate with rounded ends, the connectives broad forming a broad body with a cleft sinus and an oblong, pubescent appendix, the body connate to the column above the middle; column very slender, 1.75 mm long, the anther dorsal, the stigma subapical.

Etymology: From the Greek ophiostele, "a snake-like column," referring to the long, slender column.

Type: Venezuela: State of Merida, epiphytic in cloud forest between Santa Cruz and Canagua, alt. 2600 m, Nov. 1973, G. C. K. Dunsterville 1100 (MO), C. Luer illustr. 11513.

This species was identified in Venezuelan Orchids Illustrated as the Ecuadorian L. monoptera Lindl. Lepanthes monoptera was described from a collection by Jameson near Cuenca in southern Ecuador, and it is found commonly in southern and central Ecuador. The habit, raceme, and all floral parts easily separate the two species.

Lepanthes ophiostele is recognized by the slender, subdense, many-flowered raceme that approaches the leaf in length, and the slender, elongated column to which the lip is connate above the middle.

Lepanthes pectinata Luer, sp. nov.

Planta mediocris caespitosa, foliis acuminatis quam racemis distichis congestissimis longipedicellatis longioribus, sepalis ovatis obtusis, petalis magnis transverse bilobis glabris, lobo superiore suborbiculato, lobo inferiore triangulari obtuso, labello bilaminato, laminis ellipticis glabris, connectivis late cuneatis, appendice segmentata pubescenti.

Plant medium in size, epiphytic, caespitose; roots slender. Ramicauls erect to subpendent, slender, 2.5-7.5 cm long, enclosed by 4-8 closely fitting, minutely subscabrous, lepanthiform sheaths. Leaf erect, coriaceous, more or less suffused with purple, elliptical to suboborbicular, 2-6 cm long, 1-4 cm wide, the apex subacute to obtuse, more or less abruptly acuminate, the base similarly acuminate to the petiole 1.5 mm long. Inflorescence a very congested, distichous, long-pedicellate, successively many-flowered raceme up to 20 mm long, borne on top of the leaf by a filiform peduncle 10-20 mm long; floral bracts subscabrous, 1 mm long; pedicels 2-2.5 mm long; ovary 3 mm long; sepals red-brown, entire, ovate, subacute to obtuse, the dorsal sepal 2.5 mm long, 2 mm wide, connate to the lateral sepals for 0.5 mm, the lateral sepals oblique, 2 mm long, 1.25 mm wide, connate 1 mm; petals orange, red toward the base, glabrous (microscopically cellular-pubescent), transversely bilobed, 1 mm long, 2.75 mm wide, the upper lobe suborbicular, the lower lobe triangular with the apex rounded; lip red-orange, essentially glabrous, bilaminate, the blades elliptical, 1.4 mm long, with obtuse ends, the connectives broadly cuneate, connate to the base of the column, the sinus obtuse with a comparatively large oblong appendix with a long-pubescent terminal segment; column 1.25 mm long, the anther dorsal, the stigma ventral.

Etymology: From the Latin pectinatus, "like a comb," referring to the congested, long-pedicellate raceme.

Type: Venezuela: State of Bolivar: epiphytic in forest along the road to Santa Elena de Uairen, between Km 114 and 136, alt. 900-1300 m, Jan. 1964, G. C. K. Dunsterville 832 (MO), C. Luer illustr. 11514.

This species from eastern Venezuela was identified as the Jamaican L. ovalis (Sw.) Lawc. & Rendle in the Flora of Venezuela, and as the Central American L. turialvae Rchb. f. in Venezuelan Orchids Illustrated. Besides the distinctive habit with acuminate leaves and smaller flowers, the large, segmented, pubescent, appendix easily distinguishes this species from the other two. The appendix, however, is very similar to that of several apparently unrelated species from Ecuador.

Lepanthes scolex Luer, sp. nov.

Planta parva caespitosa, foliis ellipticis quam racemis subdensis longioribus, sepalis ovatis breviter acuminatis subdenticulatis, petalis transverse bilobis, lobis rotundis subaequantibus, labello bilaminato, laminis anguste ovatis obtusis, connectivis oblongis, appendice oblonga pubescenti.

Plant small, epiphytic, caespitose; roots slender; ramicauls slender, erect, up to 4.5 cm long, enclosed by 5-7 closely fitting, lepanthiform sheaths. Leaf erect, coriaceous, elliptical, acute, up to 3 cm long, 1.2 cm wide, the base cuneate. Inflorescence a subdense, successively few-flowered raceme up to 15 mm long, borne behind the leaf by a filiform peduncle up to 10 mm long; floral bracts and pedicels ca. 1 mm long; ovary ca. 1 mm long; sepals pale translucent brown, ovate, minutely subdenticulate, the dorsal sepal obtuse, shortly acuminate into the acute apex, 3.2 mm long, 1.8 mm wide, connate to the lateral sepals for 0.5 mm, the lateral sepals oblique, acute, acuminate, 1-veined, 3.2 mm long, 1.25 mm wide, connate 0.6 mm; petals bright yellow, the upper lobe suffused with red, glandular-cellular, transversely bilobed, 0.6 mm long, 1.75 mm wide, the lobes subequal, suborbicular; lip bright red, bilaminate, the lobes narrowly ovate, obtuse, glandular-cellular, 1.4 mm long, the connectives oblong, the body rounded, connate to the base of the column, the sinus obtuse with an oblong, pubescent appendix.

Etymology: From the Greek skolex, "a tapeworm," referring to the appearance of the appendix.

Type: Venezuela: State of Trujillo: epiphytic in rain forest between Bocono and Guaramacal, alt. ca. 2000 m, Aug. 1962, G. C. K. Dunsterville 724 (SEL), C. Luer illustr. 11515.

This species was identified in Venezuelan Orchids Illustrated as L. acuminata Schltr. from the northern part of Central America. Although superficially similar, the Central American species may be distinguished from this Venezuelan species by the narrower, twice longer, entire sepals, proportionately larger petals, and a very small, triangular appendix.

I am grateful to Mr. Dunsterville who generously supplied me with pickled vegetative and floral material of the above species.

NUEVOS REGISTROS Y TAXA INTERESANTES DE PTERIDOFITAS DEL VALLE DE MEXICO. (ISOETACEAE, PSILOTACEAE Y SELAGINELLACEAE)

Ma. de la Luz Arreguín-Sánchez *
Laboratorio de Botánica Fanerogámica
Escuela Nacional de Ciencias Biológicas
Instituto Politécnico Nacional 11340,
México D.F. Becario de COFAA.

Como resultado de las investigaciones sobre la pteridoflora del Valle de México iniciada en el año de 1975, se encontraron algunos taxa que resultan ser nuevos registros para la zona de estudio y otros que han sido citados en trabajos anteriores pero que son poco conocidos, o bien especies que existian en la zona y suponemos han desaparecido de la región.

En el presente artículo, aportaremos datos de nuevos registros y taxa interesantes de tres familias de pteridofitas correspondientes al grupo comunmente llamado afin a los helechos y en artículos posteriores trataremos al resto de las pteridófitas.

Al revisar la bibliografía tendiente a reunir información sobre la pteridoflora del Valle de México, encontramos que Reiche (1914) enumera 24 géneros y 84 especies de pteridofitas y dentro del grupo afin a los helechos cita los géneros Equisetum con una especie, Lycopodium con tres especies y Selaginella con tres especies. La mención de estos taxa en el Valle de México, tiene que tomarse con cierta reserva, pues no es clara la circunscripción del área y muchas de las especies no crecen dentro de los limites adoptados por Rzedowski (1979) y cuyo criterio de limitación seguimos en este trabajo.

Dentro del grupo afin a los helechos, encontramos cuatro familias; Equisetaceae, Isoetaceae y Psilotaceae representadas cada una con una especie y la familia Selaginellaceae con siete especies.

Todas las familias antes citadas, a excepción de Equisetaceae, presentan nuevos registros o especies interesantes que comentar.

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FAMILIA ISOETACEAE, representada con la especie Isoetes mexicana Underw.

Se trata de un taxa escaso, Pfeiffer (1922) y Conzatti (1936) citan el ejemplar de Pringle 13261 del año 1904 - colectado en la Serrania de las Cruces, Edo. de México y desde esa fecha no se habia vuelto a colectar hasta el - año de 1976 cuando se realizó una excursión en la Sierra de las Cruces, Edo. de México a 3000 m de altitud, se encontraron algunos ejemplares que estan depositados en el herbario de la ENCB (Arreguín 711). En ese mismo año, en el Puerto de las Cruces, Delegación de Cuajimalpa, Distrito Federal a 3100 m de altitud se le colectó y el ejemplar quedo depositado en el herbario de la ENCB (Rzedowski 34261). En el año de 1979, cerca de Tezoantla, Municipio, de Real del Monte, Edo. de Hidalgo a 2800 m - se encontró algunas plantas que estan depositadas en el herbario de la ENCB (Rzedowski 36110).

En los tres lugares colectados en las últimas fechas, la especie crecía en sitios anegados y es una planta muy escasa.

FAMILIA PSILOTACEAE, representada con una especie Psilotum complanatum Sw.

Es una planta que al parecer existia en el Pedregal - de San Angel, Distrito Federal. El Dr. Jerzy Rzedowski la colectó en el año de 1966 en un sitio llamado La Candelaria, crecía entre las oquedades de lava a 2250 m de altitud.

Se han realizado diversas excursiones al Pedregal de - San Angel y no se ha vuelto a encontrar, quedando como - testigos de la existencia de esta planta en el Valle de - México los ejemplares colectados por el Dr. Rzedowski y - depositados en los herbarios de la ENCB y MEXU (Rzedowski 22147).

FAMILIA SELAGINELLACEAE, representada en el área con el - género Selaginella y siete especies.

Reiche (1914) cita las especies Selaginella rupestris, S. aschenbornii y S. lepidophyllum.

Como resultado del estudio del material de herbario, - apoyado por las observaciones de campo y los datos obtenidos de la revisión bibliográfica, se aceptan para el área 7 especies; Selaginella lepidophylla, especie también citada por Reiche. Selaginella peruviana considerada por - Tryon (1955) como nombre válido y pasando como sinonimo - de esta especie S. aschenbornii y lo que Reiche cito como Selaginella rupestris, según la revisión de Tryon (1955) corresponde a una serie de especies que antes se incluían como S.rupestris, pero actualmente se segregan en varias especies. En el Valle de México encontramos cinco de ellas; S. arsenei, S. peruviana, S. rupincola, S. wrightii y S. sellowii, -

las cuatro primeras son especies poco frecuentes en la región, no así el caso de la última.

Selaginella arsenei Weath., se tiene una colecta del Municipio de Real del Monte, Edo. de Hidalgo, colectada e identificada en 1955 por los doctores R.M. & A.F. Tryon 5133 y depositada en el herbario de MEXU. No se ha vuelto a colectar en el Valle de México.

Selaginella peruviana (Milde) Hieron., en los herbarios revisados y en las áreas exploradas no se ha encontrado esta especie, pero se ha considerado porque Tryon (1955) cita un ejemplar de Schaffner 10 del Distrito Federal, depositado en los herbarios B y BM. En el mismo caso se encuentra S. rupincola Underw., Schaffner la colectó en el Distrito Federal y la registro con el número 11, los ejemplares están depositados en los herbarios B, GH y US.

Selaginella wrightii Hieron., Se tiene un ejemplar depositado en MEXU de Schaffner sin número, 1875 del Peñon, Valle de México y no se ha vuelto a colectar.

Selaginella delicatissima Linden ex A. Braun, se trata de un nuevo registro para la zona, con una colecta del municipio de Tlalmanalco, Edo. de México, a 2750 m de altitud en vegetación de bosque mesófilo de montaña y el ejemplar esta depositado en el herbario de la ENCB (S. Carrillo 8).

BIBLIOGRAFIA CITADA:

1) Conzatti, C. 1946. Flora Taxonómica Mexicana. 1:144. Talleres Gráficos de la Nación.
2) Pfeiffer, N.E. 1922. Monograph of the Isoetaceae. Ann. Missouri Bot. Gard. 9:79-232.
3) Reiche, C. 1914. La vegetación en los alrededores de la Capital de México. Tipografía Económica. 143 p.
4) Rzedowski & Rzedowski (Ed.). 1979. Flora Fanerogamica del Valle de México. C.E.C.S.A. 1:1-59.
5) Tryon, R.M. 1955. Selaginella rupestris and its allies. Ann. Missouri Bot. Gard. 42(1):1-99.

A NOTE CONCERNING THE COMBINATION *ASTER* SUBGENUS *ASCENDENTES* (RYDB.) SEMPLE

Warren Frank Lamboy
Department of Plant Biology, University of Illinois
Urbana, Illinois 61801

The recently published combination *Aster* subgenus *Ascendentes* (Rydb.) Semple (1985) is not validly published, since the author does not accept this particular taxon as a subgenus of *Aster*. Instead he considers the group to be a new genus, *Virgulaster* Semple. The International Code of Botanical Nomenclature (Voss et al., 1983) deals with such a situation in Article *34.1*, the first two sections of which read: "A name is not validly published *(a)* when it is not accepted by the author in the original publication; *(b)* when it is merely proposed in anticipation of the future acceptance of the group concerned, or of a particular circumscription, or rank of the group (so-called provisional name) . . . ."

Thus, the combination *Aster* subgenus *Ascendentes* (Rydb.) Semple is, by Article *34.1(a)*, not validly published. Furthermore, if it is argued that the combination was published in anticipation of future acceptance of the taxon at subgeneric rank, the combination is invalid by Article *34.1(b)*.

The privilege of choosing a name for this group, when it is treated as a subgenus of *Aster*--a taxonomic decision that I would be inclined to support--is that of the worker who accepts the taxon at subgeneric rank.

ACKNOWLEDGEMENT

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LITERATURE CITED

Semple, J.C. 1985. New names and combinations in Compositae, Tribe Astereae. Phytologia 58: 429-431.

Voss, E.G. et al. 1983. International Code of Botanical Nomenclature. Bohn, Scheltema, & Holkema, Utrecht.

THE STATUS OF CAREX PAMPAE KALELA (CYPERACEAE) IN SOUTHERN ARGENTINA

Gerald A. Wheeler
Department of Botany, University of Minnesota
St. Paul, Minnesota 55108, U.S.A.

Abstract

Carex pampae Kalela, which was described from Patagonia (Argentina), has no taxonomic merit and the name, which is illegitimate because it was derived from two entirely discordant elements, should hereafter be placed in synonymy under both C. subantarctica Speg. and C. atropicta Steud. as "Carex pampae Kalela, pro parte."

In 1940 Kalela described Carex pampae from the Patagonian region of Argentina and reported the species as ranging from Neuquen Province southward to Santa Cruz Province. Barros (1947) did not recognize C. pampae as a good species in a comprehensive treatment of the Cyperaceae of Argentina, nor did he place the name in synonymy at that time. Barros (1969) also failed to mention this species in a more recent treatment of strictly Patagonian Cyperaceae. The major purpose of this paper is to clarify the taxonomic status of this entity in southern South America.

Kalela (1940) described Carex pampae from plants collected at four localities (see Figs. 1 and 2): (1) Rio Negro: Angostura, 31-X-1937, Kalela 491 (syntype, H!), (2) Rio Negro: near Menque, 31-X-1937, Kalela 512 (syntype, H!), (3) Rio Negro: between Pilcaniyen and Bariloche, 1-XI-1937, Kalela 547 (syntype, H!), and (4) Santa Cruz: Rio Zabellos, 16-XII-1908, Skottsberg s.n. (lectotype [designated here], S!). Although Kalela (1940) gives the collection site for the first three-named specimens as situated in Neuquen Province, the labels on all three herbarium sheets read "Rio Negro" Province; that the latter is presumably the correct one in each case is supported by locality/political-unit affiliations in an Argentinian gazetteer.

After careful study of the original description and examination of the specimens listed above, it seems very clear that Carex pampae was described from characters derived from two distinctly different and distantly-related taxa, C. subantarctica Speg. and C. atropicta Steud. Plants from localities 1, 2, and 3 are referrable to C. subantarctica (Fig. 1); plants from locality 4 are referrable to C. atropicta (Fig. 2). Of these species, C. subantarctica is known only from Argentinian Patagonia--Neuquen Province south to Santa Cruz Province, whereas C. atropicta (typica) occurs throughout much of the southern portions of Argentina and Chile.

Because Carex subantarctica often occurs as a single-spiked, unisexual plant, it was not surprising to find all flowering material from Kalela's collections to be staminate. Therefore, while it is clear that Kalela based the perigynium and achene characteristics of C. pampae solely on Skottsberg's specimen, certain other features of this species seem to be based, at least in part, on his own collections. For instance, Kalela gives the spike length of C. pampae as 15-30 mm long, with the staminate portion being 15-25 mm. However, the staminate portion of the spikes from Skottsberg's specimen never exceeds 10 mm and the longest spike is under 20 mm. On the other hand, the length of the longest spike from Kalela's material is approximately 30 mm.

Certain vegetative features of Carex pampae also seem to based on characters derived from both the Skottsberg and Kalela specimens. For example, Kalela described the basal leaf-sheaths of C. pampae as dark brown, but often appearing dark-reddish-tinged. After examining several specimens of both C. subantarctica and C. atropicta, I found the basal leaf-sheaths of the former to be brownish (varying from light brown to dark brown), whereas those of the latter are dark-reddish-tinged.

Based on perigynia characteristics alone, it seems certain that Kalela considered Carex pampae to be closely related to C. atropicta. Thus, the question arises, "Does the Skottsberg specimen by itself represent an entity distinct from C. atropicta"? After examining material of C. atropicta from several herbaria (BAB, BM, CAS, F, GH, H, HIP, L, LIL, MO, NA, NY, S, SGO, SI, UC, UPS, US; Holmgren et al., 1981), it is my opinion that the morphological features displayed by Skottsberg's specimen are well within the variation displayed by the species. Some evidence for this claim is presented below. Furthermore, I point out a critical morphological feature overlooked by Kalela (on the Skottsberg specimen), which makes his interpretation of a single-spiked entity with short culms as specifically distinct from a 2-4-spiked entity with long culms even more dubious.

Kalela (1940) described Carex pampae as having culms 15-30 cm long, with each culm bearing a solitary spike; in comparison, those of C. atropicta were given as 30-60 cm, with each bearing 2-4 spikes. Yet, on close examination of Skottsberg's specimen I found that one plant (see Kalela's Fig. 22, p. 68, plant on left) possesses an old culm, approximately 15 cm long, that bore two spikes the previous year, although the lower spike is now represented only by a bare axis (i.e., all perigynia and scales have fallen off) which is largely hidden by the upper spike. All other culms on the Skottsberg specimen, each of which appears to be single-spiked, are not yet fully mature, thus contributing to abnormal, usually diminutive, dimensions for some plant parts (e.g., culm length, achene length and width, perigynium length and width).

I have observed a number of plants of Carex atropicta sensu Kalela (i.e., plants with 2-4 spikes per culm) with culms less than 30 cm, and in some cases the culms barely exceed

10 cm. As well, I have seen a number of plants from Patagonia and Tierra del Fuego with culms well over 30 cm that bear only a single spike. And lastly, and most importantly, I have seen a few plants of this species (such as the Skottsberg specimen itself) that bear both 1-spiked and 2-4-spiked culms on the same rhizome. Indeed, it appears that plants with 1-spiked and 2-4-spiked culms often grow together and seemingly without correlation between culm length and number of spikes per culm.

Based on all specimens examined, it seems clear that the single-spiked form of Carex atropicta occurring in Patagonia and Tierra del Fuego represents part of the normal variation of the species, and thus is of no taxonomic significance. However, this claim is not intended to include the predominantly one-spiked plants from more northern locations (e.g., Cordoba and Mendoza provinces in Argentina and Atacama Province in Chile), which differ in several respects from the southern plants and which are generally treated as distinct entities (the northern plants were not mapped for this study).

Kalela (1940) in his description of Carex pampae failed to designate a holotype. Two Kalela sheets at H (Kalela 512, 547) are labeled C. subantarctica, and a third sheet, Kalela 491, is labeled "C. subantarctica = C. pampae"; two plants comprising Kalela 491 were photographed for Kalela's Fig. 23, and this is the only sheet noted as representing "type" material of C. pampae. The Skottsberg specimen at S was originally determined as C. atropicta forma monodynama Griseb. by G. Kükenthal (as treated here the epithet monodynama is only applicable to northern plants), but in 1940 it was annotated to C. pampae by Kalela. Based on the arrangement of the plants on this sheet, there is absolutely no doubt that this was the specimen photographed for Kalela's Fig. 22.

Because a holotype of Carex pampae was not designated at the time of publication, a lectotype must be selected from among the syntypes. According to the I.C.B.N. (Recommendation 7B and a Guide for the Determination of Types; Stafleu et al., 1978), whenever the elements on which the name of a taxon is based are heterogeneous, all aspects of the protologue should be considered when choosing a lectotype. Therefore, because it is absolutely clear that Kalela's (1940) description of C. pampae was based primarily on characters derived from Skottsberg's specimen, and only secondarily on characters from his own collections, Skottsberg's specimen is chosen as the lectotype.

To summarize, Carex pampae has no taxonomic merit and the name, which is illegitimate, should hereafter be placed in synonymy under both C. subantarctica and C. atropicta as "Carex pampae Kalela, pro parte."

Acknowledgments

The writer thanks Prof. Gerald B. Ownbey for valuable suggestions regarding the manuscript; and the curators of those herbaria whose specimens were utilized in the study, particularly those at H and S who supplied the Kalela and Skottsberg specimens, respectively.

Literature Cited

Barros, M. 1947. Cyperaceae: Scirpoideae, Rhynchosporoideae, Caricoideae. In: H. R. Descole. Genera et Species Plantarum Argentinarum. Tomus IV (II). pp. 259-539.

_____. 1969. Cyperaceae. In: M. N. Correa (ed.). Flora Patagónica, Parte II, Typhaceae a Orchidaceae (exceptio Gramineae). Colec. Cient. Instituto Nacional de Tecnología Agropecuaria 8: 38-92. Buenos Aires.

Holmgren, P. K., W. Keuken, & E. K. Schofield. 1981. Index Herbariorum, ed. 7. Regnum Veg. 106: 1-452.

Kalela, A. 1940. Beiträge zur Kenntnis der Flora Ostpatagoniens I-III. Gattung Carex (part III). Ann. Acad. Sci. Fenn. ser. A, 54 no. 5. pp. 50-70.

Stafleu, F. A., et al. 1978. International Code of Botanical Nomenclature (Leningrad, 1975). Regnum Veg. 97: 1-457.

Captions to Figures

Figure 1. Distribution of Carex subantarctica; stars indicate the Kalela specimens (1 = Kalela 491; 2= Kalela 512; 3= Kalela 547).

Figure 2. Distribution of Carex atropicta (typica); star indicates Skottsberg s.n., 16-XII-1908.

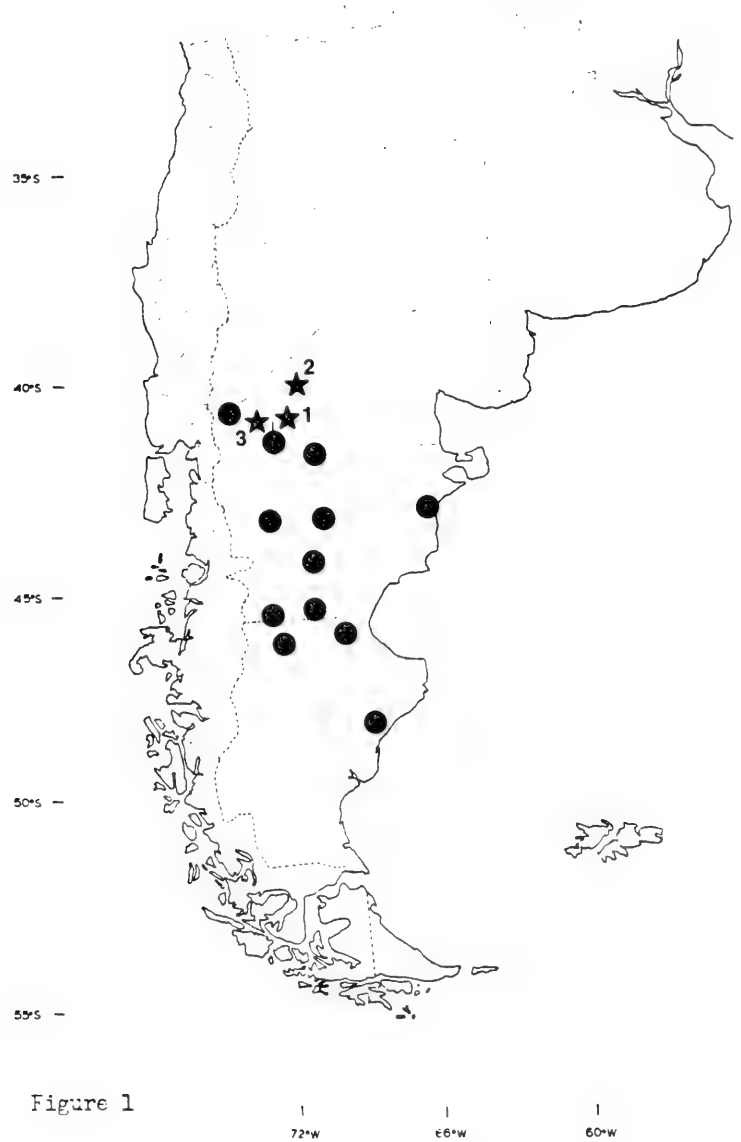

Figure 1

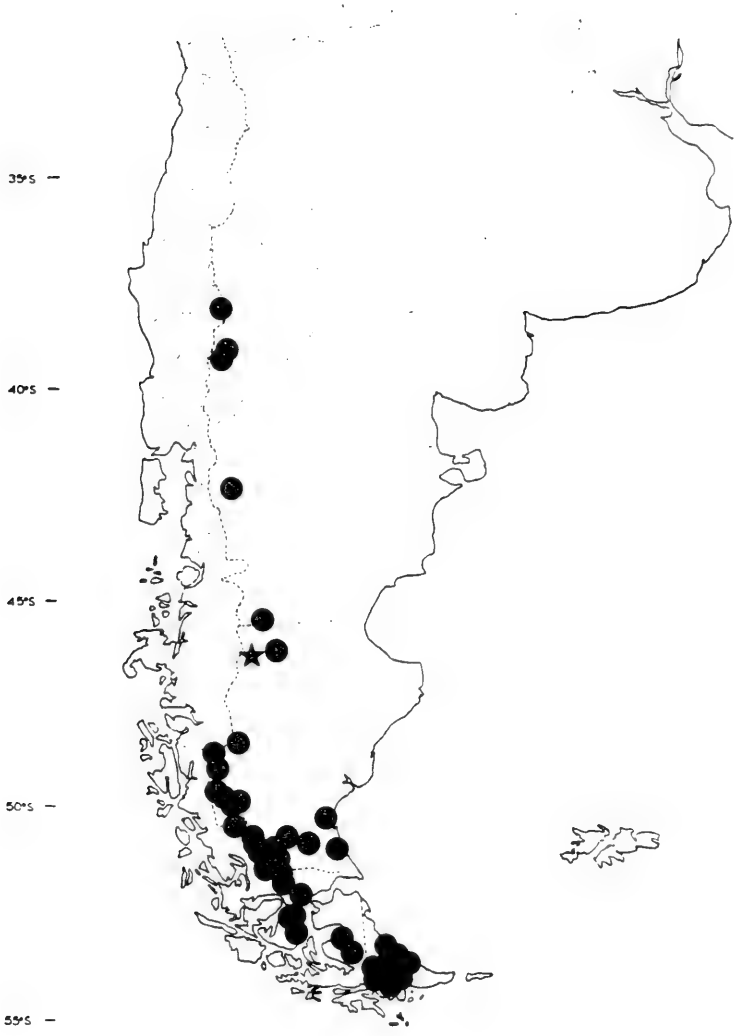

Figure 2

SOLANUM DONACHUI, *A NEW COLOMBIAN TUBER-BEARING SPECIES*

*by C. Ochoa**

Herbaceum, tuberiferum; planta valida, 15-20 cm alta, erecta, caulis basi 2.5-3.5 mm crassus, plerumque simplex, paulo sinuosus, sparse pilosus, peranguste alatus, internodia 8-10-20 mm longa. Stolones 40 cm vel plus longa, tubercula 10-15 mm diam., alba. Folia imparipinnata, (5-)8.0-10.0 x 3.5-7.5 cm, (1-)2-3 juga, foliolis interjectis deficientibus. Foliolum terminale lateralibus paulo majus (2.5-)3.5-4.5 x 2.0-2.5 cm late ellipticum usque ad suborbiculatum, apice subacutum usque ad breviter subacuminatum, basi attenuatum vel late rotundatum. Foliola lateralia anguste elliptico-lanceolata, apice acuta vel subacuta, basi rotundata, pubescentia etiam in marginibus, petiolulis vix 1 mm longis praediti. Foliola pseudostipulacea parva usque ad 7.5 x 3.5-4.0 mm, oblique elliptico-lanceolatada, usque ad anguste subfalcata. Inflorescentia pauciflora (2-3), pedunculus 2-3 cm longus, ad basim 1.5 mm crassus. Pedicellus in medium vel paulo supra articulatus, sparse pilosus tamquam calyx; pars superior (6-)7-8 mm longa, pars inferior (6-)8-9 mm longa. Calyx 5.5 mm longus, lobi brevi triangulariter lanceolati. Corola parva, rotata, alba, 1.5-2.0 cm diam., acumina 2 mm longa, dense pilosa. Antherae late elliptico lanceolatae, 4 mm longae, surcus dorsalis bene manifestus, basi cordatae, filamenta minus quam 0.8 mm longa. Stylus 7 mm longus. Fructus longe conicus. Species ad seriem Conicibaccatam pertinet.

Typus J. Cuatrecasas et R. Romero Castañeda 24473, Magdalena: Sierra Nevada de Santa Marta, ad planities versus meridiem at orientem: river Donachui: Meollaca (vel Meuyaca), Colombia, prata cun arbusculis, 3320-3260 m alt., September 28, 1959. (Holotypus: US; Isotypus: COL.).

* *Taxonomy Department of International Potato Center*
P.O. Box 5969, Lima - Perú.

NOTES ON THE GENUS *CLERODENDRUM* (*VERBENACEAE*). XVI

Harold N. Moldenke

CLERODENDRUM Burm.

Additional synonymy: *Siphonanthes* Wescott, in herb.

Additional & emended bibliography: Aschers. in G. Schweinf., Beitr. Fl. Aethiop. 1: 119--120 & 278. 1867; F. Muell., Journ. Roy. Soc. N. S. Wales 24: 75. 189. 1891; Briq., Bull. Herb. Boiss., ser. 1, 4: 348--349. 1896; F. N. Will., Bull. Herb. Boiss., ser. 2, 5: 431--432. 1905; Chiov., Nuov. Giorn. Bot. Ital., ser. 2, 29: 117--118. 1922; Chiov., Fl. Somala 2: 362--364, fig. 208. 1932; Bruggeman, Trop. Pl. 26--27 & 165--167, pl. 8 & 232. 1957; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 689--691, 694, & 697. 1961; A. R. Rees, Journ. Ecol. 52: 9--17. 1964; Anon., Ind. Bibliog. Bot. Trop. 2 (2): 4 & 23. 1965; A. R. Rees, Hort. Abstr. 35: 161. 1965; Van Steen. & Kruseman, Fl. Males. Bull. 4: 1348 & li. 1967; L. S. Sm., Contrib. Queensl. Herb. 6: 20. 1969; Van der Pijl, Princip. Dispers. Higher Pl., ed. 1, 31 & 50. 1969; Anon., Biol. Abstr. 52: 11335 (1971) and 52: B.A.S.I.C. S.51. 1971; Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971; C. D. Adams, Flow. Pl. Jamaic. 627, 636--637, 794, & 809. 1972; A. L. Mold., Phytologia 23: 318--319. 1972; Maiti, Pl. Sci. Lucknow 6: 104--105. 1974; "B. J. G.", Biol. Abstr. 65: 3289. 1977; Isaacson, Flow. Pl. Ind. 1: 335. 1979; Mold., Phytologia 59: 406--428. 1986.

Ascherson (1867) lists an unidentified species of this genus and another which he calls *Cyclonema* from Ethiopia.

CLERODENDRUM ACERBIANUM (Visiani) Benth.

Emended synonymy: *Clerodendron holstii* Gürke, Abhandl. Preuss. Akad. Wiss. 122: 27 nom. nud. 1894; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 303. 1900.

Additional & emended bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293--295 & 303. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 3, 8, 9, 18, 19, 21, 23, 32, 89, 92, & 93. 1936; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Alph. List Cit. 2: 407, 556, 619, & 620. 1948; H. N. & A. L. Mold., Pl. Life 2: 48, 54, & 64. 1948; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Phytologia 57: 364--365 & 389--391 (1985), 58: 438 (1985), and 59: 254 & 259. 1986.

Keys to help distinguish this species from other tropical African species of the genus may be found under *C. dinklagei* Gürke and *C. discolor* (Klotzsch) Vatke in the present series of notes.

Additional citations: TANZANIA: Tanganyika: *Holst 3208* (L).

CLERODENDRUM ACULEATUM (L.) Schlecht.

Additional synonymy: *Clerodendron fruticosum* P. Br. ex Walp., Repert. Bot. Syst. 4: 115 in syn. 1845.

Additional & emended bibliography: Willd. in L., Sp. Pl., ed. 4 [5], 3 (1): 383. 1800; Mold., Geogr. Distrib. Avicenn. 4--12, 14, 20--22, 32, & 36. 1939; Mold., Phytologia 58: 180. 1985.

A key to help distinguish this species from other Cuban taxa in this genus will be found under *C. grandiflorum* (Hook.) Schau. in the present series of notes.

The *Fernandez 2328*, distributed as *C. aculeatum*, actually is *C. heterophyllum* (Poir.) R. Br.

CLERODENDRUM FLORIBUNDUM var. *LATIFOLIUM* F. Muell.

Additional bibliography: Mold., Phytologia 59: 422, 424, & 427--428. 1986.

It is worth pointing out here that Domin (1928) states, in his treatment of *C. floribundum*: "Species admodum variabilis, *C. attenuatum* R. Br. et *C. medium* R. Br. amplectens; varietas *ovatum* (=*C. ovatum* R. Br., *C. cardiophyllum* F. v. Muell.. et verosimiliter quoque *C. floribundum* var. *latifolia* F. v. Muell. Fragm. IX. 5, 1875) a typo speciei longius distat [my emphasis]".

Nothing else is known to me of this taxon beyond what is stated in its bibliography.

CLERODENDRUM FLORIBUNDUM var. *MEDIUM* (R. Br.) Mold., Phytologia 39: 236. 1978.

Synonymy: *Clerodendrum medium* R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 510--511. 1810. *Clerodendron medium* R. Br. apud Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825.

Bibliography: R. Br., Prodr. Fl. Nov. Holl., imp. 1, 1: 510--511 (1810) and imp. 2 [Isis 1819:] 152. 1819; Steud., Nom. Bot. Phan., ed. 1, 207. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825; Steud., Nom. Bot. Phan., ed. 2, 1: 383. 1840; D. Dietr., Syn. Pl. 3: 616. 1843; Walp., Repert. Bot. Syst. 4: 105. 1845; Schau. in A. DC., Prodr. 11: 671. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 106. 1858; Benth. & F. Muell., Fl. Austral. 5: 64. 1870; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 95, 109, & ix. 1921; Domin, Bibl. Bot. 89: 1112. 1928; Bakh., Journ. Arnold Arb. 10: 73 & 74. 1929; Fedde & Schust., Justs Bot. Jahresber. 53 (1): 1073. 1932; Mold., Alph. List Inv. Names 19. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Inv. Names Suppl. 1: 7. 1947; Mold., Résumé 266 & 273. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Phytologia 39: 236. 1978; Hocking, Excerpt. Bot. A.33: 88. 1979; Mold., Phytol. Mem. 2: 334 & 536. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 457. 1983; Mold., Phytologia 59: 424. 1986.

This variety is said to differ from the typical form of the species in having the leaf-blades tomentose beneath and the calyx more or less pubescent. Brown's original (1810) description is merely: "foliis ellipticis breve acuminatis subtus tomentosis, calycibus adultis corollisque glabriusculis, corymbis axillaribus terminalibusque laxiusculis".

The variety is based on a collection made by Robert Brown near the Endeavour River and Bay of Inlets in the "Littora Novae Hollan-

diae intra tropicum", Queensland, Australia.

Nothing is known to me of this taxon beyond what is stated in its bibliography (above).. Domin (1928) is of the opinion that it is not sufficiently distinct from the typical form of this variable species to warrant nomenclatural designation. I look forward to how Dr. Munir will treat it.

CLERODENDRUM FORTUNATUM L. in Torner, Cent. Pl. 2: 23 [as "*fortunata*"]. 1756 [not *Clerodendron fortunatum* Blanco, 1837, nor Blume, 1844, nor Burm., 1962, nor Sessé & Moc., 1894].

Synonymy: *Clerodendrum fortunata* L. in Torner, Cent. Pl. 2: 23. 1756. *Clerodendron fortunata* L. apud Osbeck, Dagbok Ostind Resa 228, pl. 11. 1757. *Clerodendrum fortunatum* Retz., Nom. Bot. 155. 1772. *Clerodendrum fortunato* Osbeck apud Scop., Introd. Hist. Nat. 170. 1777. *Volkameria pumila* Lour., Fl. Cochinch., ed. 1, 388. 1790. *Clerodendrum angustifolium* R. A. Salisb., Prodr. Stirp. 108. 1796 [not *Clerodendron angustifolium* (Poir.) Spreng., 1825, nor (Willd.) Hassk., 1844]. *Clerodendrum foliis lanceolatis, integerrimis* L. ex Poir. in Lam., Encycl. Méth. Bot. 5: 164 in syn. 1804. *Clerodendron fortunatum* L. apud K. C. Gmel., Hort. Mag. Duc. Bad. Carlsr. 72. 1811. *Clerodendrum fortunatum* Vent. ex Pers., Sp. Pl. 3: 365. 1819. *Clerodendron pumilum* (Lour.) Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825. *Clerodendron lividum* Lindl., Edwards Bot. Reg. 11: pl. 945. 1826. *Clerodendrum lividum* Lindl. apud Loud., Hort. Brit., ed. 1, 247. 1830. *Clerodendron fortunatum* Buch.-Ham. ex Wall., Numer. List 82, no. 2652 hyponym. 1831 [not Blanco, 1837, nor Blume, 1844, nor Burm., 1962, nor Sessé & Moc., 1894]. *Clerodendron castaneifolium* Hook. & Arn., Bot. Beech. Voy. 205. 1836. *Clerodendron pentagonum* Hance in Walp., Ann. Bot. Syst. 3: 238. 1852. *Clerodendron oxysepalum* Miq., Journ. Bot. Néerl. 1: 114. 1861. *Clerodendron fortunatum* Wall. ex C. B. Clarke in Hook. f., Fl. Brit. India 4: 596 in syn. 1885. *Clerodendrum castaneifolium* Hook. apud Maxim., Bull. Acad. Imp. Sci. St.-Pétersb. 31: 84. 1886. *Clerodendrum pentagonum* Hance apud Maxim., Bull. Acad. Imp. Sci. St.-Pétersb. 31: 84. 1886. *Clerodendron pumilum* Spreng. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561 in syn. 1893. *Clerodendrum fortunatum* Vent. ex Mold., Phytol. Mem. 2: 391 in syn. 1980. *Clerodendron frotunatum* L. ex Mold., Phytol. Mem. 2: 386 in syn. 1980.

Bibliography: L. in Torner, Cent. Pl. 2: 23. 1756; Osbeck, Dagbok Ostind. Resa [Itin.] 228, pl. 11. 1757; L., Amoen. Acad. 4: 320. 1759; L., Sp. Pl., ed. 2, 2: 889. 1763; N. L. Burm., Fl. Indica 137. 1768; Osbeck, Voy. China E. Indies 1: 369, pl. 11. 1771; [Retz.], Nom. Bot. 155. 1772; Scop., Introd. Hist. Nat. 170. 1777; Reichard in L., Syst. Pl. 3: 198. 1780; J. F. Gmel. in L., Syst. Nat., ed. 13, imp. 1, 2: 962. 1789; Lour., Fl. Cochinch., ed. 1, 2: 388. 1790; Nemnich, Allgem. Polyglott. Lex. 1: 1065. 1791; Lour., Fl. Cochinch., ed. 2, 472. 1793; J. F. Gmel. in L., Syst. Nat., ed. 13, imp. 2, 2: 962. 1796; R. A. Salisb., Prodr. Stirp. 108. 1796; P. Mill., Gard. Dict., ed. 9, 1: *Clerodendron* 2. 1797; Raeusch., Nom. Bot., ed. 3, 182. 1797; Willd. in L., Sp. Pl., ed. 4 [5], 3 (1): 386. 1802; Poir. in Lam., Encycl. Méth. Bot. 5: 164. 1804; Willd., Enum. Pl. Hort. Berol. 2: 659. 1809; K. C. Gmel., Hort. Mag. Duc. Bad. Carlsr. 72.

1811; Pers., Sp. Pl. 3: 364 & 365. 1819; Steud., Nom. Bot. Phan., ed. 1, 207. 1821; Link, Enum. Hort. Berol. 2: 127. 1822; Blume, Cat. Gewass., imp. 1, 82. 1823; Blume, Bijdr. Fl. Ned. Ind. 9: 807--808. 1825; Hartweg, Hort. Carlsr. 80. 1825; Spreng. in L., Syst. Veg., ed. 16, 2: 759. 1825; Blume, Bijdr. Fl. Ned. Ind. 14: 807--808. 1826; Lindl., Edwards Bot. Reg. 11: pl. 945. 1826; Sweet, Hort. Brit., ed. 1, 1: 322. 1826; W. Hook., Curtis Bot. Mag. 56 [ser. 2, 3]: pl. 2925 (in textu). 1829; Loud., Encycl. Pl. 522. 1829; Loud., Hort. Brit., ed. 1, 247. 1830; Sweet, Hort. Brit., ed. 2, 415 & 416. 1830; Wall., Numer. List [82]. no. 2652. 1831; Loud., Hort. Brit., ed. 2, 247. 1832; Hook. & Arn., Bot. Beech. Voy. 205. 1836; Blanco, Fl. Filip., ed. 1, 508--509. 1837; G. Don in Loud., Hort. Brit., ed. 3, 247. 1839; G. Don in Sweet, Hort. Brit., ed. 3, 550. 1839; Steud., Nom. Bot. Phan., ed. 2, 1: 383. 1840; Hassk., Flora 25: Beibl. 27. 1842; D. Dietr., Syn. Pl. 3: 616 & 617. 1843; Blanco, Fl. Filip., ed. 2, 355. 1845; Voigt, Hort. Suburb. Calcut. 473. 1845; Walp., Repert. Bot. Syst. 4: 101, 103, 105, & 107. 1845; Schau. in A. DC., Prodr. 11: 657 & 671--674. 1847; Hance in Walp., Ann. Bot. Syst. 3: 238. 1852; Wittstein, Etymolog.-bot. Handwörterb., ed. 1, 206. 1852; Benth. in Hook., Journ. Bot. Kew Gard. Misc. 5: 136. 1852; Seem., Bot. Voy. Herald 405. 1857; Buek, Gen. Spec. Syn. Candoll. 3: 105, 106, & 503. 1858; Benth., Fl. Hongk. 272. 1861; Miq., Journ. Bot. Neerl. 1: 114. 1861; Balf. f., Edinb. New Philos. Journ., ser. 2, 15: 232. 1862; W. Hook., Curtis Bot. Mag. 88 [ser. 3, 18]: pl. 5294 in textu. 1862; Seem., Bonplandia 10: [249]. 1862; Lem., Illust. Hort. 10: pl. 358. 1863; Seem., Fl. Vit. 188. 1866; Hance, Journ. Linn. Soc. Lond. Bot. 13: 117. 1873; C. B. Clarke in Hook. f., Fl. Brit. India 4: 596. 1885; Henriq., Bol. Soc. Brot. 3: 144. 1885; Maxim., Bull. Acad. Imp. Sci. St.-Pétersb. 31: 83, 84, & 86. 1886; Maxim., Mél. Biol. 12: 517 & 521. 1886; Forbes & Hemsl., Journ. Linn. Soc. Lond. Bot. 26: 260--261. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 143. 1895; Gerth van Wijk, Dict. Plantnames, imp. 1, 1: 335. 1911; Dunn & Tutcher, Kew Bull. Misc. Inf. Addit. Ser. 10: 204 & 205. 1912; Gerth van Wijk, Dict. Plantnames, imp. 1, 2: 505, 554, & 584. 1916; H. Hallier, Meded. Rijks Herb. Leid. 37: 72. 1918; E. D. Merr., Sp. Blanc. 334. 1918; R. N. Parker, For. Fl. Punjab, ed. 1, 400. 1918; H. J. Lam, Verbenac. Malay. Arch. 317 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 74, 75, 84, 108, 109, & viii. 1921; Chung, Mem. Sci. Soc. China 1 (1): 228. 1924; R. N. Parker, For. Fl. Punj., ed. 2, 400. 1924; Heyne, Nutt. Plant. Ned. Ind., ed. 2, 2: 1322. 1927; E. D. Merr., Univ. Calif. Publ. Bot. 15: 266. 1929; E. D. Merr., Sunyatsenia 1: 30. 1930; Stapf, Ind. Lond. 2: 238. 1930; P'ei, Sinensia 2: 76. 1932; P'ei, Mem. Sci. Soc. China 1 (3): 125 & 160--162. 1932; Dop in Lecomte, Fl. Gén. Indo-chine 4: 853 & 880--881. 1935; E. D. Merr., Trans. Amer. Phil. Soc., ser. 2, 24 (2): 336 & 420. 1935; W. F. Hoffm., Lingn. Sci. Journ. 16: 301. 1937; Mold., Alph. List Comm. Vern. Names 13. 1939; Mold., Prelim. Alph. List Inv. Names 19--21, 23, & 53. 1940; Mold., Alph. List Inv. Names 16, 18, 19, 21, & 56. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 54, 57, 58, & 89. 1942; Mold., Phytologia 2: 98. 1945; Savage, Cat. Linn. Herb.

110. 1945; Blume, Cat. Gewass., imp. 2, 82. 1946; Mold., Alph. List Cit. 2: 410 & 556 (1948), 3: 666 & 727 (1949), and 4: 984, 1011, 1012, 1149, 1202, 1226, 1238, & 1243. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 126, 131, 133, 135, & 181. 1949; Chun & How, Act. Phytotax. Sin. 7: 77. 1958; Mold., Résumé 161, 169, 171, 174, 190, 261, 263, 266--268, 272, 273, 392, & 449. 1959; Gerth van Wijk, Dict. Plantnames, imp. 2, 1: 335 (1962) and imp. 2, 2: 505, 554, & 584. 1962; Tingle, Check List Hong Kong Pl. 38. 1967; Mold., Résumé Suppl. 16: 11 & 20 (1968) and 17: 5 & 8. 1968; D. R. W. Alexander, Hong Kong Shrubs 25. 1971; Gerth van Wijk, Dict. Plantnames, imp. 3, 1: 335 (1971) and imp. 3, 2: 505, 556, & 584. 1971; Mold., Fifth Summ. 1: 272, 287, 292, 293, 299, 322, 441, 445, 449, 452, 453, 461--465, & 467 (1971) and 2: 734, 865, & 972. 1971; Wittstein, Etymolog.-bot. Handwörterb., imp. 2, 206. 1971; Mold. in Woodson, Schery, & al., Ann. Mo. Bot. Gard. 60: 143 & 145. 1973; Mold., Phytologia 28: 448 (1974), 31: 395 (1975), and 34: 264. 1976; Walden, Wild Fls. Hong Kong pl. 40, fig. 110. 1977; Isaacson, Flow. Pl. Ind. 1: 335. 1979; Mold., Phytol. Mem. 2: 259, 277, 281, 282, 291, 313, 349, 386, 391, 394, & 537. 1980; Hu, Enum. Chin. Mat. Med. 55 & 218. 1981; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 419, 427, & 443. 1983; Walden & Hu, Wild Fls. S. China 38, pl. 40, fig. 110. 1984; Mold., Phytologia 57: 334 & 335 (1985), 58: 405, 416, & 417 (1985), and 59: 101. 1986.

Illustrations: Osbeck, Dagbok Ostind. Resa [Itin.] pl. 11. 1757; Osbeck, Voy. China E. Indies 1: pl. 11. 1771; Lindl., Edwards Bot. Reg. 11: pl. 945 (in color). 1826; D. R. W. Alexander, Hong Kong Shrubs 25 (in color). 1971; Walden, Wild Fls. Hong Kong pl. 40, fig. 110. 1977; Walden & Hu, Wild Fls. S. China pl. 40, fig. 110 (in color). 1981.

A herbaceous or low semi-woody or woody subshrub or shrub, 0.5--2 m. tall, ill-smelling, usually with 1 or 2 simple erect stems or few-branched, with all the young parts purplish, the young branches minutely and softly brown-puberulent, becoming glabrescent in age; stems cylindric, ashy-gray or blackish, softly hairy; branchlets cylindric; leaves decussate-opposite; petioles 0.7--2 cm. long, sometimes subalate, almost flat and canaliculate above, rounded beneath, at first densely tomentellous, finally glabrescent; leaf-blades thin-textured (when dried) or fleshy and stiff (when fresh), oblong or broadly oblong to narrowly elliptic, elliptic, oblong-lanceolate, or lanceolate or even subobovate, 5--15 cm. long, 2.5--6 cm. wide, apically acute or acuminate to abruptly short-attenuate, marginally entire, subentire, or subsinuate to irregularly and coasrsely dentate or denticulate (except at the base), basally cuneate or rotundate, dull dark-green above, paler green beneath, sparsely pilose on both surfaces to finally glabrous or nearly so, sometimes "subtomentose" (especially on the prominent venation) beneath; midrib often puberulent beneath; secondaries 5--8 pairs, prominent beneath; inflorescence axillary, pedunculate, situated mostly near the tips of the stems or branches, at first densely pubescent or "tomentose", finally glabrescent, much shorter than the subtending leaves, the cymes only 5--10-flowered, trichotomous, 2--4 cm. wide; peduncles very slender, 1.5--2.5 cm. long; pedicels very slender,

0.5--1 cm. long; bracts oval, purple or purplish-red (or white?), apically acuminate; calyx campanulate, ovoid, livid purple or purplish, inflated, 5-angled, about 1.3 cm. long, deeply 5-parted almost to the base, with acute sinuses, the segments broadly ovate, 7--12 mm. long, basally 7--10 mm. wide, apically acute or acuminate, sparsely pubescent or finally glabrescent on both surfaces; corolla hypocrateriform, white or yellowish, often slightly tinged with pinkish or madder-color, slightly longer than the calyx, externally densely pubescent (especially the lobes), the tube subinfundibular, straight, slender, about as long as the calyx, the limb obliquely subrotundate, reflexed in age, 5-parted, the lobes regular, ovate, apically obtuse, finally revolute, the 2 lowermost often projecting; stamens 4, inserted at about the middle of the corolla-tube, nearly equal, shortly exserted or to twice as long as the corolla, declinate, basally pubescent, finally recurved; filaments capillary, white; anthers ovate, sagittate, dark-brown, smooth; style filiform, shorter than the stamens; stigma bifid, the branches apically acute; ovary roundish, externally smooth, 4-celled, each cell 1-ovulate; ovules ascending; fruiting-calyx accrescent, persistent, reddish- or livid-purple; fruit drupaceous, green to red, finally blue or black, globose, about 6 mm. long and wide, 4-lobed.

This distinctive species is native to southeastern China and is based on an unnumbered Osbeck collection in the Linnean Herbarium in London from Dane's Island near Whampoa, below Canton, in Kwangtung, China. I have personally examined this specimen [*Herb. Linnaeus 789 [810], sheet no. 2*], present in Linnaeus' third enumeration and inscribed "fortunatum" in Linnaeus' own handwriting -- it is plainly what we now regard as *C. fortunatum*.

Collectors have encountered *C. fortunatum* on dry open hillsides and grassy slopes under trees in mixed woodland, near streams, and along roadsides, at about 60 m. altitude, in flower and fruit from October to January and May to August. Alexander avers that it flowers "in summer". Lau reports it "rare in loam on dry gentle slopes" in Kwangtung, while Ching says that it is "common" in Kwangsi; Taam found it "abundant on dry clay slopes" in Hong Kong. Woo refers to it as an "herb less than 1 m. tall, common on hillsides" in Hong Kong, the "bracts white, petals purple". Tsang reports it "fairly common in dry clay of meadows" in Kwangsi and "abundant but scattered on dry steep slopes in sandy soil" and "fairly common but scattered in dry sandy soil of meadows" in Kwangtung.

The corollas are described as "white" by most collectors, including on *Chan 1057, Chun 9, Hallier 3511, Herb. Canton Chr. Coll. 12872, Lau 20169, Peng & al. 872, Taam 1518, Tsang 21072 & 22642, Tsiang 2604, Tsui 419*, and *Ying 456*, as well as by Dunn & Tutcher (1912) and as "white pinkish-tinged" on *Chun 6825*. However, on *Tsui 834* it is stated that the "flowers" were "pink"; on *Ying 390* "flowers blue"; on *Lau 728, Tak & Chow 2683*, and *Tsui 548* "flowers red"; on *Ying 918* "flowers purple"; on *Ching 7830* "flowers purplish"; on *Peng 1829* "flowers white & purple"; on *Tso 20703* "flowers deep purple"; on *Tso 21181* "calyx and unopened flowers purple". One wonders if in at least some of these cases the collectors were referring to the calyx or fruiting-calyx rather than to the corolla, as red,

blue, or purple, but on *Hu 9322* the collector definitely says "petals pink changing to red." Hooker (1862) refers to the species as "scarlet-flowered". Possibly two color forms exist.

Common and vernacular names for *Clerodendrum fortunatum* include "devil's lantern", "discoloured clerodendrum", "fortuné", "fortunate clerodendrum", "ghost lantern", "gelukkige boom", "gelukkige lotboom", "glorybower", "glücklige Losbaum", "Glücksbaum", "kuei-têng-lung", "k'u-têng-lung", "kwai tang lung", "kwai tang lung shue", "livid-bracted clerodendrum", "livid clerodendrum", "paak fa kwai tang lung", and "spear-leaved clerodendrum". The vernacular name, "pinna", is listed for it from Sri Lanka, but this is erroneous -- "pinna" applies there only to *C. serratum* (L.) Moon.

Clerodendrum fortunatum is said by Sweet (1826) to have been introduced into cultivation in England in 1784 from China, while the so-called *C. lividum* Lindl. was introduced, also from China, in 1824.

Seemann (1862) cites unnumbered collections of Champion, Hance, Seemann, Wilford, and Wright from Hong Kong; of Loureiro, Millet, and Osbeck from Canton; of Robertson from Whampoa; and of Bradley and of Lind from undesignated lacalities in China, as well as *Fortune 85* from southern China. He comments that "Die im Linné'schen Herbar aufbewahrten Exemplare stammen verscheinlich von Osbeck; die Standort ist denselben nicht beigefügt. *Clerodendron fortunatum* werd vor etwa 30 Jahren in unseren Gärten eingeführt, und hat es Lindley nach cultivierten Exemplaren als *C. lividum* abgebildet; doch scheint es wieder verschwunden zu sein, wenigsten aus englischen Gärten; in deutschen möcht es vielleicht irgendwo noch stecken."

It should be noted that Seemann (1866) says "I may here remark of a Chinese species (*C. fortunatum*, Linn.) that I was wrong in referring, from description, Loureiro's *Volkameria pumila* (*Clerodendron pumilum*, Spreng.) to it as a synonym. I have since seen the original specimens of *Volkameria pumila*, Loureiro, at the British Museum, and find it to be entirely different from *C. fortunatum*." However, Merrill (1935) tells us that Loureiro's *Volkameria pumila* was described as "Habitat inculta prope Cantonem Sinarum" and that Hemsley (1890) "merely lists Loureiro's species as an obscure plant. The description is good and it applies in essentials to the Linnaean species, the type of which was a specimen from the vicinity of Canton; it may be noted, however, that Seemann.....(1866) states that Loureiro's species is not the same as *Clerodendrum fortunatum* Linn. This, however, may possibly be due to a misinterpretation of the Linnaean species itself. Mr. J. E. Dandy informs me that he could find no specimen of *Volkameria pumila* from Loureiro in the herbarium of the British Museum, nor is the species checked in the Museum copy of Loureiro's Flora Cochinchinensis as having been received from him. Loureiro describes the leaves as large and tomentose; they are relatively small, as compared with those of many species of *Clerodendrum* and are nearly glabrous in all specimens of the Linnaean species that I have seen. In the original description of *Clerodendrum fortunatum* Linnaeus states: 'Habitat in India;' the specimen on which the species was based was collected by Osbeck near Canton, China. For a species that presents comparatively little variation, and one that is limited in distribution, it has accumulated a rather long

list of synonyms, all based on material from southeastern China where it is common." In a personal communication to me, Merrill states that "Osbeck's specimens were from Dane's Island near Whampoa, below Canton.....Osbeck.....in describing the same species in 1757 may be excused for his statement that it had not yet been described by any botanist" [when it actually had been described by Eric Torner for Linnaeus in the previous year].

Poiret (1804), after giving a lengthy and detailed description in French, notes that "Cette plante croît naturellement dans l'Inde & à l'île de Java. Sonnerat l'y a recueillie, & en a communiqué des individus au citoyen Lamarck", in whose herbarium he saw a dried specimen. He describes the leaf venation as "Leur principale nervure, assez saillante, se divise en rameaux simples qui se terminent par une courbure, dont le sommet de chaque rameau s'infere en arc sur le rameau supérieur, à une petite distance des bords de la feuille. Leur intervalle est occupé par des veines saillantes, surtout a la face inférieure; transverses, disposées en réseau avec d'autres plus petites, placées en un sens opposé aux premières."

The species is used as a medicine by local herbalists in southern China to treat bruises and is marketed as "Ramie Clerodendri Fortunati". The plant serves as a host to *Aphis gossypii*.

Of his *C. lividum* Lindley (1826) comments that it is "A new and remarkable species of *Clerodendron* brought from China, for the Horticultural Society, in 1824, by Mr. J. D. Parker. Our drawing was made at the Chiswick garden, in November of the same year."

The *C. fortunatum* accredited to Wallich and to Buchanan-Hamilton was based on *Wallich 2652* from Assam, India. The specific epithet, for some reason unclear to me, is sometimes written with an uppercase initial letter.

It should be pointed out here that the *Clerodendron fortunatum* credited to Blume is a synonym of *C. indicum* (L.) Kuntze, that credited to Blanco is *C. minahassae* var. *brevitubulosum* H. J. Lam, that credited to Burman is *C. serratum* (L.) Moon, and that credited to Sessé & Mocino is *C. ligustrinum* (Jacq.) R. Br. The *C. angustifolium* (Poir.) Spreng. also referred to in the synonymy (above) is a valid species, while *C. angustifolium* (Willd.) Hassk. is a synonym of *C. indicum* (L.) Kuntze.

It should also be noted here that the *Arbor zeylanica, fortunata quibusdam* Petiv., the *Frutex flore perlato, fructu rotundo* Kleinhof, and the *Planta fortunata, pinná zeylonensibus* Herm., all included by Poiret (1804) in the synonymy of *C. fortunatum* L., actually all belong in the synonymy of *C. serratum* (L.) Moon.

Among other errors in the literature may be mentioned that the Schauer (1847) reference is mis-quoted as "11: 74" instead of 11: 674 by P'ei (1932), who also mis-cites the Walpers reference as "1844" instead of 1845 and the Lindley reference as "1825" instead of 1826. The Hance (1852) reference is often cited as "1852-1853", the titlepage date. The Hooker & Arnott (1836) reference is often mis-cited as "1841", but actually pages 193 to 288 of the work involved were issued in 1836.

The *Herb. Gasström 14*, cited below, is inscribed "Ex Ind. Orient." but is also inscribed in Chinese on the reverse side, and I assume

that it originated in China, not India. The *Chun 5007*, also cited below, is a mixture of *C. fortunatum* and *C. kaempferi* (Jacq.) Sieb.

Dunn & Tutcher (1912) cite specimens from Happy Valley, above Wanchai Gap, "and elsewhere" in Hong Kong, Lantau Island, Taimoshan, New Territory, and Whampoa.

Hallier (1918) refers to the species as "häufig" in Hong Kong, citing *Hallier 3517* in the Hamburg and Leiden herbaria. Maximowicz (1886) cites an unnumbered Hance collection from Whampoa and one of Millett from Canton, adding that "everyone" [omnes] collected it in Hong Kong. Hun & How (1958) cite *Lau 28168* and *Hainan Exped. 170* from Hainan Island. Bakhuizen (1921) cites only *Hance 394* and *Weisz 1914* from Whampoa and Hong Kong.

Keys to help distinguish *C. fortunatum* from other taxa occurring in China and in Indochina will be found under *C. canescens* Wall., *C. henryi* P'ei, and *C. hahnianum* Dop in the present series of notes.

Material of *C. fortunatum* has been misidentified and distributed in some herbaria as *C. canescens* Wall., a very different taxon. On the other hand, the *Herb. Schreber s.n.*, distributed as *C. fortunatum*, actually is *C. indicum* (L.) Kuntze.

Citations: CHINA: Kwangsi: *Ching 7830* (Ca--409506, N, W--1248680); *Tsang 22642* (S). Kwangtung: *N. J. Andersson s.n.* [Whampoa, Dec. 1852] (S, S); *Chow & al. 78046* (Ac, N, W--2895269); *Chun 9* (N), *3071* (N); *Dahlström 325* (S); *Ekeberg s.n.* [Canton] (Mu--787, S); *Hance 394* (S); *Herb. Canton Chr. Coll. 12872* (W--1248082); *Lau 728* (N), *20169* (Bz--19271, Ca--611465, Mi, N); *C. O. Levine, Herb. Canton Chr. Coll. 86* (W--779091), *105* (W--778549), *769* (W--779037); *Osbeck s.n.* [Canton] (S); *Peng 1829* [Herb. Canton Chr. Coll. 13654] (Ca--287560); *Peng, Tak, & Kin 872* [Herb. Canton Chr. Coll. 12872] (Ca--274717); *Ping 1829* [Herb. Canton Chr. Coll. 13654] (Bz--19273); *Ping, Herb. Canton Chr. Coll. 11150* (Bz--19276, W--1248869); *Tak, Herb. Canton Chr. Coll. 16624* (Du--200929); *Tak & Chow 2683* [Herb. Canton Chr. Coll. 14544] (Ca--319216), *2810* [Herb. Canton Chr. Coll. 14671] (Ca--319346); *Tsang 21072* (N, S), *21225* (N, S); *Tsang, Herb. Lingnan Univ. 16624* (I); *Tsiang 2604* (N); *Tso 20703* (N), *21181* (N); *Tsui 419* (N, W--1754653), *548* (Ba, Bz--19272, Ca--611718, Mi, Ms, N, Ob--89835, S, W--1754724), *834* (N); *Ying 390* (Bz--19275, Du--250186), *456* (Du--250187, N), *779* (Bz--19274, Du--200925), *918* (Ca--359017). Province undetermined: *Herb. Gasström 14* (S, S). CHINESE OFFSHORE ISLANDS: Dane's: *Herb. Linnaeus 810/2* (Ls--type, N--photo of type); *Herb. Osbeck s.n.* (S). Honam: *C. O. Levine, Herb. Canton Chr. Coll. 306* (W--778637); *E. D. Merrill 10142* (Gg--32010). Lantau: *Moldenke & Moldenke 28110* (Ac); *Tsang, Herb. Lingnan Univ. 16624* (S). HONG KONG: *Chan 1057* (Mi); *Chun 5007* in part (Du--200923 in part), *5303* (Ca--358076), *6545* (Ca--357981), *6546* (Ca--357982), *6825* (Ca--374003); *Dahlström 4* (S); *C. Ford s.n.* [Hongkong] (N); *Fortune 85* (Mu--838); *Holman s.n.* [July 1911] (Du--66771); *Hu 6022* (W--2697288), *9322* (W--2711876); *Taam 1518* (Ca--82701, Mi, N, W--2063807); *Woo 229* (Mi); *C. Wright s.n.* [Hongkong] (T, W--44915). HONG KONG OFFSHORE ISLANDS: Little Hong Kong: *Ying 612* (Pd). VIETNAM: Tonkin: *Balansa 924* (W--2497128). LOCALITY OF COLLECTION UNDETERMINED: *Dahl s.n.* (S); *Gröndahl s.n.* (S); *Herb. Alstroemer s.n.* (S); *Herb. Swartz s.n.* (S). MOUNTED ILLUSTRATIONS: Lindl., Edwards Bot. Reg. 11: pl. 945.

1826 (Ld, Ld).

CLERODENDRUM FORTUNEI Hemsl. in Forbes & Hemsl., Journ. Linn. Soc. Lond. Bot. 26: 259--260 [as "*Clerodendron*?"]. 1890; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57 & 89. 1942.

Synonymy: *Clerodendron*? *fortunei* Hemsl, in Forbes & Hemsl., Journ. Linn. Soc. Lond. Bot. 26: 259. 1890.

Bibliography: Forbes & Hemsl., Journ. Linn. Soc. Lond. Bot. 26: 259--260. 1890; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; P'ei, Mem. Sci. Soc. China 1 (3): 162. 1932; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 57 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 59. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 131 & 181. 1949; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 169, 174, & 449. 1959; Mold., Fifth Summ. 1: 287 & 293 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 277, 282, & 537. 1980.

Hemsley's original (1890) description of this plant is as follows: "Frutex undique glaber, ramulis gracillimis lignosis, cortice albido. Folia longe graciliterque petiolata, valde membranacea, oblonga, cum petiolo usque ad 6 poll. longa, apice abrupte acuminata, basi cuneata, margine integra, utrinque glabra, atro-viridia, venis primariis lateralibus utrinque 5--6 curvatis inconspicuis; petiolus gracilis, teres, usque 2 poll. longus. Flores paucissimi, laxissime paniculati, angustissimi, bipollicares, paniculis terminalibus semipedalibus trichotimis, ramulis pedicellisque elongatis fere capillaribus, bracteis minutis subulatis; calyx glaber, herbaceus, crassiusculus, anguste campanulatus, circiter 3 lineas longus, aequaliter 5-fidus, lobis lanceolatis acutis; corolla puberula, tubo fere filiformi bipollicari leviter curvato, limbi lobis oblongis 3--4 lineas longis; stamina glabra, distincte didynama, vix exserta; ovarium glabrum, obscure lobatum, imperfecte 2-loculare 2-ovulatum? Fructus ignotus."

The species is based on *Fortune 20* from somewhere in China, deposited in the Kew herbarium. Hemsley (1890) continues: "Characterized by an exceedingly slender habit, few very narrow flowers, and scarcely exserted stamens. Until the ovary and fruit are better known the genus must remain doubtful."

Citations: CHINA: Province undetermined: *E. H. Wilson 2770* [Lookai] (Ld--photo, N, N--photo, V--10140). HONG KONG: *Fortune 45* (S).

CLERODENDRUM FRIESII K. Schum. in K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Südsee 372 [as "*Clerodendron*"]. 1905; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 67 & 90. 1942.

Synonymy: *Clerodendron friesii* K. Schum. in K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Südsee 372. 1905.

Bibliography: K. Schum. in K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Südsee 372. 1905; Prain, Ind. Kew. Suppl. 3: 44. 1908; H. J. Lam, Verbenac. Malay. Arch. 278 & 363. 1919; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 94, 109, & viii. 1921; H. J. Lam in Lauterb., Engl. Bot. Jahrb. 59: 96. 1921; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 67 & 90. 1942; H. N. & A. L. Mold., Pl. Life 2: 60. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 149

& 181. 1949; Mold., Résumé 200 & 263. 1959; Mold., Fifth Summ. 1: 335 & 445 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 325 & 537. 1980.

A small tree; branches stout, almost 6 mm. in diameter, glabrous; bark black; pith in the internodes dark brownish-gray, with the appearance of being inhabited by ants; leaves decussate-opposite, comparatively long-petiolate; petioles 2.5--4 cm. long, rather deeply canaliculate above; leaf-blades large, subcoriaceous, lanceolate, 18--25 cm. long, 5.5--8.5 cm. wide at the midpoint, apically attenuate-acuminate, basally narrowed or somewhat acuminate, glabrous on both surfaces, black above and brown beneath when dried; secondaries 10 or 11 per side, conspicuous, more prominent beneath than above (as also the veinlet reticulation); inflorescence paniculate, many-flowered, interrupted, 12 cm. long; peduncles to 2 cm. long, slender, glabrous; primary bracts herbaceous, ovate, to 6 cm. long. apically acuminate; rachis glabrous; calyx 5 mm. long, 5-lobed to below the middle, the lobes ovate, apically acute or obtuse, ciliolate, imbricate, overlapping; corolla club-shaped, yellow, apically orange, 2 cm. long, the lobes short; pistil twice as long as the corolla.

This species is based on a 38-cm.-long branch of *Nyman 730*, collected at Sattelberg, at 600 m. altitude, in the Territory of New Guinea, in July, 1899., deposited in the Berlin herbarium, now destroyed.

The collection cited below is a mixture with *C. magnificum* Warb.

Citations: NEW GUINEA: Territory of New Guinea: *W. MacGregor s.n.* [Camp 1, 1889] (Mb).

CLERODENDRUM FRUTECTORUM S. Moore, Journ. Bot. Brit. 57: 249 [as "*Clerodendron*"]. 1919; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 63. 1936.

Synonymy: *Clerodendron frutectorum* S. Moore, Journ. Bot. Brit. 57: 249. 1919. *Clerodendron capitatum* var. *subdentatum* DeWild. ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Clerodendrum capitatum* var. *rhodesiense* Mold., Phytologia 3: 263--264. 1950. *Clerodendron capitatum* var. *cordatum* Peter ex Mold., Résumé 261 in syn. 1959.

Bibliography: S. Moore, Journ. Bot. Brit. 57: 249. 1919; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 9, 36. 63, & 93. 1936; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47, 48, & 90 (1942) and ed. 2, 112, 115, & 181. 1949; Mold., Phytologia 3: 263--264. 1950; Mold., Résumé 137, 138, 141, 148, 261, 272, 426, & 449. 1959; Mold., Résumé Suppl. 1: 9. 1959; Mold., Fifth Summ. 1: 221, 228, 235, 245, 441, & 462 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 211, 212, 218, 225, 235, & 537. 1980; Mold., Phytologia 58: 421, 422, & 439 (1985) and 59: 102. 1986.

A shrub, to 3 m. tall, reproducing by suckers; stems and branches rather robust, leafy, rather densely hirtellous or pilose-pubescent with wide-spreading brownish hairs, sometimes trailing; wood light-brown; leaves decussate-opposite; petioles 1.6--16 cm. long, those of the upper leaves 1 cm. or more shorter, all pubescent; leaf-

blades large, membranous, ovate, 14--22 cm. long, 10--14 cm. wide, or the upper ones only 8--10 cm. long and 6--8 cm. wide, apically shortly cuspidate-acuminate (the acumen itself abruptly acute), the larger marginally rather coarsely and irregularly apiculate-dentate from the widest part to the apex with up to about 9 teeth per side and the smaller ones sinuate or all entire or subentire, basally shortly cordate and 5-veined, shiny and regularly pilose with translucent multicellular hairs above, very densely short-pubescent especially on the venation beneath; inflorescence large, conglobate, at the apex of the branches in the axils of the smaller leaves, plainly stipitate; bracts spatulate, 12--15 mm. long, somewhat shorter than the calyx, apically acuminate, pubescent; pedicels much abbreviated; calyx infundibular, 18 mm. long, pubescent, divided almost to the middle, the lobes ovate-lanceolate, 10 mm. long, apically short-acuminate; corolla white or creamy-white, 5 cm. long, about 3 times as long as the calyx, the tube slender, about 1.25 mm. wide at the middle, 2 mm. wide at the base and 4 mm. wide at the apex, externally glandular-pubescent, the limb broadly ovoid when unopened, the lobes 9 mm. long, 6 mm. wide, apically very obtuse, much shorter than the tube.

This species is based on *Kassner 2473* from among bushes at Shiwale, Zaire. Moore (1919) notes that it has "Affinity with *C. capitatum* Schum. & Thonn., but quite different leaves and shorter corollas among other features".

Clerodendrum capitatum var. *rhodesiense*, previously regarded by me as a valid taxon, seems, rather, to be identical with Moore's plant, and is, therefore, here reduced to its synonymy. It is based on *E. Milne-Redhead 4303* from *Brachystegia* woodland in the Mwinilunga district of Zambia just south of Matonchi Farm, collected on January 24, 1938, and deposited in the Kew herbarium.

Clerodendrum frutectorum differs from typical *C. capitatum* (Willd.) Schum. & Thonn. in having the stems and petioles rather densely hirsutulous-pubescent with wide-spreading brownish hairs, the upper leaf-surface regularly pilose with translucent multicellular hairs, and the lower leaf-surface very densely short-pubescent, especially on the venation.

Clerodendrum capitatum var. *cordatum* is based on *Peter 35876* from Tanganyika.

Clerodendrum frutectorum has been encountered by collectors in the dense shade of forests, in *Brachystegia* woodlands, and on termitaria, at 1062--1100 m. altitude, in flower in January and March.

It is worth recording that the *Verdick 409* collection is annotated in the Brussels herbarium as "*Clerodendron capitatum* var. *subdentatum* DeWild., nov. var."

The corollas of *C. frutectorum* are described as having been "white" on *Peter 35876* and *Watmough 225* and as "creamy-white" on *Quarré 3102*.

Thomas (1936) cites *Kassner 2473* from Zaire, *Chevalier 832a* and *Passarge 34, 35, & 36* from Nigeria, and *Kersting A.191* from Togo.

Citations: ZAIRE: *Bredo 1048* (Br); *Caton 46* (E--2168594); *Giorgi s.n.* [Envir. Elisabethville 1923] (Br); *Homble 1* (Br); *Kassner 2473* (Br--isotype, Ld--photo of isotype, N--photo of isotype); *Quarré 129*

(Br, Br, N), *1042* (Br), *1093* (Br), *1546* (Br, Br), *3102* (Br, Br, N), *5323* (Br, Br, Br, N); *Robyns 1525* (Br, Br); *RRPP. Salesiens S.363* (Br), *S.716* (Br); *Verdick 409* (Br). TANZANIA: Tanganyika: *Peter 35876* [V.139] (B, B). ZAMBIA: *E. Milne-Redhead 4303* (N, N--photo); *Watmough 225* (S).

CLERODENDRUM FUGITANS Wernham, Journ. Bot. Brit. 54: 230--231 [as "*Clerodendron*"]. 1916.

Synonymy: *Clerodendron fugitans* Wernham, Journ. Bot. Brit. 54: 230. 1916. *Clerodendrum futigans* Wernham apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 38, 66, & 93 sphalm. 1936.

Bibliography: Wernham, Journ. Bot. Brit. 54: 230--231. 1916; Fedde & Schust., Justs Bot. Jahresber. 44: 253. 1922; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 38, 66, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 47 & 90 (1942) and ed. 2, 113 & 181. 1949; Mold., Résumé 139 & 449. 1959; Mold., Fifth Summ. 1: 223 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 214 & 537. 1980.

A scandent shrub; stems subterete, subfistular, striate, glabrescent; petioles about 1 cm. long, hirtous-pubescent to glabrescent; leaf-blades thinly membranous, elliptic, 8--11 cm. long, 5--6 cm. wide, apically shortly acute-acuminate, basally rounded, glabrous; secondaries about 4 per side; inflorescence capitate, terminating lateral branchlets, subsessile or very shortly pedunculate, comparatively small, scarcely 3 cm. wide during anthesis; exterior bracts narrowly lanceolate, the interior ones broader, about 1 cm. long, apically very acutely acuminate, silvery ciliate or subglabrous; calyx-tube scarcely 2.5 mm. long, externally glabrous, the lobes to 4.5 mm. long, similar to the bracts in indument, the venation very slender but very distinct; corolla-tube slender, 5.5--6.5 cm. long, externally very sparsely glandular-pilose or glabrous, the lobes elliptic, about 1 cm. long and 5 mm. wide, apically rounded, glabrous on both surfaces.

The species is based on *Bates 676* from the edge of a path near a forest near Mbimbili, Bitye, in southern Cameroons, collected on December 15, 1914, probably deposited in the British Museum herbarium. Moore (1916) comments that "This is readily distinguished from most of the capitate species by the small heads and small bracts and calyx-lobes, and from B.[sic] *Talbotii* Wernham, its nearest apparent ally, by the much longer corolla-tube."

Thomas (1936) cites only the type collection and states that "Diese Art ist mir nur aus der Beschreibung bekannt; danach dürfte sie der vorigen [*C. cephalanthum* Oliv.] sehr ähnlich sein". Nothing is known to me either of this species beyond what is stated in its bibliography (above).

CLERODENDRUM FULGENS Firminger, Man. Gard. India, ed. 3, 529 & 609 [as "*Clerodendron*"]. 1874; Mold., Phytologia 50: 255 & 268. 1982.

Synonymy: *Clerodendron fulgens* Firminger, Man. Gard. India, ed. 3, 529 & 609. 1874.

Bibliography: Firminger, Man. Gard. India, ed. 3, 529 & 609.

1874; Mold., Phytologia 50: 255 & 268. 1982.

Nothing is known to me about this plant beyond the fact that Firminger (1874) implies that it is cultivated in Indian gardens. Presumably it is one of the scarlet-flowered species, perhaps *C. speciosissimum* Van Geert, which is widely cultivated there.

CLERODENDRUM FUSCUM Gürke, Engl. Bot. Jahrb. 18: 175 [as "*Clerodendron*"]. 1893; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 35, 61, & 93. 1936.

Synonymy: *Clerodendron fuscum* Gürke, Engl. Bot. Jahrb. 18: 175. 1893. *Clerodendron macrocalyx* DeWild., Bull. Jard. Bot. Brux. 7: 172. 1920. *Clerodendron grandicalyx* E. A. Bruce, Kew Bull. Misc. Inf. 1934: 306. 1934. *Clerodendrum macrocalyx* DeWild. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 61 & 94 in syn. 1936. *Clerodendrum fuscum* Vatke ex Mold., Résumé Suppl. 3: 31 in syn. 1962. *Clerodendrum fuscum* Gilg ex Mold., Résumé Suppl. 18: 9 in syn. 1969.

Bibliography: Gürke, Engl. Bot. Jahrb. 18: 175. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. C: 341. 1895; Durand & DeWild., Bull. Soc. Roy. Bot. Belg. 37: 124. 1898; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 294 & 304--305. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; DeWild., Ann. Mus. Cong. Belg. Bot., ser. 5, 3: 134 & 255 (1909) and ser. 5, 3: 468. 1912; DeWild., Bull. Roy. Soc. Bot. Belg. 51 (3) [ser. 2, 1]: 91, 132, & 233. 1913; De Wild., Bull. Jard. Bot. Brux. 7: 172. 1920; DeWild., Pl. Bequaert. 2: 264--265. 1922; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497 (1927) and 53 (1): 1072. 1932; Bruce, Kew Bull. Misc. Inf. 1934: 306. 1934; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 35, 61, & 93. 1936; A. W. Hill. Ind. Kew. Suppl. 9: 68. 1938; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Alph. List Inv. Names 18. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48, 49, & 90. 1942; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; W. Robyns, Fl. Sperm. Parc Nat. Albert 2: 140 & 143. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 115, 116, & 181. 1949; Mold., Biol. Abstr. 27: 1887. 1953; Hauman, Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1954; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 141, 143, 144, 216, 263, 264, 266, & 449. 1959; Mold., Résumé Suppl. 1: 10 (1959), 12: 6 (1965), and 18: 9. 1969; Bouquet, Invent. Pl. Méd. Tox. Cong. Braz. 32. 1967; Mold., Fifth Summ. 1: 228, 232, 233, 235, 242, 358, 445, 446, 450, & 462 (1971) and 2: 865. 1971; Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: [230]. 1972; Lebrun & Stork, Ind. Cart. Répart. Pl. Vasc. Afr. 32. 1977; Mold., Phytol. Mem. 2: 217, 218, 222, 223, 225, 232, 349, & 537. 1980; Mold., Phytologia 58: 441 (1985) and 59: 112, 255, & 358. 1986.

An erect, scrambling, or scandent, brown- or violet-pubescent shrub or small, slender, sarmentose, woody, sun-loving liana, to 8 m. long; stems hollow; young branches and branchlets short-pubescent with dark-brown articulated hairs; leaves decussate-opposite, the upper ones sessile or subsessile, the lower ones long- and short-petiolate; petioles absent or 0.5--5.5 cm. long, more or less brown-

or violet-villous, articulated at the base or 3--5 mm. above the base, leaving a stout, oblique projection after falling (which aids in climbing); leaf-blades papery-coriaceous, sometimes stiff and scabrous or soft and supple, broadly ovate or oval-orbicular to subrotund, 6--20 cm. long, 4--15.5 cm. wide, apically more or less abruptly acuminate (the acumen itself apically acute) or rounded to a short mucro, marginally entire, basally deeply cordate with a rounded sinus, hirtous with violet or brown articulated and appressed hairs on both surfaces (chiefly on the venation), more sparsely so or glabrescent above, densely scrobiculate (under a hans-lens) beneath, with 3 basal secondaries and 4 or 5 lateral ones, all anastomosing; inflorescence cymose, the cymes axillary or terminal, corymbose, oval, few-flowered, more or less long-pedunculate, to 20 cm. wide, generally paired, di- or trichotomous; bracts and bractlets linear, cream-yellow, the lower ones to 1 cm. long, the upper shorter, to 5 mm. long, all shortly reddish-villous; peduncles 2--9 cm. long, tomentose; rachis and cyme ramifications tomentose; pedicels to 2 cm. long, shortly villous; flowers inodorous; calyx more or less campanulate, white, yellowish-white, or cream-color to pale-yellow or yellow, finally turning violet, showy, 1.6--2.8 cm. long, 8--12 mm. wide, externally sparsely pubescent with dark-brown articulated hairs, 5-parted to 1/3 its length, ciliate, the lobes ovate to lanceolate or deltoid, 1.9--2.2 cm. long, basally 6--7 mm. wide, apically acute or acuminate; corolla zygomorphic, hypocrateriform, white or yellowish-white or internally white and red-spotted, exterbally purple-red, the tube slender, 1.5--3 cm. long, almost twice as long as the calyx, externally densely reddish-pilose or sparsely glandular-villous, the 5 lobes imbricate in bud, 5--10 mm. long, the 3 upper ones with a red spot; stamens olivaceous, long-exserted; filaments green; style deep-violet, long-exserted, filiform, 6 cm. long, as long as the stamens; stigma bifid; fruiting-calyx persistent, rosy- or violet-white to mauve "no. 44 on the Séguy color-chart" (1936), composed of 5, free, oval lobes, enclosing the fruit; fruit drupaceous, at first dark-green, later black, globose or subglobose, 12--13 mm. long, 12 mm. wide, externally glabrous and shiny.

This species is based on *Stuhlmann 3061* & *3096* from the mountains of Kajonsa, West Mpororo, Tanganyika, collected, respectively, on January 28 and 30, 1892, and *Pogge 335* from along the Lulu River at 9½ S. lat., in May of 1876, deposited in the Berlin herbarium, now doubtless destroyed. *Clerodendron macrocalyx* is based on *Bequaert 1637, 2031,* & *6492,* the first from a secondary forest at Bomili, collected on December 26, 1913, the second [now regarded as representing var. *attenuatum* Mold.] from a forest at Avacubi, collected on January 20, 1914, and the third from between Masisi and Walikale, collected on January 4, 1915 -- all in Zaire and deposited in the Brussels herbarium. Of this taxon DeWildeman (1922) comments: "Cette plante est indiscutablement voisine du *C. scandens* Pal. Beauv. (cf. Baker in Flora of trop. Afr. V. p. 304), dont elle se differencie très fortement par les dimensions de son calice profondément divisé en 5 lobes aigus." *C. grandicalyx* is based on *Rogers & Gardner 319* from Uganda in the Kew herbarium,

Collectors have encountered *Clerodendrum fuscum* in shady, tropoph-

ilous, virgin and secondary forests, the edges of gallery forests, in sandy soil, sunny or partly sunny clearings, and old deforested and abandoned cultivated areas, at 470--2000 m. altitude, in flower in January, June, July, and December, and in fruit in January, May, and August. Rogers & Gardner speak of it as "rare" in Uganda, but Louis refers to it as "rather common" in Zaire. Troupin refers to it as a "herbaceous liana" -- manifestly a contradiction in terms.

Goossens reports that the juice of the crushed leaves is used by natives in the treatment of headaches -- "une gouette est introduite dans la commissure de yeux".

Vernacular names reported for the species are "boondo makila", "boondo na n'gula", "boone nala", "ifonge", "kamakula", "kasabiniola", "lungungu", "mbabi", "mbambake", "ndambula", "wangange", and "yangange".

The corolla is described as having been "white" on *Bequaert 1637* and *Troupin 5524* & *6299*, "yellow" on *Gillardin 369*, "cream with a central spot of wine-red" on *Louis 1091*, "pale-yellow with a large spot of dark-purple in the center" on *Louis 12781*, "ivory-white with a deep purple-red spot" on *Bequaert 2031*, "yellowish-white, the 3 upper petals with a red spot" on *Bequaert 6492*, "yellow, the 2 large lobes vivid-red" on *Lebrun 3233*, "cream, the 3 upper petals turned back and splashed with crimson" on *Rogers & Gardner 319*, "cream-yellow with a carmine-lake spot [71 in the Séguy color-chart]" on *Louis 13065*, and "the upper lip carmine-red" on *Gossweiler 14040*. On *Louis 1292* it is described as "jaune-créme, mais plus ou moins maculés de lateraux rouge-grosseille sur leur moitié", while on *Louis 9814* it was "jaunâtre pâle, la corolle largement maculeé d'un beau rouge pourpre surtout la levre inférieure". It is possible that several distinct color-forms are involved here.

Gürke (1895) describes the plant as "Ein mit braunen Haaren dicht besetzter Strauch mit herzförmigen, stengelumfassenden B[lätter] und grossen gelben Kelchen".

Baker (1900) cites *Stuhlmann 3061* & *3096* from Tanganyika, *Dupuis s.n.* from Lower Congo, and *Preuss s.n.* from Lunda. DeWildeman (1912) cites *Allard 464* & *s.n.*, *Claessens 292*, *Janssens s.n.*, *Jespersen s.n.*, *Seret 858bis*, and *Vanderyst s.n.* from Zaire. In his 1909 work he cites *Flamigni 114*, *Huyghe s.n.*, *Laurent 1955* & *s.n.*, *Pynaert 245* & *292*, *Sapin s.n.*, and *Seret 460*. Thomas (1936) cites *Mildbraed 1060* & *1232* and *Stuhlmann 3061* & *3096* from Tanganyika and *Bequaert 6492*, *Dupuis s.n.*, and *Pogge 335* from Zaire.

Robyns (1947) describes *Clerodendrum fuscum* as an "Arbuste lianiforme, se rencontrant dans tout les districts du Congo Belge occidental, sauf le District Côtier, et s'étendant à travers de District des Lacs Edouard et Kivu jusque dans le Ruanda et le Sud-Ouest de l'Uganda (Mpororo). Il croît de préférence dans les formations forestieres equatoriales et dans les defrichements forestiers". He cites *Humbert 8682*. Lewalle (1972) cites *Lewalle 604* from Burundi.

Bruce (1934) asserts that her *C. grandicalyx* is distinguished by its conspicuous calyx, but "in other respects it is very similar to *C. cordifolium* A. Rich."

It may be noted, in passing, that the Gürke (1893) reference in this species' bibliography (above) is sometimes cited as "1894";

similarly, the DeWildeman (1913) reference is sometimes mis-cited as "1912", the titlepage date.

A key to help distinguish *C. fuscum* from other tropical African species of the genus will be found under *C. dinklagei* Gürke in this present series of notes [59: 254--255].

The unnumbered Elskens collection cited below is a mixture of *C. fuscum* and leaves of *C. splendens* G. Don, while *Vanderyst 19139* is a mixture with *C. excavatum* DeWild.

Material of *Clerodendrum fuscum* has been misidentified and distributed in some herbaria as *C. splendens* G. Don and *C. thompsonii* Balf. [=*C. thomsonae* Balf. f.]. On the other hand, the *Leontovitch 197*, distributed as *C. fuscum*, actually is *C. splendens* G. Don.

Citations: ZAIRE: *Allard 416* (Br), *464* (Br); *Bequaert 1637* (Br), *6492* (Br, Ld--photo, N, N--photo); *Berger s.n.* [1909] (Br); *Boone 71* (Br); *Callens 1725* (N), *2961* (N), *3651* (N), *3943* (N), *4937* (Gg); *Claessens 292* (Br); *Collector undetermined 507* (Br); *Dupuis s.n.* [Juillet 1893] (Br); *Elskens s.n.* [5 Mai 1913] in part (Br), *s.n.* [15 Juin 1913] in part (Br); *Flamigni 114a* (Br); *G. Gilbert 65* (Br); *Gillardin 369* (Br, Br, N), *373* (Br, Br), *504* (Br, Br); *Gillet 193* (Br), *804* (Br), *3004* (Br), *3330* (Br), *s.n.* [Kisantu 1900] (Br), *s.n.* [Aout 1902] (Br, N); *Goossens 1554* (Br, Br, N), *6055* (Br, N), *6125* (Br), *6160* (Br), *6164* (Br); *Hulstaert 337* (Br), *585* (Br), *586* (Br), *599* (Br); *Humbert 8343* (B, Br); *Janssens s.n.* [1909] (Br); *Jespersen s.n.* [1910] (Br); *M. Laurent 1916* (Br); *Laurent & Laurent s.n.* [18-11-03] (Br), *s.n.* [18-12-03] (Br), *s.n.* [20-11-03] (Br); *Lebrun 691* (Br), *3233* (Br, Br), *5544* (Br, Br), *5587* (Br, Br); *Louis 876* (Br, S), *1091* (B, Br, Ca--962229, N, Vi), *1292* (Br), *5839* (Bm, Br), *9814* (Br, N), *10044* (Br), *12781* (Br), *13065* (Br, W--2091099); *Putnam 9* (Br), *M.479* (Br); *W. Robyns 1332* (Br, Br); *Roechoudt 13* (Br); *Sapin s.n.* [Juillet 1906] (Br), *s.n.* [Decembre 1909] (Br), *s.n.* [Juillet 1910] (Br), *s.n.* (Br, Br, N); *Scaetta 720* (Br), *753* (Br, Br), *784* (Br), *858* (Br); *Seret 460* (Br, N), *858bis* (Br); *Troupin 5524* (N), *6299* (W--2375337); *Ueentel s.n.* [Iboko, juin 1900] (Br); *Vanderyst 574* (Br), *5465* (Br), *9943* (Br), *9947* (Br), *14887* (Br, Br), *15114* (Br, Br), *19100* (Br), *19139* in part (Br), *21012* (Br, N), *21015* (Br), *s.n.* [Octobre 1911] (Br), *s.n.* [Envir. Kisantu] (Br); *Vanderyst & Lambrette 5420* (Br). BURUNDI: *Lewalle 3776* (Ac). UGANDA: *Rogers & Gardner 319* (Br, Ld--photo, N--photo). ANGOLA: Lunda: *Gossweiler 14040* (B, Ul, W--2074409). CULTIVATED: Zaire: *Callens 4155* (Ld).

CLERODENDRUM FUSCUM var. **ATTENUATUM** Mold., Phytologia 4: 176. 1953.

Bibliography: Mold., Biol. Abstr. 27: 1887 & 2026. 1953; Mold., Phytologia 4: 176. 1953; Hauman, Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1954; Mold., Résumé 141 & 449. 1959; Mold., Fifth Summ. 1: 228 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 218 & 537. 1980.

This variety differs from the typical form of the species in having its calyx during anthesis 2.3--3 cm. long, split almost to the base, the lobes ovate and apically long-attenuate into a filiform-subulate tip.

The variety is based on *Corbisier-Baland 1609* from Eala, Zaire, collected on July 7, 1932, and deposited in the Brussels herbarium.

Louis describes the plant as follows: "liane ligneuse de 3 m. de

haut (en pleine forêt primitive); ramiscules velus-violets; pétioles articulés; grand calice blanc vaguement teinté de vert, pétales coudés formant 5 poches à la base, puis dressés et convergents en pyramide; corolla bilabiée 2/3, de même couleur que le calice avec belle tache rouge sombre (51 Séguy) à la base de la lèvre inférieure; filets vert pâle courbes, anthères vert sombre; graines d'un noir intense a arille adaxiale, basilaire, oblongue, profondement ruminée, orange vif (plus vif que le 196 de Séguy), entourées du calice persistent rose-violacé."

Lebrun refers to the "flowers" as "white, with a large purple blotch at the base of the principal segment" (*no. 6635*) or "calyx yellowish-white, corolla yellow, the petals spotted or streaked with purple at the base (*no. 691*). He describes the plant as an "arbuste lianiforme". Corbisier-Baland refers to it as an "arbuste sarmenteux décoratif". The calyx is also described by others as "rose" and the fruit as black.

Collectors have encountered this plant in secondary and swampy forests, at 470 m. altitude, in flower in January, May to August, and November, and in fruit in January and September. The only vernacular name reported for it is "mbambake e boliki".

The *Bequaert 2031*, cited below, is one of the cotype collections cited by DeWildeman (1920) in his description of *C. macrocalyx* De Wild., so in designating a lectotype for the latter, this collection should be excluded from consideration.

The *Leemans 194*, also cited below, is a mixture with *C. umbellatum* var. *asperifolium* (Thomas) Mold.

Citations: ZAIRE: *Bequaert 2031* (Br, Ld--photo, N, N--photo); *Claessens 15* (Br); *Corbisier-Baland 1609* (Br--type, Br--isotype, Ld--photo of type, N--photo of type); *Goossens 2609* (Br), *2659* (Br), *2764* (Br), *6016* (Br, Br), *6115* (Br, N), *6176* (Br); *Huyghe s.n.* [1907] (Br); *M. Laurent 1955* (Br); *Lebrun 691* (Br), *1357* (Br, Br, N), *6635* (Br, Br, N); *Leemans 194* in part (Br), *262* in part (Br, Br); *Louis 7582* (Br); *Pynaert 241* (Br, N), *292* (Br). CULTIVATED: Zaire: *Corbisier-Baland 4285* (Br).

CLERODENDRUM FUSCUM var. *LANCEOLATUM* Mold., Phytologia 4: 176. 1953.

Bibliography: Mold., Biol. Abstr. 27: 1887 & 2026. 1953; Mold., Phytologia 4: 176. 1953; Mold., Résumé 141 & 449. 1959; Mold., Fifth Summ. 1: 228 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 218 & 537. 1980.

This variety differs from the typical form of the species in having its leaf-blades regularly lanceolate, 5--7 cm. long, and 1.6--3.2 cm. wide.

It is based on *Dewulf 755* from a savanna at Bas Uele, Zaire, collected on March 10, 1935, and deposited in the Brussels herbarium. Thus far it is known to me only from the original collection.

Citations: ZAIRE: *Dewulf 755* (Br--type, Ld--photo of type, N--photo of type).

CLERODENDRUM GALEATUM Balf. f., Proc. Roy. Soc. Edinb. 12: 91 [as "*Clerodendron*"]. 1884; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 90. 1942.

Synonymy: *Clerodendron (Cyclonema) galeatum* Balf. f., Proc. Roy. Soc. Edinb. 12: 91. 1884. *Clerodendron galeatum* Balf., Trans. Roy. Soc. Edinb. 31: 235. 1888.

Bibliography: Balf. f., Proc. Roy. Soc. Edinb. 12: 91. 1884; Balf. f., Trans. Roy. Soc. Edinb. 31: [Bot. Socotra] 235--236, pl. 80. 1888; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Stapf, Ind. Lond. 2: 238. 1930; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 53 & 90. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Cit. 1: 27. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 124 & 181. 1949; Mold., Résumé 158 & 449. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 561. 1960; Mold., Fifth Summ. 1: 265 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 253, 386, & 537. 1980.

Illustrations: Balf. f., Trans. Roy. Soc. Edinb. 31: pl. 80. 1888.

A shrub, tomentose-pubescent throughout and fuscous; branches angular; leaves decussate-opposite, petiolate; leaf-blades broadly elliptic or oblong, rarely subobovate, 5--8.75 cm. long, 2.5--5 cm. wide, apically obtuse or broadly acute (rarely emarginate), marginally obscurely crenate and broadly revolute, basally narrowed, lighter and rather more densely pubescent-tomentose beneath; inflorescence terminal, erect, rigid; peduncles 2.5--5 cm. long; primary rachis regularly and racemosely branched, 1 or 2 times dichotomous, the inflorescence-branches ascending; bracts large, foliaceous, sessile, semiamplexicaul, ovate or elliptic to subrotund; bractlets spatulate or lanceolate, stipitate; pedicels 6 mm. long; calyx 4 mm. long, 5-lobed to about 1/3 its length, the lobes rounded, externally shortly pilose; corolla-tube 6 mm. long, internally glabrous, the posterior lobe cucullate-hooded and 1.2 cm. long, the others subequal, elliptic, apically obtuse, externally strigulate, marginally ciliate; stamens inserted in the throat of the corolla; filaments thickened for the basal 3 mm., straight and villous, filiform and strigulose above; anthers oblong; fruit drupaceous, 4-lobed, the endocarp crustaceous, smooth.

This endemic species, obviously belonging to the subgenus *Cyclonema*, is based on *Balfour 441* from the Haghier hills behind Tamarida, Socotra. Balfour (1888) refers to it as "An interesting species having its nearest allies in *C. myricoides*, and *C. pilosus*, Benth. and Hook. (Gen. Pl. ii. 1156), and a few other African species ranging from Abyssinia to the Cape, all characterised by the production of the posterior lobe of the corolla into a large helmet-like hood. Upon this character Hochstetter (in Flora 1842, 225) founded the genus *Cyclonema*, but Bentham and Hooker have reduced this to *Clerodendron*, as the hooding is more or less apparent in many other species of the genus. The inflorescence of our species is a very marked feature with its large bracts, and this with the characters of the foliage easily separate it from related species." A local vernacular name for the plant is "duuha". The species is known to me thus far only from the type collection.

Citations: SOCOTRA: *Balfour 441* (L--isotype). MOUNTED ILLUSTRATIONS: Balf. f., Trans. Roy. Soc. Edinb. 31: pl. 80. 1888 (Ld).

CLERODENDRUM GARRETTIANUM Craib, Kew Bull. Misc. Inf. 1911: 444 [as "*Clerodendron*"]. 1911; H. Hallier, Meded. Rijks Herb. Leid. 37: 75. 1918.

Synonymy: *Clerodendron garrettianum* Craib, Kew Bull. Misc. Inf. 1911: 444. 1911. *Clerodendrum garretianum* Craib ex H. Hallier, Meded. Rijks Herb. Leid. 37: 75 sphalm. 1918. *Clerodendron disparifolium* Bakh. ex Fletcher, Kew Bull. Misc. Inf. 1938: 427 in syn. 1938 [not *Clerodendrum disparifolium* Blume, 1826, nor Hassk., 1921, nor Kochum, 1980]. *Clerodendrum garethianum* Craib ex Mold., Résumé Suppl. 15: 19 in syn. 1967. *Clerodendrum garethianum* Craub ex Mold., Fifth Summ. 1: 462 sphalm. in syn. 1971.

Bibliography: Craib, Kew Bull. Misc. Inf. 1911: 444. 1911; Craib, Contrib. Fl. Siam Dicot. 165. 1912; Fedde & Schust., Justs Bot.Jahresber. 39 (2): 319. 1913; H. Hallier, Meded. Rijks Herb. Leid. 37: 75. 1918; Dop in Lecomte, Notul. Syst. 4: 11. 1920; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 84, 109, & viii. 1921; Prain, Ind. Kew. Suppl. 5, imp. 1, 61. 1921; Dop in Lecomte, Fl. Gen. Indo-chine 4: 851 & 868. 1935; Fletcher, Kew Bull. Misc. Inf. 1938: 405, 407, 424, & 427. 1938; Mold., Alph. List Inv. Names 17. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 60 & 90. 1942; H. N. & A. L. Mold., Pl. Life 2: 60. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 137 & 181. 1949; Anon., Kew Bull. Gen. Ind. 77. 1959; Mold., Résume 177, 262, & 449. 1959; Prain, Ind. Kew. Suppl. 5, imp. 2, 61. 1960; Mold., Dansk Bot. Arkiv 23: 89. 1963; Mold., Resumé Suppl. 15: 18 & 19. 1967; Mold., Fifth Summ. 1: 295, 443, 445, & 462 (1971) and 2: 865. 1971; Mold., Phytol. Mem. 2: 284 & 537. 1980; Mold., Phytologia 58: 404 (1985) and 59: 325, 330, & 409. 1986.

A branched shrub, 0.5--1.2 m. tall; branchlets slender, at first puberulent, later glabrous; bark brown or red-brown; leaves decussate-opposite, somewhat unequal; petioles somewhat unequal, 0.5--5 cm. long, canaliculate above, puberulent; leaf-blades thinly chartaceous, oblong or oblong-lanceolate, 5.5--19 cm. long, 1.5--5.8 cm. wide, apically acuminate (the acumen acute), marginally subentire and ciliolate, basally mostly very broadly cuneate but sometimes cuneate, cuneate-rotund, or subcordate-truncate, very sparsely setulose or short-pubescent above, puberulent on the midrib and secondaries beneath; secondaries 7--9 per side, the 2 basal ones mostly very oblique, conspicuous above, prominulent beneath; tertiaries transverse, conspicuous above, prominulent beneath; inflorescence terminal, paniculate, subnutant, about 5 cm. long and 6 cm. wide, leafy, the lower cymes axillary; peduncles 2--3 cm. long; lowest bracts lanceolate, to 1.3 cm. long, foliaceous, apically acuminate; pedicels to 8 mm. long, puberulent; calyx externally puberulent, its tube scarcely 2 mm. long, the lobes lanceolate, about 5 mm. long and 1.5 mm. wide, apically acute, ventrally pubescent; corolla white or greenish-white to pale-yellow, externally puberulent, its tube 2--2.5 cm. long, scarcely 1 mm. wide, the lobes subequal, oblong-spatulate, to 1 cm. long and 2.75 mm. wide, ciliolate; stamens inserted near the apex of the corolla-tube; filaments 1.7 cm. long, glabrous; anthers oblong, 1.5 mm. long; style slender, 3.2 cm. long, glabrous; stigma shortly bifid; ovary externally glabrous.

This species is based on *Kerr 1309* & *1435* from evergreen jungles, at 690--900 m. altitude, Chiengmai, on Doi Sootep, Thailand.

Collectors have found this plant growing in thickets, on mountainsides, in the crevices of limestone rock, and especially in light evergreen forests and jungles, at 25--1200 m. altitude, in flower in June and September. Smitinand refers to it as "scattered in evergreen jungles" in Thailand.

The corollas are said to have been "white" on *Smitinand 1722*, "greenish-white" on *Kerr 1309* & *1435*, and "pale-yellow" on *Iwatsuki & al. T.10976*.

According to Bakhuizen (1921), who identified it as *C. disparifolium* Blume in 1920 and as *C. deflexum* Wall. in 1924, the species greatly resembles these two species, but differs in that its leaves are much smaller, thinner, and less pubescent. It may prove to be only a variety of the latter taxon.

It may be noted here that the *C. disparifolium* of Blume, referred to in the synonymy (above) is a valid species with *C. disparifolium* Kochum as a synonym, while the *C. disparifolium* credited to Hasskarl is a synonym of *C. laevifolium* Blume.

Fletcher (1938) cites for *C. garrettianum* from Thailand: *Kerr 1309, 1435, 3392,* & *9101, Marcan 1073, Put 1143* & *1939,* and *Winit 780, 1170, 1475,* & *1476*.

A key to help distinguish this species from other Indochinese taxa will be found under *C. hahnianum* Dop in the present series of notes.

Citations: THAILAND: *Hansen, Seidenfaden, & Smitinand 11041* (Cp); *Iwatsuki, Fukuoka, Hutch, & Chaiglom T.10976* (Ac); *Kerr 1435* [King photo 293] (Bz--19161--cotype, Ld--photo of cotype, N--photo of cotype, N--photo of cotype, W--photo of cotype); *Smitinand 1722* [Herb. Roy. For. Dept. 9970] (Ld); *Sørensen, Larsen, & Hansen 6857* (Cp).

CLERODENDRUM GAUDICHAUDII Dop in Lecomte, Notul. Syst. 4: 10 [as "*Clerodendron*"]. 1920; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 90. 1942.

Synonymy: *Clerodendron gaudichaudii* Dop in Lecomte, Notul. Syst. 4: 10. 1920.

Bibliography: Dop in Lecomte, Notul. Syst. 4: 10. 1920; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497. 1927; Dop in Lecomte, Fl. Gén. Indo-chine 4: 852 & 873. 1935; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 90. 1942; H. N. & A. L. Mold., Pl. Life 2: 60. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 136 & 181. 1949; Mold., Resumé 175 & 449. 1959; Mold., Fifth Summ. 1: 299 (1971) and 2: 865. 1971; Mold., Phytologia 31: 395. 1975; L. H. & E. Z. Bailey, Hortus Third 285. 1976; Mold., Phytol. Mem. 2: 291, 349, 386, & 537. 1980.

A small tree, 5--6 m. tall; branches terete, glabrous; bark reddish-brown, shiny, wrinkled; leaves variable; petioles 2--3 cm. long, glabrous; leaf-blades membranous, obovate or obovate-elliptic to elliptic or oblong, 12--20 cm. long, 3.5--6 cm. wide, apically acute or acuminate to obtuse, marginally entire or coarsely and irregularly dentate or denticulate, basally rounded or sometimes obtuse, glabrous and shiny on both surfaces; midrib rounded, prominent; sec-

ondaries 12--14, recurved-ascending; veinlet reticulation distinct, irregular; inflorescence terminal or subterminal, to 10 cm. long and 4 cm. wide, glabrous; peduncles 2 cm. long; inflorescence ramifications distant, branched; cymes 3-flowered; bracts and bractlets linear, very small; pedicels 4--5 mm. long; calyx campanulate, yellow during anthesis, 12 mm. long, basally 10 mm. wide, externally glabrous, the tube practically obsolete, the lobes oval-lanceolate, 11.5 mm. long, 4 mm. wide, apically acute, distinctly venose, marginally scarious; corolla yellow, glabrous, the tube cylindric, 12 mm. long, the lobes spatulate, 5 mm. long, apically rounded; stamens somewhat exserted; style slender; stigma shortly bifid; ovary externally glabrous; fruiting-calyx accrescent, reddish, 2.5 cm. long, widespreading;fruit drupaceous, 1 cm. long, black, shiny, composed of 4 pyrenes.

This endemic species is based on *d'Alleizette 480, Bauche 36,* and *Gaudichaud 135* from Hue and Tourane, Annam, and *Bon 5466* from Son-Thon, Tonkin, Vietnam. Dop (1935) adds unnumbered Chevalier and Squires collections from Annam. Dop (1920) notes that "Cette espèce est voisine du *Cl. Robinsonii*; elle s'en éloigne par le port, les feuilles et le calice qui ne devient rouge que dans le fruit."

Clerodendrum gaudichaudii has been found growing at 1000 m. altitude. The Baileys (1976) list it as cultivated in the United States. A key to help distinguish it from other Indochinese taxa will be found under *C. hahnianum* Dop in the present series of notes.

As yet nothing is known to me of this species beyond what is given in its bibliography (above).

CLERODENDRUM GEOFFRAYI Dop in Lecomte, Notul. Syst. 4: 8 [as "*Clerodendron*"]. 1920; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 90. 1942.

Synonymy: *Clerodendron geoffrayi* Dop in Lecomte, Notul. Syst. 4: 8. 1920.

Bibliography: Dop in Lecomte, Notul. Syst. 4: 8. 1920; A. W. Hill, Ind. Kew. Suppl. 6: 49. 1926; Fedde & Schust., Justs Bot. Jahresber. 48 (1): 497. 1927; Dop in Lecomte, Fl. Gén. Indo-chine 4: 853 & 881--882. 1935; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 59 & 90. 1942; H. N. & A. L. Mold., Pl. Life 2: 60. 1948; Mold.,Known Geogr. Distrib. Verbenac., ed. 2, 136 & 181. 1949; Mold., Résumé 175 & 449. 1959; Mold., Fifth Summ. 1: 299 (1971) and 2: 866. 1971; Mold,, Phytologia 31: 395. 1975; Mold., Phytol. Mem. 2: 288, 386, & 537. 1980.

A large woody plant; branches pubescent; leaves decussate-opposite; petioles 6 cm. long, pubescent; leaf-blades membranous, elliptic-oblong, 25 cm. long, basally 9.5 cm. wide, 12 cm. wide at the mid-point, apically abruptly acuminate, marginally subentire and ciliolate, basally truncate and subhastate with 2 rounded lobes, glabrous above, pubescent on the venation beneath; midrib rounded, very prominent; secondaries 18, alternate, slender, somewhat recurved, marginally anastomosing in intramarginal arcs, the 2 lowermost opposite and bifurcate 1 cm. from the base; veinlets parallel, with distinct reticulation; inflorescence terminal, paniculate, pendent, 27 cm. long, 13 cm. wide, finely pubescent, the ramifications branched,

trichotomous, the cymes 7-flowered; bracts and bractlets very small; pedicels 1--2 cm. long; calyx campanulate, red, 10 mm. long, the tube 4 mm. long, the lobes ovate, 6 mm. long, apically acute, 1-veined; corolla white, puberulent, the tube 13 mm. long, the lobes spatulate, 10 mm. long, apically obtuse; stamens long-exserted; filaments glabrous; anthers oblong; style slender; stigma shortly bifid; ovary externally glabrous; fruit unknown.

This little-known apparently endemic species is based on an unnumbered Geoffray collection from Kep, Cambodia, where the plant is said to be "rare sous bois". Dop (1938) comments that "Une seule feuille a putètre examinée; cette espèce se rapproche du *C. hastato-oblongum* C. B. Clarke, insuffisamment décrit par l'auteur."

Nothing else is known to me of this taxon beyond what is stated in its bibliography (above).

CLERODENDRUM GIBBOSUM Mold., Amer. Journ. Bot. 38: 323--324. 1951.

Bibliography: Mold., Amer. Journ. Bot. 38: 323--324. 1951; Mold. in Humbert, Fl. Madag. 174: 152, 209--211, & 267, fig. 34 (1 & 2). 1956; Mold., Résumé 155 & 449. 1959; G. Taylor, Ind. Kew. Suppl. 12: 36. 1959; Mold., Fifth Summ. 1: 260 (1971) and 2: 866. 1971; Mold., Phytol. Mem. 2: 249 & 537. 1980; Mold., Phytologia 58: 188. 1985.

Illustrations: Mold. in Humbert, Fl. Madag. 174: 211, fig. 34 (1 & 2. 1956.

A shrub, to 2 m. tall; branchlets and twigs slender, gray, obtusely tetragonal or subterete, glabrous or the youngest parts obscurely puberulous, mostly prominently lenticellate, the youngest parts often somewhat flattened and canaliculate (and then puberulous in the channel); nodes not annulate; principal internodes 1.5--5 cm. long; leaves decussate-opposite; petioles rather slender, 4--8 mm. long, glabrous; leaf-blades chartaceous, quite firm, uniformly bright-green on both surfaces, sometimes brunnescent in drying, elliptic, 3--8.5 cm. long, 1.4--3.3 cm. wide, apically acute or (mostly) acuminate, marginally entire, basally acute or acuminate, glabrous and lustrous on both surfaces; midrib slender, flat or slightly subimpressed above, prominent beneath; secondaries very slender, 6--9 per side, divergent, arcuately joined several mm. from the margins beneath, prominulent or subimpressed above, very sharply prominent beneath; vein and veinlet reticulation very abundant, fine, prominulent on both surfaces; inflorescence axillary and terminal, mostly at the tips of the twigs, cymose; cymes 6--9 cm. long, 1.5--4 cm. wide, mostly simple or once dichotomous, 3- or 7-flowered, very loose; peduncles filiform, 1--5.5 cm. long, often flattened, stramineous or brownish, more or less spreading-puberulent or glabrescent; cyme-branches similar to the peduncle in all respects but shorter; pedicels filiform, 3--11 mm. long, minutely puberulent with widely scattered hairs or glabrate; foliaceous bracts apparently absent; bractlets and prophylla linear-setaceous, 1--2 mm. long; calyx thinly membranous, urceolate, gibbous-inflated, ovate, 8--15 mm. long, 7--11 mm. wide, glabrous or practically so, its rim 5-lobed, the lobes ovate, about 2 mm. long, apically acute or apiculate; corolla hypocrateriform, zygomorphic, white, its tube cylindric, about 2 cm. long, externally glabrous or slightly pilosulous

on the lower ¼ and within, the limb 5-parted, about 1.5--2 cm. wide; stamens 4, inserted about 1 cm. from the base of the corolla-tube, exserted about 1 cm. from its mouth; filaments glabrous, 1.5--2 cm. long; anthers dorsifixed, 2-celled; disk small, beneath the ovary; ovary globose, externally glabrous; style about 3 cm. long, arched, glabrous, narrowed from the base to the apex, slightly narrower at the point of insertion; stigma 2-toothed; ovary 2-celled, with 2 ovules in each cell.

This endemic species is based on *Boivin 1800* from the edge of the sea near Sainte Marie, Madagascar, collected in September, 1888, and deposited in the Paris herbarium. Other collectors have encountered this plant growing among gneiss rocks, in flower in August and September.

A key to help distinguish this species from its Madagascar relatives will be found under *C. baronianum* Oliv. in the present series of notes (58: 184--190).

Citations: MADAGASCAR: *Boivin 1800* (E--photo of type, F--photo of type, Ld--photo of type, N--fragment of type, N--photo of type, P--type); *Decary 604* (P), *4614* (P), *4719* (P).

CLERODENDRUM GLABRATUM Gürke, Engl. Bot. Jahrb. 28: 295 [as "*Clerodendron*"]. 1900; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 43, 77, & 93. 1936.

Synonymy: *Clerodendron glabratum* Gürke, Engl. Bot. Jahrb. 28: 295. 1900.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 516--517. 1900; Gürke, Engl. Bot. Jahrb. 28: 295. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 495. 1900; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 43. 1904; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 43, 77, & 93. 1936; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 49 & 90 (1942) and ed. 2, 116 & 181. 1949; Mold., Résumé 144 & 450. 1959; Mold., Résumé Suppl. 9: 3. 1961; Mold., Fifth Summ. 1: 235 & 445 (1971) and 2: 866. 1971; Mold., Phytol. Mem. 2: 225 & 537. 1980.

A shrub; branches glabrous, with small petiolar spurs after the leaves have fallen, with a small supplementary bud plainly visible; leaves decussate-opposite; petioles 1--2 cm. long, glabrous; leaf-blades chartaceous or papyraceous, ovate-elliptic, 5--10 cm. long, 2.5--4.5 cm. wide, mostly about twice as long as wide, apically acuminate, marginally entire, basally plainly long-attenuate into the petiole, glabrous and shiny on both surfaces; inflorescence loosely pseudo-umbellate, the cymes very many-flowered, the ramifications glabrous or here and there finely downy; peduncles to 4 cm. long; bracts and bractlets narrow-lanceolate or awl-shaped, sessile, 2--4 mm. long, finely downy; calyx campanulate, about 3 mm. long, basally narrowed into the pedicel, 5-toothed to about 1/3 the length, externally finely downy, the teeth narrowly triangular or deltoid, about 1 mm. long, apically acuminate, basally 0.5 mm. wide; corolla-tube 6--8 mm. long, 1 mm. wide, the lobes broadly elliptic, about 3 mm. long and 2.5 mm. wide, apically obtuse.

This species is based on *Stuhlmann 7996* from Kondutschi, Tanganyika, Tanzania, collected in flower on May 9, 1894, and deposited in the Berlin herbarium, now destroyed. Baker (1900) cites only the

type collection, but Thomas (1936) adds *Braun 3648* from Tanganyika.

Gürke (1900) comments that "Habituell hat die Pflanze Ähnlichkeit mit *Cl. toxicarium* Baker, in dessen Nähe sie auch zu stellen ist. Diese Art hat jedoch behaarte Blätter und etwas grössere Kelche, deren Zähne breiter und nicht so lang zugespitzt sind."

The *E. Wall 54*, distributed as *C. glabratum*, actually is *C. glabrum* E. Mey., while *Peter 24343* is *C. incisum* Klotzsch.

Nothing further is known to me of *C. glabratum* beyond what is stated in its bibliography (above).

CLERODENDRUM GLABRUM E. Mey., Comm. Pl. Afr. Austr. 273 [as "*Clerodendron*"]. 1838; Steud., Nom. Bot. Phan., ed. 2, 1: 383. 1840.

Synonymy: *Clerodendrum capense* Donn. ex Steud., Nom. Bot. Phan., ed. 1, 207 nom. nud. 1821. *Clerodendron glabrum* E. Mey., Comm. Pl. Afr. Austr. 273. 1838. *Clerodendrum capense* Don ex Steud., Nom. Bot. Phan., ed. 2, 1: 382. 1840. *Ehretia triphylla* Hochst., Flora 27: 830. 1844. *Amerina triphylla* (Hochst.) A. DC., Prodr. 9: 513. 1845. *Clerodendron capense* Eckl. & Zeyh. ex Schau. in A. DC., Prodr. 11: 661 in syn. 1847 [not *C. capense* Walther, 1947]. *Clerodendron glabrum* Sond. ex Harv., Gen. S. Afr. Pl., ed. 2, 292. 1868. *Amerina triphylla* DC. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 106. 1893. *Clerodendron capense* D. Don apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893. *Clerodendron ovale* Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 298. 1900 [not *C. ovale* Klotzsch, 1862]. *Siphonanthus glabra* (E. Mey.) Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900. *Siphonanthus glabra* Hiern apud Thiselt.-Dyer, Ind. Kew. Suppl. 2: 172. 1904. *Clerodendrum capense* Ecklon & Zeyher apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76 in syn. 1936. *Amerina triphylla* Schau. ex Mold., Alph. List Inv. Names 4 in syn. 1942. *Clerodendron capense* Don ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Clerodendron ovale* Kunth ex Mold., Alph. List Inv. Names Suppl. 1: 6 in syn. 1947. *Clerodendron glabrum* var. *capense* Ecklon & Zeyher ex Mold., Résumé 263 in syn. 1959. *Clerodendrom glabrum* E. Mey. ex Menninger, 1960 Price List Flow. Trees [3] sphalm. 1960. *Amerina triphylla* A. DC. apud Palmer & Pitman, Trees South. Afr. 3: 1963 in syn. 1972.

Bibliography: Steud., Nom. Bot. Phan., ed. 1, 207. 1821; E. Mey., Comm. Pl. Afr. Austr. 273. 1838; Harv., Gen. S. Afr. Pl., ed. 1, 269. 1838; Steud., Nom. Bot. Phan., ed. 2, 1: 382 & 383. 1840; Hochst., Flora 27: 830. 1844; A. DC., Prodr. 9: 513. 1845; Walp., Repert. Bot. Syst. 4: 110--111 & 114. 1845; Schau. in A. DC., Prodr. 11: 661. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 19, 105, & 106. 1858; Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 257. 1861; Harv., Gen. S. Afr. Pl., ed. 2, 292. 1868; Schinz, Verhandl. Bot. Ver. Brandenb. 31: 206. 1890; Gürke, Engl. Bot. Jahrb. 18: 179. 1893; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 106, 560, & 561. 1893; Sims, Sketch Check-list Fl. Kaffr. 63. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1893; Wood & Evans, Natal Pl. 1 (1): pl. 45. 1898; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293, 297, 297, & 515. 1900; Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 218--220 & 225. 1901; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 172.

1904; Sim, For. Fl. Cape Colony 236, pl. 120, fig. 2. 1907; Sim, For. Fl. Portug. E. Afr. pl. 98. 1909; N. L. Britton, Fl. Bermuda 318. 1918; R. N. Parker, For. Fl. Punjab, ed. 1, 403. 1918; DeWild., Pl. Bequaert. 2: 264. 1922; R. N. Parker, For. Fl. Punjab, ed. 2, 403. 1924; Galpin, Bot. Surv. S. Afr. Mem. 7: 13. 1925; Good & Exell, Journ. Bot. Brit. 68, Suppl. 2: 140. 1930; Stapf, Ind. Lond. 2: 238. 1930; Watt & Breyer-Brandwijk, Med. Poison. Pl. Southeast. Afr., ed. 1, 154--155 & 230. 1932; Smuts, Kew Bull. Misc. Inf. 1933: 418. 1933; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 11, 25, 43, 76, & 93. 1936; Mold., Alph. List Comm. Vern. Names 23. 1939; Mold., Geogr. Distrib. Avicenn 3, 15, & 37. 1939; Mold., Prelim. Alph. List Inv. Names 5, 19, 21, 23, 25, & 40. 1940; L. H. & E. Z. Bailey, Hortus Second, imp. 1, 188. 1941; Mold., Suppl. List Comm. Vern. Names 5. 1941; Mold., Alph. List Inv. Names 2, 4, 16, 17, 19, 21, 24, & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 5, 19, 45--52, 72, & 90. 1942; Mold., Phytologia 2: 49. 1945; J. Hutchins., Botanist South. Afr. 363. 1946; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 106, 560, & 561. 1946; Mold., Alph. List Cit. 1: 23, 54, 72, 81, 137, 165, 174, 176, 206, 220, 234, 237, 275, & 297. 1946; Mold., Alph. List Inv. Names Suppl. 1: 6 & 7. 1947; Mold., Alph. List Cit. 2: 327, 407, 422, 429, 449, 620, 628, & 641. 1948; Neal, Gard. Hawaii, ed. 1, imp. 1, 644 (1948) and ed. 1, imp. 2, 644. 1949; L. H. Bailey, Man. Cult. Pl., ed. 2, 845 & 1051. 1949; Mold., Alph. List Cit. 3: 718, 748, 761, 762, 849, 902, & 942 (1949) and 4: 996, 1040, 1104, 1140, & 1193. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 9, 35, 116--121, 158, & 181. 1949; R. O. Williams, Useful Ornam. Pl. Zanzib. 61, 198, & 358. 1949; Mold., Phytologia 4: 45. 1952; Wild, Rhodes. Agric. Journ. 49: 289. 1952; Wild, Veg. South. Rhodes. Term. 11. 1952; Wild, Vict. Falls Handb. 158. 1953; Mold., Journ. Calif. Hort. Soc. 15: 87. 1954;Pardy, Rhodes. Agric. Journ. 52: 414. 1955; Wild, Rhodes. Agric. Journ. 52: 538. 1955; Wild, Observ. Veg. Sabi 8. 1955; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Ind. 1955: 63. 1956; R. N. Parker, For. Fl. Punjab, ed. 3, 577. 1956; Synge in Chittenden, Roy. Hort. Soc. Dict. Hort., ed. 2, 1: 504 & 505. 1956; Coates & Palgrave, Trees Cent. Afr. 427--[429]. 1957; Menninger, 1959 Price List [2]. 1958; Killick, Bot. Surv. S. Afr. 32: 50, 70, & 112. 1959; Mold., Résumé 12, 41, 49, 141, 144--146, 148--150, 152, 153, 161, 216, 234, 261--268, 272, 273, 284, 344, 426, & 450. 1959; Mold., Résumé Suppl. 1: 9 & 10. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 106, 560, & 561. 1960; Martin & Noel, Fl. Albany Bathhurst 92. 1960; Menninger, 1960 Price List Flow. Trees [3]. 1960; Mold., Résumé Suppl. 2: 8. 1960; Dale & Greenway, Kenya Trees 582 & 584. 1961; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 694. 1961; Menninger, Flow. Trees World 283. 1962; Mold., Résumé Suppl. 3: 28. 1962; Watt & Breyer-Brandwijk, Med. Poison. Pl. S. East. Afr., ed. 2, 517 & 1047--1048. 1962; F. White, For. Fl. North. Rhodes. 365 & 367. 1963; Huber in Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 2, 441 & 444--445. 1963; Mold., Résumé Suppl. 9: 3. 1964; Neal, Gard. Hawaii, ed. 2, 731. 1965; F. White, Webbia 19: 674. 1965; Mold., Résumé Suppl. 12: 6 (1965) and 13: 4. 1966; R. H. Compton, Journ. S. Afr. Bot. Suppl. 6: 66 ; C. A. Sm., Comm. Names S. Afr. Pl. 106, 439, 469, 498,

& 600. 1966; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. 1966: 56. 1967; Friedrich-Holzhammer in Merxmüller, Prodr. Fl. SWdw. Afr. 13 (122): 5. 1967; Mold., Résumé Suppl. 15: 8, 14, & 18. 1967; Moll, For. Trees Natal 139. 1967; J. M. Watt, Lloydia 30: 2 & 4. 1967; Mold., Résumé Suppl. 16: 8. 1968; Moll, Journ. S. Afr. Bot. 34: 75. 1968; Uphof, Dict. Econ. Pl., ed. 2, 137. 1968; Wild, Kirkia 7: 29 & 53. 1968; Gledhill, East. Cape Veld Fls. 201, fig. 2. 1969; Richards & Morony, Check List Fl. Mbala 237. 1969; Van der Schijff, Check List Vasc. Pl. Kruger Natl. Park 81. 1969; Farnsworth, Pharmacog. Titles 5 (11): v & title 15121. 1970; Fosberg, Atoll Res. Bull. 136: 109. 1970; Fosberg & Renvoize, Atoll. Res. Bull. 136: 64 & 152. 1970; Gillett, Numb. Check-list Trees Kenya 46. 1970; Stoddart, Benson, & Peake, Atoll. Res. Bull. 136: 127. 1970; Farnsworth, Pharmacog. Titles 5, Cumul. Gen. Ind. 1971; Long & Lakela, Fl. Trop. Fla. 738 & 935. 1971; Mold., Fifth Summ. 1: 28, 79, 92, 228, 235, 239, 240, 242, 247, 249, 251, 253--256, 258, 272, 358, 389, 438, 441, 444--446, 452, 454, 461, & 465 (1971) and 2: 491, 622, 866, & 970. 1971; Renvoize, Phil. Trans. Roy. Soc. B.260: 230. 1971; Palmer & Pitman, Trees South. Afr., ed. 2, 3: 1963--1965 & 1967. 1972; Venter, Journ. S. Afr. Bot. 38: 231. 1972; Altschul, Drugs Foods 248. 1973; Jacobsen, Kirkia 9: 172. 1973; L. H. & E. Z. Bailey, Hortus Second, imp. 18, 188. 1974; Gibbs, Chemotax. Flow. Pl. 3: 1753 & 1754 (1974) and 4: 2080. 1974; Mold., Phytologia 28: 442 & 448 (1974) and 31: 389 & 391. 1975; Renvoize, Kew Bull. 30: 151. 1975; L. H. & E. Z. Bailey, Hortus Third 285--286. 1976; Long & Lakela, Fl. Trop. Fla., ed. 2, 738 & 935. 1976; Mold., Phytologia 34: 261, 268, & 273. 1976; Venter, Journ. S. Afr. Bot. 42: 216 & 230. 1976; Mold., Phytologia 36: 39. 1977; Fosberg, Kew Bull. 33: 143--144. 1978; Isaacson, Flow. Pl. Ind. 1: 335. 1979; Fosberg & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Aldabra] 220--222, fig. 35 (3 & 4). 1980; J. T. & R. Kartesz, Syn. Checklist Vasc. Fl. 2: 466. 1980; Mold., Phytol. Mem. 2: 21, 71, 85, 218, 225, 228--230, 232, 237, 238, 240, 242, 243, 245, 247, 259, 341, 349, 373, 386, 388, 391, 392, & 537. 1980; Mold., Phytologia 50: 251 & 259. 1982; Reis in Lipp, New Pl. Sources Drugs 251. 1982; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 411 & 457--459. 1983; Mold., Phytologia 57: 338 & 458 (1985), 58: 181, 189, & 197 (1985), and 59: 259, 335, 346, 424, & 428. 1986.

Illustrations: Wood & Evans, Natal Pl. 1: pl. 45. 1898; Sim, For. Fl. Cape Colony pl. 120, fig. 2. 1907; Sim, For. Fl. Portug. E. Afr. pl. 98. 1909; Coates & Palgrave, Trees Cent. Afr. 428. 1957; Moll, For. Trees Natal 139. 1967; Gledhill, East. Cape Veld Fls. 201, fig. 2. 1969; Palmer & Pitman, Trees South. Afr. 3: 1964 & 1965. 1972.

A wide-spreading or sprawling, densely leafy, much-branched, deciduous or evergreen bush or half-climbing shrub, or small spreading tree, 1--12 m. tall, growing singly or in groups, the whole plant fetid or "smelling like cooked meat"; trunk single, upright, branched, to 30 cm. in diameter; sap colorless; outer bark grayish-white to brown or yellow-brown, thick or thin, pulverulent, rough, cracked in age; wood white or tinged with red-brown, fairly heavy (weight 43.1 lbs. per cu. ft.), hard (relative hardness 3.0), moderately strong, elastic (elasticity coefficient 331 tons; modulus of

rupture 3.96 tons), dense, close-grained; medullary rays fine, pores small, numerous, distributed irregularly in short radial lines; blaze white, streaked with yellow; crown spreading, leafy, often drooping; stems often numerous, simple or branched; branchlets slender or rather stout, obtusely tetragonal, very conspicuously lenticellate, the bark light-gray, usually glabrous or sometimes obscurely pulverulent when young; nodes indistinctly annulate; principal internodes 2--9.5 cm. long; leaves decussate-opposite, ternate, or quaternate, with an unpleasant feline odor when crushed; petioles slender, 0.9--2.5 cm. long, flattened and strigillose above, glabrous and rounded beneath, borne on a rather conspicuous, corky, and elongated cicatrix; leaf-blades firmly chartaceous or subcoriaceous, somewhat fleshy when fresh, dark-green or yellowish-green and glossy above, much lighter beneath, ovate or elliptic-ovate to oblong, 2.7--14 cm. long, 1.8--7.6 cm. wide, apically acute or acuminate to obtuse, marginally mostly entire or rarely with a few scattered teeth, basally broadly and abruptly acute or short-cuneate, glabrous above except for the midrib, glabrous and densely punctate beneath; inflorescence axillary in the uppermost leaf-axils and terminal, the cymes opposite or whorled, solitary, compound, very densely many-flowered, to 7.5 cm. long and 6 cm. wide, several times bifurcate, puberulent throughout; terminal panicles corymbose or subcorymbose to pyramidal or thyrsoid, densely congested, composed of 2--7 cymes; peduncles rather slender (or the terminal ones stouter), 1.5--3.5 cm. long, minutely puberulent or subglabrate; pedicels very slender, 2--10 mm. long, puberulent; bractlets and prophylla linear or linear-lanceolate, 2--6 mm. long, glabrous or strigillose; flowers richly fragrant, the perianth pentamerous; calyx campanulate, 2--6 mm. long, externally glabrous or puberulent and with numerous sessile spherical glands, the rim 5-toothed, the teeth short, subulate-triangular or -lanceolate, 1.5--3 mm. long, apically acute; corolla hypocrateriform, white or frequently tinged with pale-pink, the tube straight, 5--12 mm. long, externally finely puberulent and glandulose, the lobes obovate, 3--4 mm. long, subequal, reflexed in age, apically rounded-obtuse, marginally somewhat wavy; stamens 4--6, twice as long as the corolla-lobes; style subulate, long-exserted, partially persistent on the fruit; stigma bifid; ovary oblong, externally glabrous, imperfectly 4-celled and each cell 1-ovulate or 2-celled and each cell 2-ovulate; fruiting-calyx accrescent, 5--7-toothed; fruit drupaceous, small, globose or subglobose, 8--12 mm. long and wide, oblique, shiny, at first green, then white or cream-color to yellowish, black when mature, externally glabrous, centrally mucronate, 4-furrowed, 1--4-seeded, usually easily dividing into two 1-seeded bony pyrenes of which one is often infertile.

This species is based on an unnumbered Drège collection from "ad ripas Basche, alt. 500 ped." in South Africa. It is native to tropical and southern Africa from Tanzania, Kenya, and Angola to Malawi, Mozambique, and South Africa, also in the Comoro and Seychelles Islands; widely cultivated for hedges and for ornament in tropical and subtropical parts of both hemispheres and tending to escape and become naturalized. It is widely utilized as a hedge plant in Sierra

Leone and arrow-shafts are made of its stems. In South Africa a decoction of the leaves, mixed with milk, is used as a purgative and vermifuge for calves. In Tanzania the leaves and twigs are made into a steaming infusion over which fever patients bend or sit. Many African tribes rub the leaves over their hands and face before attempting to take honey from bees' nests to prevent being stung. In Zululand and Zaire the leaves are used to produce a cough and fever remedy and an infusion from the roots is taken orally in cases of snakebite, especially that of the mambas. The Zulu also use the leaf as one of their remedies against internal parasites such as tapeworm and roundworm, while an infusion of the juice of the roots with *Iboza riparia* N. E. Br. is taken as an emetic and expectorant in the treatment of various rheumatic conditions and stomach-ache. The Sotho employ the leaf infusion in cases of colic, while a leaf decoction applied to the wounds is supposed to inhibit the development of blowfly and other maggots in animal wounds. Others place the pounded leaves in the armpits and on the neck of children suffering from convulsions in order to induce them to sleep. An infusion of the root-bark is used as a vermifuge for donkeys and it is believed by some practitioners that the odor of the plant will repel beetles. In the Transvaal the leaves, in solution, are employed as a disinfectant and in the treatment of coughs, colds, and colic. The wood is said to make excellent timber. The Zulus use the wood as tinder for starting fires.

The leaves of this plant are often infested by the fungus, *Meliola clerodendricola* P. Henn., in Sierra Leone (e.g., on *Deighton 1225*).

Sim describes *Clerodendrum glabrum* as "A small and often bushy evergreen tree, 15 feet in height, 6--12 inches in diameter, with grey bark often damaged by insects.....It occurs in the coast districts [of the Cape] from Port Elizabeth to Natal, also more inland in Transvaal and Tropical Africa."

Galpin (1925) describes the species as a "Tree 15 to 20 feet high; stem about 9 inches in diameter. Only attains arborescent size along the northern borders of the flats in sandy loams, and I have no local information as to its timber value"; Sim asserts that it is "seldom used". Parker (1924) describes the plant as "Indigenous to tropical and South Africa. Occasionally grown in gardens in the plains. This plant has much the appearance of a *Ligustrum*."

Gürke (1893) notes that "Einige Ähnlichkeit, besonders in Bezug auf die Blattform besitzt die vorliegende Art [C. *formicarum*] mit dem in Capland einheimischen C. *glabrum* E. Mey.; doch ist dieser durch die sehr lang zugespitzten Kelchzipfel verschieden."

Palmer & Pitman (1972) tell us that C. *glabrum* "is a distributed species of coastal bush and forest, often on stream banks, of bushveld, and in South West Africa of mopane scrub, extending from the eastern Cape [of Good Hope], through Natal and Zululand -- from the coast to the Frakensberg -- and Swaziland, to the Transvaal, Botswana, and Ovamboland in South West Africa, and northwards to tropical Africa. It is a widespread species in the Transvaal, and about January, when it is usually in bloom, it can be noted along many roads from Pretoria northwards through the Waterberg. It may be a

shrub, a small tree -- on the coastal dunes short and deformed -- or a tree up to 12 m high in forest; either deciduous or evergreen; with a trunk up to about 30 cm in diameter.....This is one of the rain or weeping trees of South Africa. Small insects known as froghoppers suck the moisture from the branches and this forms a spittle and later drops of 'water' that fall to the ground below. Two butterflies which are known to breed on the tree are the Purple Brown Hairstreak, *Hypolycaena phillipus* and the Natal Red Bar, *Spindasis natalensis*, which is particularly common along the Natal coast. The former....breeds on the leaves and females may often be seen searching for a suitable plant on which to lay their eggs. The larvae of the Natal Red Bar.....live in tubes in the stalks which are formed by ants eating out the pith, and from these they emerge at night to feed upon the leaves. The verbena tree, in particular the form with sweet-smelling flowers, makes a good garden tree and may be grown from seed or cuttings. It is fast-growing and young trees reproduced from cuttings often flower when 30--90 cm high -- at about one year of age.

Collectors have found *Clerodendrum glabrum* growing in sandy soil as well as in black or rich red-brown loam and even in copper-bearing soil in areas of 500 mm. annual rainfall and in cultivated soil of hedges, often in old degraded areas of native culture, in thickets and secondary growth, in churchyards and bushy sandy places, sandy seaside areas, on maritime dunes and in coastal bush and forest and their margins, on anthills, in coconut plantations, on riverbanks and along streamlets, in light open forests and coppices, in white sandy soil of mopane scrub, in semi-karroid areas, on wooded kloops, and in closed, dense, high, and xerophilous forests, as well as open, mesic, deciduous forests, from sealevel to 1930 m. altitude, in anthesis in every month of the year, and in fruit in January, March, May, June, August, November, and December.

Hornby refers to the plant as "widely distributed [in Mozambique] along with *Spirostachys*, *Sideroxylon*, *Cussonia* and many other genera", while Balsinhas found it growing on littoral dunes with *Aloë*, *Euphorbia*, *Commiphora neglecta*, *C. schlechteri*, *Bridelia* sp., etc. in the same country, as well as with *Mimusops* sp., *Diospyros rotundifolia*, *Acacia kraussiana*, etc. Bayliss refers to it as "local" in Cape Province, but Gledhill (1969) reports it "common in dune bush and coastal bush of Alexandria and Bathurst divisions and also in Albany. Occurs also in Natal." In Natal it is said by Moll (1967) to occur in "Forest margins and sometimes a canopy tree in disturbed forests". Acocks calls it a "frequent small tree" in Cape Province, while Scheepers refers to it as a "rather infrequent ruderal" in the Transvaal. Hiern (1900) speaks of it as "not uncommon" in Loanda, Angola.

Killick (1959) avers that the plant is only "occasional in forests and in mixed communities around sinks" in South Africa; Smuts (1933) describes it as "very common in sandstone soil" in the Transvaal. Frazier describes it as a "common woody shrub to 2 m. tall inland of coastal sand dunes at the edge of coconut plantations" in Tanzania. On Zanzibar island Faulkner found it "in open bush formation a short distance from the foreshore in white sand". Compton

reports it from the "middle veld" in Swaziland, while Jacobsen (1973) refers to it as "rare in thickets on dolomite outcrops" in Zimbabwe. Stoddart and his associates found it in the sand beach community of mixed native and introduced species on Assumption island. Huber (1963) tells us that it has been introduced in western tropical Africa as a hedge plant. My wife and I have found it in cultivation in Florida, in the Hawaiian Islands, and in Sri Lanka. In the Kruger National Park it is "associated with scrub on the banks of dongas and on anthills" according to Van der Schijff.

Dale & Greenway (1961) aver that the species is found only in the coastal districts of Kenya, citing *Dale 3571*, *Graham 1954*, and *Scott-Elliot 6103*.

A key to help distinguish *C. glabrum* from its non-capitate relatives is given under *C. dusenii* Gürke in the present series of notes (59: 335); another, distinguishing it from other commonly cultivated taxa, is given under *C. bethunianum* Low (58: 195--198), and others under *C. discolor* (Klotzsch) Vatke (59: 259--260) and *C. indicum* (L.) Kuntze.

The corollas of *Clerodendrum glabrum* are usually described as "white" [e.g., Dale & Greenway (1961), Huber (1963), and Venter (1972) and on *Barbosa & Balsinhas 5532*, *Barbosa & Lemos 7578 & 7841*, *Edwards 2933*, *Estêves de Sousa 160*, *Faulkner 671*, *1690*, & *2552*, *Forbes 631*, *Frazier 1125*, *Galpin 774*, *Hornby 2556*, *Herb. Bailey s.n.*, *Lemos & Balsinhas 17*, *78*, & *91*, *McClintock s.n.*, *Marques 2496*, *Rodin 4076*, *Schijff 4218*, *Schlieben 2635*, *Suehiro s.n.*, *Tanner 2306*, *3031*, *3325*, *3550*, & *3671*, *Torre 1731*, *Welwitsch 5625*, *5651*, & *5710*, *Wild 5864*, and *Wood 1204*], but are said to have been "pure-white" on *Winter & Giess 7011*, "white-cream" on *Sidey 3879*, "white or pinkish" by the Baileys (1976), "pale-pink" on *Bayliss 4400* & *6073* and *Scheepers 848*, "pink" on *Acocks 10976*, *Compton 31271*, and *Natal Herb. 12121*, "cream-pink" on *Sidey 3157* & *3620*, "white, tube pinkish" on *Jaasund 2068*, "pale-purple on white" by Martin & Noel (1960), "purplish-mauve on white" by Gledhill (1969), "pale-violet" on *Torre 2628*, and "violet" on *Wall 54*.

Common and vernacular names reported for *C. glabrum* are "bitterblaar", "bush clerodendrum", "bush glorybower", "huilboom", "ifamu", "kuwakilo", "manuelambeua", "manunhelambeua", "manunhelambeva", "mlanyuni", "mohlokohloko", "mongkangkani", "mothlokuthloku", "motlhokutlkoku", "mselenkanga", "mtiwa-nyuni", "mtozatoza", "mukula-usihu", "munukha-tshilongwy" [=smells of cattle dung], "palo de perico", "stinkblaar", "stinkboom", "truitjie-roer-my-nie", "umphehlacwathi" [=twirl the fire sticks], "umkukambiba", "umqangazane", "um-qangazane", "umqagazani", "umqupongo", "umqaqongp", "um-quaquane", "umquaquane", "um-quoqongo", "umqwaqu", "umqwaqwanam", "uphehlacmathi", "verbena tree", and "weeping tree".

Gibbs (1974) reports negative results from the HCl/methanol test and the absence of syringin from the stems and of cyanogenesis from the leaves.

Curran reports finding a stem diameter of 6 inches on a 20-foot tree of this species. Schijff and Bayliss both refer to the flowers as "unpleasant" scented, while Rodin even goes so far as to describe them as having a "skunk-like odor". Most other writers and collec-

tors assert that the flowers are "beautifully fragrant". Palmer & Pitman imply that there is a pleasantly fragrant form of the species and one that is not. The *Degener s.n.* and *Forbes 631* collections, cited below, represent a very broad-leaved form.

Meeuse, in commenting on *Transvaal Mus. 15759*, avers that it is "Related to *C. glabrum*. Keys out to *C. glabratum* in Thomas' key, but calyx-teeth are erect and I can find remains of petioles on thigs. I feel inclined to make it a var. of *C. glabrum*." *Dale 2116* and *Estêves de Sousa 160* are intermediate between *C. glabratum* and *C. glabrum*, with the remains of the petioles conspicuous. *Warmela 53310/6* is also intermediate. *Pedro & Pedrogar 1432* is rather typical *C. glabrum*, but the petiolar remains are quite distinct and the leaf-blades are very thin (rather than thicker in texture as is usual). *Gomes e Sousa 1668* seems to be typical *C. glabrum*, but, again, the petiolar remains are very obvious on the stems.

The fruit of *Clerodendrum glabrum* is eaten by birds such as white-eyes and bulbuls in South Africa. The leaves on *Tanner 2847* are described as having been "thick, dull green, flaccid".

The Baileys (1948) refer to the species as "adapted to S. Calif. and S, Fla. [U.S.A.]" in life zone 9, but in England, according to Synge (1956), it must be grown in a greenhouse. Williams (1949) lists it from Zanzibar and Pemba islands. The Morales Ruano collection, cited below, seems to have come from wild (naturalized) material -- its accompanying label gives no indication that it was taken from a cultivated plant. Pencilled floral sketches accompany *Suehiro s.n.* *Gomes e Sousa 1711* is said to match perfectly *Welwitsch 5625, 5627,* & *5721* in the British Museum herbarium. *Schlechter 6285* seems to be a topotype collection, from Bashee, and is, indeed, an excellent match for the type collection from that locality. *Krauss 100* is the type collection of *Ehretia triphylla*.

Pearson (1901) cites *Cooper 3496, Drège s.n., Galpin 2937,* and *MacOwan 748* from Cape Province, South Africa, *Galpin 774, Herb. Wood 4170,* and *Thorncroft 48* from Transvaal, and *Bowker 549, Cooper 1220, Drege s.n., Gerrard 638* & *726, Gerrard & McKen 661, Hewitson s.n., Krauss 100,* and *Wood 7551* from Natal.

Thomas (1936) cites the following collections: from Mombasa - *Scott Elliot 6103;* from Tanganyika - *Busse 2310* & *2433, Hildebrandt 1298, Holst 3076, Holtz 520, 1916, 2539,* & *2730, Lyne 47, Schlieben 2635,* and *Stuhlmann 192, 293, 7375, 7481, 7522, 7558, 7559, 7648, 7655, 7689, 7691, 7703, 7705, 7718, 7744, 7780, 7841, 7896, 7899, 8452, 8497, I.628,* & *I.632;* from Mozambique - *Kirk s.n., Peters s.n., Rodrigues de Carvalho s.n.,* and *Schlechter 12004;* from Natal - *Bachmann 1148* & *1150, Landauer 97, Rudatis 383* & *1825,* and *Wood 939* & *6661;* from Cape Province- *Britten s.n., Drège 3485* & *s.n., Ecklon s, n.,* and *Schlechter 6285;* and from Angola - *Gossweiler 157* and *Welwitsch 5625, 5651, 5657, 5721,* & *5725.*

Good & Exell (1930) cite *Gossweiler 157, 463,* & *1529* from Angola, asserting that the species is "Widespread in Tropical and South Africa". Baker (1900) cites *Scott-Elliot 6103* from Mombasa, *Monteiro s.n.* and *Welwitsch 5625, 5651, 5656, 5657, 5710, 5721, 5752,* & *5753* from Angola, *Kirk 20* from French Island, *Kirk s.n.* from Tanzania, and *Forbes s.n.* and *Kirk s.n.* from Mozambique. Hiern (1900) cites

the same Welwitsch numbers, all from Loanda, as well as his *no. 5655* as "perhaps that species" from Icolo e Bengo, Angola.

Reis & Lipp (1982) cite *Tanner 3671* from Tanganyika; Van der Schijff (1969) cites his *nos. 170, 597, 1608, 1744, 3445,* & *4218* from the Kruger National Park; Friedrich-Holzhammer (1967) cites *Winter & Giess 7011* from Namibia; Altschul (1973) cites *Watt & Brandwyk 1731* from South Africa; and Jacobsen (1973) cites his *no. 3657* from Zimbabwe.

Huber (1963) cites *Deighton 3349* & *4623* from Sierra Leone, giving the species' natural distribution, as known to him, as "From Mombasa southwards to the eastern Cape Province; also in Angola." Hutchinson (1946) cites his *no. 2449* from South Africa.

It should be noted here that the *C. ovale* Klotzsch, *C. ovalifolium* Engl., and *C. rehmannii* Gürke, often included in the synonymy of typical *Clerodendrum glabrum*, actually belong in the synonymy of *C. glabrum* var. *vagum* (Hiern) Mold., as does also *C. glabrum* var. *ovale* H. H. W. Pearson; *C. glabrum* var. *angustifolium* E. Mey., however, is regarded by me as a valid variety (q.v.).

For some reason not obvious to me, Thomas (1936) regards *Drège 3485* [Key, 8-6-1832] as the type collection of *Clerodendrum glabrum*.

The Meyer (1838) work, in which *C. glabrum* was first described, is usually cited in bibliographies as "1: 237" and the year of publication as "1835", "1836", or "1837" [as, for instance, by Hiern (1900)], but page 237 occurs in fascicle 2 of two continuously paged fascicles and pp. 173--326 were not actually published until January 14 and 20, 1838.

Material of typical *Clerodendrum glabrum* has been misidentified and distributed in some herbaria as *C. eriophyllum* Gürke, *C. glabratum* Gürke, *C. ovale* Klotzsch, *C. ovale* Kunth, *C. phlomidis* L., *C. trichotomum* Thunb., *C. trichotomum* var. *fargesii* (Dode) Rehd., *Volkameria aculeata* L., *Nuxia congesta* R. Br., and even *Rubiaceae* sp.

On the other hand, the *Faulkner 671, Schlieben 2635,* and *Sidey 3157,* distributed as typical *C. glabrum,* actually represent *C. glabrum* var. *angustifolium* E. Mey., while *Hnatiuk 731313* and *Wood 1623* & *1624* are *C. glabrum* var. *minutiflorum* (J. G. Baker) Fosberg, *Dahlstrom 1517* & *1942, Edwards 1553, Galpin 9059, Gibson 3, Govt. Herb. Salisb. 33103, Greenlow s.n., Meebold 12835* & *12842, Read 1019, Schlieben 9204,* and *Werdermann & Oberdieck 1805* are *C. glabrum* var. *vagum* (Hiern) Mold., *Walther s.n.* [July 1934] is *Calodendron capense* Thunb. in the *Rutaceae,* and *Haptrom & Lindberg s.n.* is something in the *Myoporaceae.*

Citations: FLORIDA: Dade Co.: *Buswell s.n.* [Miami, Jan. 17, 1937] (Bu, Ws), *s.n.* [Miami, Feb. 7, 1937] (N, N, N, N), *s.n.* [May 15, 1937] (Bu); *Herb. N. Y. Bot. Gard. acc. 2304* (N); *Phillips 1906* (Tu--79038); *Small & Alexander s.n.* [Miami, May 15, 1937] (H--83119). GUATEMALA: Sacatepéquez: *Morales Ruano 1374* (F--605688, Ld--photo, N, N--photo). BERMUDA ISLANDS: Main: *O. Degener s.n.* [Aug. 3, 1921] (A, Ms). TANZANIA: Tanganyika: *Busse 2360* (Br), *2433* [Peter 51872] (B); *Faulkner 1690* (S); *Frazier 1125* (W--2810810); *Jaasund 2068* (Go); *J. Proctor 2504* (N); *Tanner 2306* (Ba, Mi, N), *2847* (Ba), *3031* (Ba, N), *3325* (Ba, Mi, N), *3550* (N, Na), *3671* (Ba, Ca--1218827, N). ZAN-

ZIBAR: *Faulkner 2552* (S); *E. H. L. Krause 16807* (B), *16808* (B). KENYA: *Dale 2116* (Af), *3571* (Br), *3804* (Br); *Napier 6247* (Br); *Wall 54* (Ew). MALAWI: *Stolz 1166* (Af, Cp, N, N--photo, S, S). MOZAMBIQUE: Inhambane: *Gomes e Sousa 1668* (Af, Br), *1711* (Br, Ul); *Torre 2648* (Ul). Gazaland: *Herb. Gazaland Exped. s.n.* [July 1915] (Ld), *s.n.* [VIII.1915] (Ul); *Grandvaux Barbosa & Lemos 7826* (Ul), *7841* (Ul); *Lemos & Balsinhas 78* (Ul), *91* (Ul); *Torre 6675* (Ld, Ul); *Transvaal Mus. Herb. 15759* (Tm). Lourenço Marques: *Balsinhas 278* (Ul), *724* (Ul), *735* (Ul); *Borle 326* (En); *Connell s.n.* (Af); *Estêves de Sousa 160* (Af); *Figueuredi Gomes e Sousa 3776* (S); *Grandvaux Barbosa & Lemos 7578* (Ul), *8666* (Ul); *Herb. Lab. Quim. Serv. Saúde 39201* (Ul); *Hornby 2556* (Rh); *Junod 122* (Ul); *Lemos & Balsinhas 17* (Ul); *Marques 2496* (Mu); *Schlechter 12004* [Herb. Then. I.2927] (B, Br, L, S, Vt, W--553350); *Sousa 160* (Ul); *Torre 1731* (Ul), *2502* (Ul), *7586* (Ul). Zambezia: *Wild 5864* (Ul). Province undetermined: *Barbosa & Balsinhas 5532* (Ul); *Pedro & Pedrogar 1432* [Sul de Save] (Af). NAMIBIA: *Rodin 9050* (Mu); *Winter & Giese 7011* (Mu). BOTSWANA: *Pole-Evans 3231* (Cb). SWAZILAND: *Compton 31271* (Mu); *Kemp 694* (W--2781905). SOUTH AFRICA: Cape Province: *Acocks 10976* (Af); *Bayliss BS.4400* (Ba, N, W--2616805), *6073* (Ba, N); *Bowie s.n.* [Albany] (Bm); *Drège s.n.* [Basche] (L--isotype, N--photo of isotype, S--isotype), *s.n.* [Key Isl.] (N--photo, S, S); *Ecklon s.n.* [10.3] (L); *Ecklon & Zeyher s.n.* [Uitenhaaf] (S); *E. P. Phillips 177* (Mu--4058, Mu--4221); *Schlechter 6285* (Af, Br, Cb, S); *Sidey 3620* (W--2410037); *C. A. Smith 3809* (Cb); *Thorncroft 48* [Natal Herb. 4705] (Na); *Wilkes s.n.* [Cape of Good Hope] (W--41181). Natal: *D. Edwards 2933* (Mu); *Forbes 631* [Natal Herb. 21009] (Ms, Na); *Gerstner s.n.* [Natal Herb. 22611] (Na); *Krauss 100* (Bm, E--140859, Ld--photo, Mu--65, N--photo); *Kuntze s.n.* [Clairmont 10/ 3/94] (N, W--554738); *Natal Herb. 966* (Na), *12121* (Na); *Peter 45290* [V.11] (B); *Sidey 3879* (W--2552756); *O. West 879* (Cb); *J. M. Wood 939* (W--206542), *1204* (Na--5701), *6661* (Na--7645), *10978* (Vi). Transvaal: *Breyer s.n.* (Tm--20940); *Dahlstrand 616* (Go); *Galpin 774* (Ka--92274, Ld, Ld, S); *Kassner 1334* (Br); *Krige 182* (Af); *Rodin 4076* (Ba); *Scheepers 848* (Mu); *Schijff 4218* (B); *Schlechter 6285* (Ca--299094, Cb); *Schlieben & Strey 8304b* (Mu); *Strey 3562* (Mu); *Thorncroft 42* [Herb. Transvaal Mus. 9622] (Cb); *Warmela 54410/6* (Af); *O. West 122* (S). RÉUNION ISLAND: *Lotsy T.11* (Mu). INDIA: Bombay Island: *Herb. Blatter 15039* (Xa). HAWAIIAN ISLANDS: Oahu: *Suehiro s.n.* [Aug. 4, 1939] (Mu). CULTIVATED: Australia: *M. S. Clemens 43441* (Mi). Bermuda: *Bailey, Whetzel, Degener, & McCallan 121* (Ba), *s.n.* [Aug. 3, 1921] (Ba), *s.n.* [Montrose, Mar. 1, 1922] (Ba, Ld--photo, N--photo); *Brown, Britton, & Wortley 1641* (B, K, N). Brazil: *Curran 337* (W--920213); *Glaziou 6653* (B, Cb, Cp, K, N, P). California: *McClintock s.n.* [West Los Angeles, Sept. 4, 1945] (Gg--361161, N), *s.n.* [Oct. 24, 1945] (Gg--361162); *McClintock, Spaulding, & Spaulding s.n.* [October 25, 1945] (N); *Walther 854* (A, Ba, Gg--170500), *s.n.* [Santa Monica, Aug. 27, 1927] (F--647688), *s.n.* [Santa Monica, Sept. 1928] (Gg--159787). Florida: *Herb. Bailey s.n.* [Royal Palm Nurseries, June 19, 1937] (Ba). Hawaiian Islands:*Caum s.n.* [6/11/32] (Bi); *Isenberg s.n.* [June 19, 1941] (Bi); *A. R. Moldenke 93* [H. N. Moldenke 21866] (Mi); *H. N. & A. L. Moldenke 21842* (Mi); *Suehiro s.n.* [Aug 4, 1939] (Bi, Bi). In-

dia: *G. L. Shah 4868* (Xa). Java: *H. Hallier C.126* (Le, X, X). Sri Lanka: *Collector undetermined 125/49* (Pd). MOUNTED ILLUSTRATIONS: Sim, For. Fl. Colony Cape pl. 120, fig. 2. 1906 (Ld).

CLERODENDRUM GLABRUM var. *ANGUSTIFOLIUM* E. Mey., Comm. Pl. Afr. Austr. 273 [as "*Clerodendron*" & "*angustifolia*"]. 1838; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76 in syn. 1936; Mold., Phytol. Mem. 2: 245, 386, & 537. 1980.

Synonymy: *Clerodendron glabrum* β *angustifolia* E. Mey., Comm. Pl. Afr. Austr. 273. 1838. *Clerodendron glabrum angustifolia* Sims, Sketch Check-list Fl. Kaffr. 63. 1894. *Clerodendrum glabrum* var. *angustifolia* E. Mey. apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76 in syn. 1936. *Clerodendron glabrum* var. *angustifolium* E. Mey. ex Mold., Prelim. Alph. List Inv. Names 20 in syn. 1940.

Bibliography: E. Mey., Comm. Pl. Afr. Austr. 273. 1838; Harv., Gen. S. Afr. Pl., ed. 2, 269. 1838; Sims, Sketch Check-list Fl. Kaffr. 63. 1894; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76. 1936; Mold., Prelim. Alph. List Inv. Names 20. 1940; Mold., Alph. List Inv. Names 17. 1942; Mold., Résumé 263. 1959; Mold., Fifth Summ. 1: 445. 1971; Mold., Phytol. Mem. 2: 245, 386, & 537. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 458. 1983.

This variety differs from the typical form of the species in having the leaf-blades ovate-lanceolate and only half as large. It is based on an unnumbered Drège collection from "Ad ripas fluvii Key, alt. 500 ped. (V,b)", Cape Province, South Africa -- probably the sheet in the Leningrad herbarium marked "var." on the label represents this same collection. Thomas (1936) does not regard the variety as sufficiently distinct to be regarded as valid, but does not cite the aforementioned collections.

The material of this taxon cited below has previously been regarded and distributed as typical *C. glabrum* E. Mey.

Citations: TANZANIA: Tanganyika: *Faulkner 671* (S). CHOLE ISLAND: *Schlieben 2635* in part (W--2214364). MAFIA ISLAND: *Schlieben 2636* in part (B). SOUTH AFRICA: Cape Province: *Drège s.n.* ["var."] (L--isotype).

CLERODENDRUM GLABRUM var. *MINUTIFLORUM* (J. G. Baker) Fosb., Kew Bull. 33: 193. 1978.

Synonymy: *Clerodendron minutiflorum* J. G. Baker, Kew Bull. Misc. Inf. 1894: 150. 1894. *Clerodendrum glabrum* "sensu Fosberg" ex Fosb. & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Alcabra] 222 in syn. 1980.

Bibliography: J. G. Baker, Kew Bull. Misc. Inf. 1894: 150. 1894; Schinz, Abhandl. Senckenb. Naturf. Gesellsch. 21: 90. 1897; Durand & Jacks., Ind. Kew. Suppl 1, imp. 1, 101. 1901; Voelzkow, Abhandl. Senckenb. Naturf. Gesell. 26: 552. 1902; Hemsl., Kew Bull. Misc. Inf. 1919: 128. 1919; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 122 & 182. 1949; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 101. 1959; Mold., Résumé 155 & 451. 1959; Fosberg & Renvoize, Atoll Res. Bull. 136: 64, 109, & 152. 1970; Fosberg, Phil. Trans. Roy. Soc. B.260: 218 & 225. 1971; Mold., Fifth Summ. 1: 258 (1971) and 2: 869. 1971; Ren-

voize, Phil. Trans. Roy. Soc. B.260: 230. 1971; Renvoize, Kew Bull. 30: 151. 1975; Fosberg, Kew Bull. 33: 143--144. 1978; Fosberg & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Aldabra] 220--222, fig. 35 (3 & 4). 1980; Mold., Phytol. Mem. 2: 247, 392, & 537. 1980; Mold., Phytologia 50: 251 & 259 (1982) and 58: 189. 1985.

Illustrations: Fosberg & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Aldabra] 221, fig. 35 (3 & 4). 1980.

An erect deciduous shrub or small straight tree, to 5 m. tall; branchlets slender, rather pale, the younger portions pale-yellowish or cream, pilose or tomentulose, the indument varying in density, lenticellate; lenticels white; nodes prominent; principal internodes abbreviated; leaves sparse, soft, decussate-opposite to alternate or ternate (often on the same plant), distinctly petiolate, usually clustered at the tips of the branchlets; petioles slender, 1--2 cm. long; leaf-blades ovate to elliptic, 5--9 cm. long, 3--6 cm. wide, green or light-green to gray-green on both surfaces, often nigrescent in drying, apically acuminate or more rarely acute or even rounded, marginally entire, basally acute to attenuate or obtuse to subcordate, frequently sickle-shaped and conduplicate, subglabrous on both surfaces, on sterile shoots sometimes larger, more broadly ovate and basally subcordate; inflorescence mostly terminal, the cymes small, dense, 2--4 cm. long and wide, slender, irregularly branched, tomentellous-pubescent or pilose throughout, occasionally some in the upper leaf-axils; pedicels short; flowers strongly fragrant; calyx campanulate, 2--3 mm. long, externally woolly, the rim subtruncate to very shallowly dentate or lobed, the teeth minute, deltoid; corolla white, hypocrateriform, externally more or less minutely pubescent, the tube cylindric, 5--6 mm. long, 1 mm. wide, often almost 3 times as long as the calyx, the limb 2--4 mm. wide, the 5 lobes oblong, 2 mm. long, 1 mm. wide, apically rounded or obtuse; stamens 4, exserted about 5 mm. from the corolla-mouth; pistil single, elongate; style equaling the stamens, apically purple; stigma shortly bifid; fruiting-calyx accrescent, spreading to almost patelliform, persistent, stiff; fruit drupacepus, orange-yellow or orange, globose to obovoid, 4--6 mm. long and wide, apically rounded to papilliform and glabrous; seeds solitary in each cell, turbinate, about 7 mm. long and 4 mm. wide.

This variety is based on an unnumbered W. L. Abbott collection from Aldabra, deposited in the Kew herbarium. Fosberg & Renvoize (1980) describe the calyx as "2--3 cm long", but this is obviously an unfortunate typographic error -- "cm" instead of "mm".

Fosberg (1978) comments that *C. glabrum* is "An extremely variable African species with a very wide distribution, extending over the whole of southern Africa, north to Angola in the west and north through East Africa to Kenya and Uganda; missing from Madagascar but possibly represented there by *C. humbertii* Moldenke, which seems similar in many respects. *C. glabrum* is found in one of its forms on Chole Island, near Mafia. This species varies widely in leaf size and shape, as well as in the density and nature of the indument of the young parts, inflorescence, and flowers. *C. minutiflorum* Baker seems to fall well within this range of variation, so that it is appropriate to combine the two. The only feature noted in which

they rather consistently differ is in the margin of the calyx, which in African specimens has prominent triangular to triangular-acuminate lobes, while in Aldabra material it is from subtruncate to minutely denticulate or with very low scarcely denticulate lobes. This, with a tendency toward wider, sometimes even subcordate, leaves, seems to warrant maintaining it in varietal rank. A number of varieties have been proposed for mainland African plants, mainly on leaf characters, but none matches this island population." He and Renvoize (1980) assert that the Aldabra plant is "A constituent of the inland scrub communities. Flowers mainly during the wet season, but responds to unseasonal rains. A favourite food plant of tortoise."

There appear to be two forms of the variety -- one is a form whose leaves are very thin and turn black in drying, usually remaining perfectly flat in pressing (e.g., *Fosberg 48701* & *48836*, *Fosberg & McKenzie 49644*, and *Frazier 40*); the other is a form whose leaves remain gray-green in drying, are thicker in texture, and tend to be conduplicate (e.g., *Fosberg 48747*, *48803*, *48938*, *49149*, *49207*, *49371*, *49391*, *49400*, *49491*, & *49746*, *Fosberg & Grubb 49155*, and *Frazier 708*).

Recent collectors have encountered this plant on sandy shores, the shores of lagoons, in guano pits, and in mixed scrub on limestone, at or near sealevel, in flower from November to February, and in fruit in January. On South Island Fosberg reports it "Very local in deep pits and fissures in prominent champignon near the coast"; on West Island Wood found it "locally common". Ridgway asserts that the plant has a "strong, sharp, attractive perfume to the flowers and leaves".

The corollas are said to have been "white" on *Renvoize 961* and *Wood 1624* and "white or cream" on *Ridgway 110*. Wood reports that his *no. 1623* exhibits anthers that are fertile and exserted, while on his *no. 1624* they are sterile and included.

Fosberg (1978) cites (in addition to the collections cited below) the following: *Dupont 51*, *Fryer 77*, and *Thomasset 251* from Aldabra; *Frazier s.n.* from Mentor; *Dupont 105* and *Stoddart 1069* & *1103* from Assumption; *Thomasset s.n.* from Cosmoledo; and *Veevers-Carter 110* from Astove.

Material of this variety has been misidentified and distributed in some herbaria as typical *C. glabrum* E. Mey.

Citations: COMORO ISLANDS: Aldabra: *Abbott s.n.* (Ld--photo of isotype, W--286411--isotype); *Hnatiuk 731313* (W--2834336). Assumption: *Frazier 708* (W--2878696). South: *Fosberg 48938* (W--2878407), *49149* (N, W--2878421), *49207* (W--2878408), *49371* (W--2878380), *49391* (W--2878396), *49400* (W--2878395); *Fosberg & Grubb 49155* (W--2878381); *Fosberg & McKenzie 49644* (W--2878394); *Frazier 40* (W--2878695); *Hnatiuk s.n.* [Cinq Cases, 26/3/74] (W--2834345: *Renvoize 961* (W--2835358), *1013* (W--2940261). West: *Fosberg 48701* (W--2878409), *48747* (W--2878416), *48803* (W--2878415), *48836* (W--2878405), *49491* (W--2878404); *Hnatiuk 731501* (W--2834337); *D. Wood 1623* (W--2835360), *1624* (W--2835359). SEYCHELLES ISLANDS: Astove: *Fosberg & Graham 49746* (W--2878378); *Ridgway 110* (Ld, W--2834346). MOUNTED ILLUSTRATIONS: Fosberg & Renvoize, Kew Bull. Addit. Ser. 7: [Fl. Aldabra]

221, fig. 35 (3 & 4). 1980 (Ld).

CLERODENDRUM GLABRUM var. *VAGUM* (Hiern) Mold., Prelim. Alph. List Inv. Names 40 hyponym. 1940; Phytologia 13: 306. 1966.

Synonymy: *Clerodendron ovale* Klotzsch in Peters, Naturwiss. Reise Mossamb. Bot. 1: 257. 1861 [not Baker, 1900, nor Kunth, 1947]. *Clerodendron eriophyllum* Gürke, Engl. Bot. Jahrb. 18: 178. 1893. *Clerodendron ovalifolium* Engl., Pflanzenw. Ost-Afr. A.124: 341. 1895 [not A. Gray, 1862, nor (A. L. Juss.) Bakh., 1970]. *Clerodendron rehmanni* Gürke, Engl. Bot. Jahrb. 28: 294. 1900. *Clerodendron rehmannii* Gürke apud K. Schum., Justs Bot. Jahresber. 28 (1): 495. 1900. *Siphonanthus rehmannii* (Gürke) Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900. *Siphonanthus glabra* var. *vaga* Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900. *Siphonanthus glabra* var. *incarnata* Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900. *Clerodendron glabrum* var. *ovale* H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 219. 1912. *Clerodendrum glabrum* var. *pubescens* Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 77. 1936. *Clerodendrum rehmanni* Gürke apud Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 77. 1936. *Clerodendrum eriophyllum* Gürke apud Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 77. 1936. *Clerodendrum ovale* Klotzsch apud B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76 in syn. 1936. *Clerodendrum ovalifolium* Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 76 in syn. 1936. *Clerodendron glabrum* var. *ovale* (Klotzsch) H. H. W. Pearson ex Mold., Résumé 263 in syn. 1959. *Clerodendron glabrum* var. *ovate* Pearson ex Mold., Résumé Suppl. 3: 30 in syn. 1962. *Clerodendrum eraphyllum* Gürke ex Mold., Résumé Suppl. 15: 19 in syn. 1967. *Clerodendrum criophytum* Guerke ex Richards & Morony, Check List Fl. Mbala 237 sphalm. 1969. *Clerodendron rehmannii* var. *tenuifolium* Merxm. ex Mold., Phytol. Mem. 2: 388 in syn. 1980

Bibliography: Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 257. 1861; Vatke, Linnaea 43: 537. 1882; Gürke, Engl. Bot. Jahrb. 18: 178. 1893; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 561. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. A: 94 & 124 (1895) and C: 341. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 250. 1898; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 293, 298--300, & 515. 1900; Hiern, Cat. Afr. Pl. Coll. Welw. 1: 842. 1900; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 101. 1901; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 318--220. 1901; K. Schum., Justs Bot. Jahresber. 28 (1): 495. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 44. 1904; Sim, For. Fl. Cape Colony 286. 1907; Rübsaamen, Marcellia 10: 106, fig. 9 & 10. 1911; Dalla Torre, Justs Bot. Jahresber. 39 (1): 1328. 1913; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 43, 76--78, 93, & 95. 1936; Mold., Geogr. Distrib. Avicenn. 38. 1939; Mold., Prelim. Alph. List Inv. Names 23 & 40. 1940; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 101. 1941; Mold., Alph. List Inv. Names 21 & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 48--52 & 89--91. 1942; J. Hutchins., Botanist South. Afr. 399 & 400. 1946; Jacks, in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 561. 1946; Mold., Alph. List Cit. 1: 23, 174, & 254 (1946), 2: 407, 628, & 641 (1948), and 3: 762, 849, & 977. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 115--121, 181, & 183. 1949 [to be continued]

BOOK REVIEWS

Alma L. Moldenke

"A REVISED HANDBOOK TO THE FLORA OF CEYLON" Volume 5 edited by M. D. Dassanayake & F. R. Fosberg, ix & 476 pp., 51 b/w multi-fig. & 1 tab. Amerind Publishing Co., Pvt., Ltd., New Delhi, India for the Smithsonian Institution & The National Science Foundation, both of Washington, D. C. 1985. $30.00.

Like the 4 earlier volumes, this one brings up-to-date and thus available the rare Trimen's excellent flora (1893--1900), Alston's additions and corrections to it (1931) and Abeywickrama's checklist (1959) with the local field and several herbaria studies by family-specialist systematists and native student collectors. In this volume H. Huber prepared the *Annonaceae*, C. Grey-Wilson the *Balsaminaceae* with fine illustrations, M. D. Dassanayake the *Cochlospermaceae* and the *Bixaceae* with 7 multi-figured drawings, B. C. Stone the *Rutaceae* with 9 multi-figured drawings which could have been much more valuable with veining details added to single leaves and leaflets, and T. Koyama (our longtime confrère at the New York Botanical Garden) the huge *Cyperaceae* with 35 detailed figured drawings. All accounts give family characteristics, keys on generic and specific levels, distribution, ecologic notes, and specimens examined.

"HANDBOOK OF OREGON PLANT AND ANIMAL FOSSILS" by William N. & Elizabeth L. Orr, vii & 285 pp., hundreds of fossil drawings, charts & maps. The Orrs, P. O. Box 5286, Eugene, Oregon 97405. 1981. $10.95 paperbound.

A tremendous amount of information in geology and paleontology is presented between the covers of this book. The authors duly credit the Rev. Thomas Condon as founder in these fields in this state and among others our long-time friend, Ralph Chaney. Most of the fossils found in Oregon appear in the sandstones of the changing west coast and its river mouths. Consequently most of these fossils are marine echinoderms, mollusks, sea and andromodous fish, a whale and plants represented mainly by pollen. The next largest find is in the John Day formation with lake fish, reptiles, birds and the many amazing mammals like elephants and camels. There are also listed plant fossil genera recorded in previous literature from thallophytes through monocots. The drawings given of so many fossils and/or restorations add much reality to their names. Some valuable charts are printed so miniscutely even with clear space left on the page.

The geological maps are very helpful. This is the only complete report for the state on this subject and so is highly valuable.

"ECOLOGICAL INTERACTIONS IN SOIL -- Plants, Microbes and Animals" edited by A. H. Fitter & associates, viii & 451 pp., 104 b/w fig. incl. 18 photos. & 67 tab. Blackwell Scientific Publications, Oxford, Boston, Massachusetts 02108 & Palo Alto, California 94301. 1985. $57.00.

The 33 papers by some 60 authors on all aspects of soil biota are from a conference presented by the British Ecological Society giving assorted pertinent scientists opportunities to integrate their edging and overlapping research interests as to roots, root hairs, nematodes, mycelia of saprophytic and parasitic fungi affecting not only soil plant parts but also underground animals, specialized mycorrhiza, collembolans, ants and other small insects, earthworms, soil bacteria, and soil protozoa in their complicated varying microenvironments on and below the soil surfaces of crops and forests. This is an important new emphasis for such interested researchers, professors and students. This book should be an important library acquisition for all institutions where such work is being done.

"BIOPHYSICAL PLANT PHYSIOLOGY AND ECOLOGY" by Park S. Nobel, xiii & 608 pp., 111 b/w illus. & 15 tab. W. H. Freeman & Company, San Francisco, California & New York, N. Y. 10010. 1983. $34.95.

This is an introductory (?) level text dealing with such topics as diffusion, solutes, light and photochemistry, bioenergetics, and leaf and plant fluxes. There are problems planned for each of the 9 chapters. There is a full 8-parted appendix with such items as symbols and abbreviations, logarithms and trigonometric functions, and Gibbs free energy and chemical potentials. Then are given the answers to the chapters' problems. The author's predecessors to this book came out in 1970 and 1978. This new edition adds pertinent ecological considerations very effectively since it "emphasizes physical concepts that are important for a broad biological understanding of processes, particularly in vivo."

"A NEW LOOK AT THE DINOSAURS" by Alan Charig, 160 pp., 1 color pl., 3 charts, & 3 maps, 104 b/w photos., 104 draw., 6 charts, & 13 maps. Facts on File Publications, New York, N. Y. 10016. 1985. Reprint of 1983. $9.95 paperbound.

The skilled author of this book is the curator of fossil amphibians, reptiles and birds at the renowned British Museum (Natural History). Most of the many excellent illustrations come from this source too. Hundreds of different kinds are shown, described and located on every continent but Antarctica where some may well be yet undiscovered under the ice from warmer Pangean times. They reigned overlappingly and successfully for 140 million years beginning about 200 million years ago. Suggestions for their demise are still just that. True dinosaurs are distinguished from the other reptilian

archosaurs (which include crocodilians that persist today and pterosaurs that died off) because of their erect limbs supporting the body from beneath with the elbows pointed backward and knees forward. The closest descendants of these "true" dinosaurs (s.s.) are birds. I would like to summarize with: "This clearly and interestingly written and profusely illustrated book is definitely the best of the many that have been written about dinosaurs". It is how I evaluate the book but it is given here in quotation marks because it is also the recommendation of the important expert, George Gaylord Simpson.

"SHARKS OF THE WORLD" by Rodney Steel, 192 pp., 32 color & 68 b/w photos., 1 chart & 124 draw. Facts on File Publications, Inc., New York, N. Y. 10016. 1985. $17.95.

The author was formerly in the paleontology department of the British Museum: he therefore knows much about the ancient as well as the modern elasmobranchs or members of the Class *Chondrichthyes*. An appendix gives a "Check-list of Sharks Living and Extinct" arranged taxonomically. With today's use of sophisticated free-diving equipment, the development of underwater photography, and the detailed physiological (mainly sensory) testing, the scientifically oriented and the naturalist-interested members of the public can now watch and/or read facts about sharks rather than myths. Documented true stories of assorted killer sharks and their human victims make quite some reading!

"JAPANESE GARDENS" by Katsuo Saito, Quick & Easy Series, 62 pp., 32 color photo., 1 b/w photo & 7 draw. Charles E. Tuttle Co., Rutland, Vermont 05701-0410. 1985, 19th printing. $3.95.

"FUN WITH FLOWERS" by Katsuo Saito, Quick & Easy Series, 62 pp., 33 color photo. & 24 b/w draw. Charles E. Tuttle Co., Rutland, Vermont 05701-0410. 1985, 8th printing. $3.95.

These near postcard-sized, plastic-bound booklets have on the lefthand or upper side page descriptions, often with ink drawings, of the corresponding right-hand or lower side one. On the right-hand or lower side pages there are in the one book beautifully reproduced color photographs of attractive Japanese gardens and in the other booklet there are, again beautifully reproduced, photographs of floral arrangements set according to different Ikebana School patterns. Considering the excellence of these reproductions, the prices are bargain ones. These lovely booklets can be real souvenirs from Japan, printed there, available here, taking up no valuable space in luggage. They make lovely little gifts (for Garden Club, etc.) and prizes for family and friends especially for gardeners or those "laid up" -- they are so easy to handle.

"AMERICAN ARCTIC LICHENS 1. The Macrolichens" by John W. Thomson, xiii & 504 pp., 269 b/w draw., & 340 geog. dist. maps. Columbia University Press, New York. N. Y. 10025. 1984. $55.00.

The author is a teaching-research-field botanist with 14 expeditions to the American Arctic and European Lapland as a basis for this book and other publications. His work pattern is prodigious and careful. We have admired him throughout our many decades of friendship. The introduction gives a survey of the geology, climate, geography, previous lichen literature, and ecology of the region with varying habitat descriptions on different soils, rocks, bones, antlers and as epiphytes on bark and twigs, or growing over other lichens, or vagant like "*Masonhalea richardsonii*, which is never attached to the substratum but when dry rolls with the wind, then spreading and coming to rest when moistened." The text starts with a clearly planned key to 62 arctic genera. In the rest of the text they are presented alphabetically with the main literature, generic descriptions, keys to their species, descriptions giving microchemistry as well as morphology, really superb drawings (mostly by Bethia Brehmer) and clearcut geographic distribution maps. Not only lichenologists will need this excellently prepared study, but so will ecologists, naturalists, teachers, etc. I understand that this publication has been given a prestigious award. It is certainly deserving of such recognition.

"THE FAMILIES OF THE MONOCOTYLEDONS - Structure, Evolution, and Taxonomy" by R. M. T. Dahlgren, H. T. Clifford & P. F. Yeo, xii & 520 pp., 225 b/w multi-draw. & 7 tab. Springer-Verlag, New York, N. Y. 10010. 1985. $98.00.

If readers have not been following the recent literature of these authors, as well as that of R. B. Fagen, N. and K. Jacobsen, S. R. Jansen, B. J. Nielsen and F. N. Rasmussen, who are recognized on the title page as "in cooperation with", H.-D. Behnke, the A. N., C. V., T. S. and V. S. Rao-s, N. Holmgren, A. Cronquist and A. Takhtajan in part, they will find a very different arrangement herein which may well be that to be followed by most taxonomists and/or systematists of the near future. This "presentation gives great weight to evolutionary considerations....doing away with old heterogeneous families, and arranging the new smaller and more homogeneous ones according to their presumed relationships....based on an extensive body of evidence." The text considers the morphological and chemical characteristics of monocots, their origin and evolutionary patterns, and their subsequent classification into superorders, orders, families and genera. The structural drawings are many and very well executed. This is going to be an important study book for students and scholars.

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