

XP  
H947  
.58  
#6

# PHYTOLOGIA

An international journal to expedite botanical and phytoecological publication

Vol. 58

November 1985

No. 6

## CONTENTS

SILBA, J., <i>A supplement to the international census of Coniferae, I.</i> .....	365
CALDERON DE RZEDOWSKI, G., & RZEDOWSKI, J., <i>Sisyrinchium konzattii (Iridaceae), una nueva especie de las altas montañas del centro de Mexico.</i> .....	371
KOCH, S.D., & SÁNCHEZ VEGA, I., <i>Eragrostis mexicana, E. neomexicana, E. orcuttiana, and E. virescens: the resolution of a taxonomic problem.</i> .....	377
WEBER, W.A., <i>New names and combinations, principally in the Rocky Mountain flora - V.</i> .....	382
WEBER, W.A., & WITTMANN, R., <i>Additions to the flora of Colorado - XI.</i> .....	385
TURNER, B.L., <i>A new species of Tetrachyron (Asteraceae - Heliantheae) from Oaxaca, Mexico.</i> .....	389
SAGÁSTEGUI-ALVA, A., & DILLON, M.O., <i>New species and combinations in Belloa (Inuleae -Asteraceae).</i> .....	392
MOLDENKE, H.N., <i>Notes on the genus Clerodendrum (Verbenaceae). X.</i> .....	401
MOLDENKE, A.L., <i>Book Reviews.</i> .....	427

Published by Harold N. Moldenke and Alma L. Moldenke

590 Hemlock Avenue N.W.  
Corvallis, Oregon 97330  
U.S.A.

Price of this number \$3.00; for this volume \$15.00 in advance or \$16.00 after close of the volume; \$5.00 extra to all foreign addresses and domestic dealers; 512 pages constitute a complete volume; claims for numbers lost in the mails must be made immediately after receipt of the next following number for free replacement; back volume prices apply if payment is received after a volume is closed.



A SUPPLEMENT TO THE INTERNATIONAL CENSUS  
OF THE CONIFERAE, I.

John Silba  
198 W. Hoffman Ave., Lindenhurst, N.Y. 11757

In preparation for my forthcoming comprehensive taxonomic encyclopedia of the Coniferae a few nomenclatural changes will be made here. Further, several species names listed in my original checklist have now been published, therefore the citations of these names are listed here as well as a few corrections in citations listed in the original checklist.

The purpose of this checklist is to be as comprehensive as possible and to base taxonomic distinctions on gross morphological characteristics which can clearly be seen in the field. My own concept of a species is a taxon which is easily separated by gross morphological characteristics in the field, such as differences in growth patterns (crowns), bark, bud, leaf characteristics (shape, texture, duration, structure of the apex), male cones (number of scales, shapes of microsporophylls), female cones (arrangement, duration, umbos), seeds (shape and color) and cotyledons (number, size, apex structure). It is a combination of these characteristics that makes a species. I will expand further on this in my forthcoming monograph. I do not think a species should be based only on chemotaxonomic differences which can not be easily used on hand in the field as some botanists do. Chemotaxonomic characteristics can help a biologist to understand the biological make-up of a species, however these statistics have little value if they can not be easily and clearly defined in a consistent manner in the field without the use of a transportable laboratory.

The nomenclatural changes and new citations are as follows :

ABIES

A. delavayi (Van Tiegh.,) Franch.

This is a highly variable species in the field. Chinese and European botanists are still naming new species which are most likely based on scattered relic populations of this single species. I had originally recognized A. beshanzuensis Wu as a distinct species on the basis of its brown female cones. However, I have no idea whether this material was based on mature specimens and have serious doubts that it was a mature specimen. Typical A. delavayi has bluish-black female cones with hidden bracts,

however the bracts are yellowish at first and in some instances may give the cone a brownish cast in the immature state. The general characteristics of A. beshanzuensis well agree with typical A. delavayi.

A similar case is that of Pseudotsuga sinensis Dode with scattered populations growing in Eastern China and Taiwan, which were once viewed as separate species. However, when a wide range of specimens are available to examine it can clearly be seen that there is really only one variable species.

A. pindrow var. brevifolia Dallim. et Jacks. "Gamble Fir"  
Handb. Conif. 1: 126, f.25 (1923) = A. gamblei Hickel, Bull.  
Dendr. Soc. France. 37 (1939).

A distinct variant with short spirally arranged leaves and reddish-brown branchlets from N. India (Garwhal). Recognized as a distinct species by Keith Rushforth (E).

A. recurvata var. ernestii (Rehd.) Rushf., Not. R.B.G. Edinb.  
41(3): 539 (1984). This taxon was formerly recognized as

A. chensiensis var. ernestii (Rehd.) Liu. However, its general characteristics agree with A. recurvata Mast. in the color and size of the female cone. The leaves of this taxon are different from the typical variety in that the apex is notched and they are less recurved.

#### DACRYDIUM

D. cornwallii De Laub., Fl. Males. (1986, in press). Formerly listed as D. nidulum var. araucarioides De Laub., though very distinct in its Araucaria-like foliage.

#### DECUSSOCARPUS

D. nagi var. formosensis (Dummer) Silba, comb. nova.  
"Kankao Decussoberry".  
= Podocarpus formosensis Dummer, Gard. Chron. III. 52: 295  
(1912).

A distinct variant from S. Taiwan with narrow lanceolate leaves.

#### JUNIPERUS

J. barbadensis var. urbaniana (Pilg. et Ekm.) Silba, Phytologia  
56(5): 340 (1984).

A distinct variant with quadrangular branchlet systems and sharply acute leaves with an acuminate apex. Native to S.W.

Haiti and W. Dominican Republic, possibly endangered.

J. flaccida var. martinezii (Perez de la Rosa) Silba, comb. nova.  
= J. martinezii Perez de la Rosa, *Phytologia* 57(2): 81, f. 1  
(1985). A scarcely distinct taxon named from Jalisco, very  
similar to typical J. flaccida Schl. in general characteristics.  
Said to have gray-green foliage, however collections of J. flaccida  
from N. Mexico also have grayish foliage. The only consistent  
difference seems to be the smaller female cone with fewer seeds.

J. sabinoides (H.B.K.) Nees, *Linnea* 19: 706 (1847), replaces the  
name J. monticola Mart. according to Johnston in *Taxon* 34: 505  
(1985).

#### PICEA

P. maximowiczii var. senanensis Hayashi, was first validly  
published in *Tax. Stud. Jap. Conif.* 55 (1960).

P. shirasawae Hayashi, was first validly published in *Tax. Stud.*  
*Jap. Conif.* 55 (1960).

#### PINUS

P. brutia var. eldarica (Medw.) Silba, comb. nova.  
= P. eldarica Medw., *Act. Hort. Tifl.* 6.2. 21, f. (1903).  
This combination was not validly published by Magini et Tulstr.  
in *FAO For. Develop. Pap.* 5 (1955). This taxon differs mainly  
in its shorter stiffer leaves.

P. brutia var. pithyusa (Stev.) Silba, comb. nova  
= P. pithyusa Stev., *Bull. Soc. Hist. Nat. Moscou* 11: 49 (1838).  
This combination was not validly published by Magini et  
Tulstr. (1955, l.c.). A distinct variant with longer, more  
twisted leaves from a distinct geographic region.

P. culminicolor var. discolor (Bail. et Hawksw.) Silba,  
*Phytologia* 56(7): 490 (1985). Formerly included with P. culminicola  
Andr. et Beam. or with P. cembroides Zucc. ex K. Bay.. A  
distinct variant which is more tree-like rather than a shrub and  
it is often dioecious.

P. culminicolor var. johannis (M.F. Rob.) Silba, *Phytologia*  
56 (7): 491 (1985). Formerly included with P. culminicola  
or with P. cembroides. A distinct variant with loose flaky  
bark and trees are usually strongly three-leaved.

P. occidentalis var. baorucoensis Silba, var. nova

"Hispaniola Pine"

Arbor ad 10 m. alta. Vaginae persistens, 10-11 mm. longae.  
Folia 5 in fasciculo, 13-15.5 cm. longa, 1.2 mm. lata, rigida.  
Strobili feminei ovoidei-conici, 6.5-7 mm. longi; apophyses  
ovata, tumidus, prominentis.

Dominican Republic : Pedernales Prov., Sierra de Baoruco, near  
Aceitillar, 5-14-1976, W.S. Judd 1487 (Holotype : A); Santiago  
Prov., La Diferencia, 625 m. alt., 6-7-1976, W.S. Judd 1349  
(Paratype : A). Haiti : Fond Varettes, near Mission, 1000 m.,  
4-21-1920, E.C. Leonard 3767 (GH).

A distinct variant with needles consistently in fives, or  
rarely fours, and by its female cones with swollen, sometimes  
protuberant apophyses with a fine, upcurved, prominent spine.

P. patula var. jaliscana (Perez de la Rosa) Silba, comb. nova.

= P. jaliscana Perez de la Rosa, Phytologia 54(5): 290-291,  
f. 1 (1983).

A scarcely distinct taxon, differing in its grayish-red bark  
divided into plates and its grayish-brown, non-curved female  
cones. The general characteristics of this taxon, including  
crown characteristics and foliage well agree with typical  
P. patula Schiede et Deppe.

P. pentaphylla var. himeokomatsu (Miyabe et Kudo) Makino, was  
first validly published in Illustr. Fl. Nippon. 903, pl. 2709  
(1940).P. pseudostrobus var. alpulcensis (Lindl.) Mart.

P. estevesii (Mart.) Perry was reduced to synonymy with this  
taxon by Stead and Styles in Bot. J. Linn. Soc. 89(3): 249-275  
(1984) on the basis of quantitative morphological data.

P. wangii Hu et Cheng.

= P. kwangtungensis Chun et Tsiang

A variable taxon endemic to Yunnan, Kwangtung, Kwangsi and  
Hunan. The taxon named P. kwangtungensis formerly included  
under P. morrisonicola Hayata, is identical to typical P. wangii  
in its short flattened leaves. Pinus wangii may only be a variant  
of the much confused and rarer P. fenzeliana Hand.-Mzt. which  
differs in its longer, finer leaves.

## PODOCARPUS

P. atjehensis (Wassch.) De Laub., was published in Blumea 30  
(2): 271 (1985).

- P. borneensis De Laub., l.c., 266 (1985).  
P. brassii var. humilis De Laub., l.c., 274 (1985).  
P. confertus De Laub., l.c., 271 (1985).  
P. degeneri (Gray) De Laub., l.c., 271 (1985).  
P. fasciculus De Laub., l.c., 277 (1985).  
P. globulus De Laub., l.c., 269 (1985).  
P. grayi De Laub., l.c., 275 (1985).  
P. hispaniolensis De Laub., *Moscossa* 3: 149-150 (1984).  
P. insularis De Laub., *Blumea* 30(2): 268 (1985).  
P. laubenfelsii Tiong, *Blumea* 29(2): 523 (1984).  
P. micropedunculatus De Laub., *Blumea* 30(2): 268 (1985).  
P. rubens De Laub., l.c., 266 (1985).  
P. smithii De Laub., l.c., 257 (1985).  
P. spathoides De Laub., l.c., 267 (1985).  
P. subtropicalis De Laub., l.c., 277 (1985).  
P. transiens (Pilg.) De Laub., l.c., 259 (1985).

## PSEUDOLARIX

P. amabilis (Nelson) Rehder is the correct name for the "Golden Larch" as stated in *Taxon* 29(2-3): 315-317 (1980), and not P. kaempferi (Lindl.) Gord. as suggested by Bailey in *Hortus Third* (1979). The name published by Gordon in *Pinetum* : 292 (1858) is a nomen confusum.

## TAXODIUM

T. distichum var. imbricarium (Nutt.) Croom, *Cat. Pl. New Bern, N.C.* 30 (1837) replaces the name T. distichum var. nutans Sweet which is a nomen confusum according to Watson

in Taxon 34: 506-509 (1985).

#### TSUGA

Additional notes on T. argyrophylla (Chun et Kuang) De Laub. et Silba. This taxon was formerly classified in its own genus (Cathaya). Although it is relatively distinct from most other Tsuga species, let us consider the related T. mertensiana (Bong.) Carr. which has juvenile leaves in seedlings that are relatively long for a Tsuga species. Also, T. mertensiana unlike any other Tsuga has quadrangular leaves that are spirally arranged, therefore the distinctions between T. argyrophylla and other Tsuga species are not much greater than those of T. mertensiana when compared to other Tsuga species. De Laubenfels (pers. comm., 1984) states that T. argyrophylla should be placed in the same section of Tsuga (hesperopeuce) that T. mertensiana is in. Gausson (Trav. Lab. For. Toul. II. 1966) recognized close affinities in pollen structures between Cathaya and Tsuga.

#### Additional Note

Many Mexican botanists have not excepted the name Cupressus lusitanica Mill. for the widespread species of Cupressus in Mexico and the trees long cultivated in Portugal. De Laubenfels explains (pers. comm., 1984) that most Cupressus in Mexico grow in sunny locations, however there are some populations of this widespread weeping cypress that grow in the shade in Mexico. De Laubenfels suggests that the trees grown in Portugal were probably collected from trees growing in shaded areas in Mexico. Therefore, since C. lusitanica more commonly grows in the sunny locations in Mexico it seems probable that most Mexican botanists have not had the opportunity to compare material growing in the rarer shaded areas to material in Portugal. I do not believe there is any significant taxonomic differences in the shady or sunny populations of Cupressus in Mexico and see no reason why the name C. lusitanica Mill. should not be accepted for the widespread species in Mexico.



SISYRINCHIUM CONZATTII (IRIDACEAE), UNA NUEVA ESPECIE  
DE LAS ALTAS MONTAÑAS DEL CENTRO DE MEXICO\*

GRACIELA CALDERON DE RZEDOWSKI\*\*,\*\*\*

Y

JERZY RZEDOWSKI\*\*

SUMMARY

On the basis of specimens collected in the State of Mexico and in Distrito Federal at altitudes above 3300 m Sisyrinchium konzattii is described as new. This taxon differs from other congeneric species in the combination of the following characters: flowers yellow with a dark purple "eye", slender and unbranched habit with very narrow leaves, pedunculate spathes, subglobose seeds and presence of a fascicle of tuberous roots.

En el proceso de la preparación de la Flora Fanerogámica del Valle de México el género Sisyrinchium ha resultado ser de los más complicados y difíciles. Se trata de un grupo de cerca de 100 especies, distribuidas a lo largo de casi toda América, cuyo conocimiento taxonómico se halla todavía poco avanzado. Los límites de muchas especies no son fáciles de percibir y, a semejanza de lo que sucede con tantas otras iridáceas, los materiales de herbario dan una idea pobre y deformada de lo que realmente son las plantas. Con la ayuda de la bibliografía existente cuesta trabajo identificar los ejemplares, la aplicación de muchos nombres es incierta y como secuela de todas estas circunstancias, a pesar de lo

-----  
\*Trabajo parcialmente subvencionado por el Consejo Nacional de Ciencia y Tecnología.

\*\*Instituto de Ecología, A.C., Centro Regional del Bajío.  
Apartado postal 386. 61600 Pátzcuaro, Michoacán, México.

\*\*\*Laboratorio de Botánica Fanerogámica. Escuela Nacional de Ciencias Biológicas. I.P.N. México, D.F. Becaria de la C.O.F.A.A. del Instituto Politécnico Nacional.

atractivo de las flores, aun los colectores experimentados a menudo no se sienten inclinados a recoger Sisyrinchium en el campo, por lo que el grupo tampoco se encuentra adecuadamente representado en los herbarios.

Con tales antecedentes se abordó el género para la región mediante: a) la realización de un intenso trabajo de campo, buscando sacar el mayor provecho posible de observaciones de las plantas en vivo y en su medio natural, y b) el examen de una gran cantidad de ejemplares de herbario de todo México, de Centroamérica e inclusive de algunos materiales sudamericanos.

Como resultado de tal esfuerzo de aproximación se concluyó que Sisyrinchium está representado en el Valle de México al menos por 10 especies claramente diferentes entre sí, de las cuales 4 no habían sido registradas antes para la región. A su vez, de estas cuatro para una no se ha podido encontrar ningún nombre que, siquiera tentativa o provisionalmente, pudiera aplicarse y por consiguiente, aun con renuencia, se le describe a continuación como nueva.

Se aprovechan estas líneas para agradecer cumplidamente a los siguientes herbarios: A, CAS, CHAPA, DS, ENEPI, G, GH, MEXU, MO, MSC, NY, US, WIS, el préstamo de numerosos ejemplares solicitados. Se debe un reconocimiento especial también al Dr. Peter H. Raven, director del Jardín Botánico de Missouri, por su ayuda en la obtención de algunos materiales bibliográficos.

Sisyrinchium konzattii Calderón & Rzedowski sp.n.

Herba perennis, gracilis, erecta vel leviter flexuosa, glabra, usque ad 50 cm alta; radices fasciculatae, numerosae, aliquae breves carnosaeque, ceterae longae tenuesque, filiformes; caulis simplex, gracilis, quadrangularis, anguste alatus; folia linearia vel filiformia, usque ad 2 mm lata, maximam partem basalia, caulinaría pauca, ad inflorescentiam pertinentia, spathae bractearum aliquot similia; tepala ad basim minime connata, oblonga, +1 cm longa, lutea, macula basali atropurpurea, secus nervos longitudinales (1 vel plures) extensa; androecium gynoeciumque aequae

atropurpurea; fructus ellipsoideus, glaber, saepe purpureus; semina subglobosa, circa 1 mm diametro.

Planta herbácea perenne, glabra o practicamente glabra, erecta o algo flexuosa, de (12) 20 a 40 (50) cm de alto; de aspecto delicado; raíces fasciculadas por lo general numerosas, unas cortas y carnosas de  $\pm$ 1 cm de largo por  $\pm$ 0.5 cm de grueso con la porción distal a veces larga y filiforme, otras muy largas, filiformes; tallo esbelto, cuadrangular, por lo común ligeramente alado, recto o a veces geniculado, por lo general saliendo uno (o pocos) por individuo, sin ramificar en las partes inferior y media, con frecuencia en su base se observar numerosas fibrillas dirigidas hacia arriba; hojas dísticas, la mayoría (2 a 4) saliendo desde la base, más cortas que la altura de la planta, finas, lineares a filiformes, desiguales entre sí, variando en longitud de (5) 10 a 20 (40) cm y hasta de 2 mm de ancho, pero por lo general de 1 mm o menos, las bases envainantes, hojas caulinares con frecuencia reducidas a una sola, situada en la base de la (o las) espata, algo semejante a las brácteas, de 1.5 a 4 (-12) cm de largo por 2 (-4) mm de ancho en la base y menos de 1 mm hacia la punta, que suele ser muy fina; espatas 1 ó 2 (-4), pedunculadas, con brácteas subiguales o desiguales, de 2 a 2.5 cm de largo, escariosas o moradas en los bordes, con una sola flor abierta por espata, pero acompañada por lo general por 1 a 5 frutitos en distintos grados de madurez, sobre finos pedicelos morados, hasta de 1.5 cm de largo; flores hasta de 2 (2.5) cm de diámetro, tépalos unidos por  $\pm$ 1 mm en la base, oblongos, de  $\pm$ 1 cm de largo, amarillos con una mancha de color morado oscuro en la base, que se extiende a lo largo de una o varias venas; androceo por lo general con todas las piezas moradas, tubo estaminal de  $\pm$ 1 mm de largo, filamentos subulados, de unos 3 mm de largo, anteras de 2.5 a 3 mm de largo por 0.2 a 0.4 mm de ancho; gineceo morado, ovario alargado, glabro, la base unida de los estilos apenas sobresaliendo del tubo estaminal, las porciones libres subuladas, de 5 a 7 mm de largo, con frecuencia curvadas y de aspecto flexible, a veces amarillentas o blanquecinas hacia el ápice; frutos a menudo morados, glabros, elipsoides, de (4) 6 a 7 mm de largo por 3 a 4 mm de ancho, después de la dehiscencia se reducen a unos 4 mm de largo por 3 mm de ancho; semillas de color café-cobrizo oscuro,

subglobosas, de cerca de 1 mm de diámetro.

TIPO: MEXICO. ESTADO DE MEXICO. Alrededores del Llano Grande, arriba de San Rafael, municipio de Tlalmanalco; bosque de Pinus hartwegii; alt. 3600 m; 19.VIII.1984; Rzedowski 38463 (ENCB).

Otras colecciones examinadas: DISTRITO FEDERAL: Llano de la Cieneguilla, arriba del Desierto de los Leones, delegación de Cuajimalpa; bosque de Pinus hartwegii y claros adyacentes; alt. 3400 m; 14.IX.1983; Rzedowski 38276 (ENCB).

ESTADO DE MEXICO. Nevado de Toluca, on north side of mtn; above timberline in alpine meadow; 9.IX.1957; Beaman 1705 (MSC, GH). Estación Experimental de Investigación y Enseñanza de Zoquiapan, 8 km al S de Río Frío, municipio de Ixtapaluca; bosque de Pinus y Alnus; 23.X.1975; Koch 75663 (CHAPA). Ibid.; alt. 3250-3350 m; 21.VII.1978; Vega Aviña 335 (CHAPA). Cerca del Puerto del Oso, municipio de Jiquipilco; bosque de Pinus hartwegii; alt. 3400 m; 31.VIII.1983; Rzedowski 38213 (ENCB). Alrededores del Llano Grande, arriba de San Rafael, municipio de Tlalmanalco; bosque de Pinus hartwegii; alt. 3600 m; 7.IX.1983; Rzedowski 38257 (ENCB). Ibid.; zacatonal; 2.XII.1984; Rzedowski 38509 (ENCB).

S. konzattii parece estar restringido en su distribución a las altas montañas del Estado de México y del Distrito Federal, con muchas probabilidades de existir también en zonas adyacentes de Puebla y tal vez de Morelos. En el Nevado de Toluca se ha registrado por encima del límite de la vegetación arbórea (probablemente a más de 4000 m s.n.m.), mientras que las colectas restantes marcan un intervalo altitudinal de 3300 a 3600 m. En estos ambientes S. konzattii convive con cierta frecuencia con S. quadrangulatum Klatt, con S. tenuifolium Willd. y con S. toluicense Peyr.

En un grupo tan deficientemente conocido y comprendido como es Sisyrinchium es aventurado hacer conjeturas acerca de posibles parentescos entre las especies, pero caben aquí los siguientes comentarios.

S. konzattii comparte con muchos individuos de S. tenuifolium (sobre todo de las poblaciones de alta montaña) el carácter del centro ("ojo") morado oscuro de la flor, pero difiere de este último taxon en sus ovarios y frutos glabros y sobre todo en el hábito esbelto y no ramificado de la planta. De las poblaciones locales de S. toluicense, la especie nueva se diferencia igualmente en el hábito así como en el tamaño mayor de los individuos y en la presencia del "ojo" morado.

Morfológica y ecológicamente algo similar a S. konzattii resulta asimismo S. johnstonii Standl., conocido de las altas montañas de Chiapas y Guatemala, aunque discrepa en el color blanco con líneas azules de sus flores, en sus hojas más anchas, así como en las espatas sésiles o subsésiles. Otra especie, S. pringlei Rob. & Greenm. (registrada de Durango a Jalisco y Michoacán) es parecida en el hábito esbelto y en las hojas muy angostas a S. konzattii, pero carece del "ojo" oscuro de la flor, también tiene las espatas sésiles o subsésiles y vive a menos de 3000 m de altitud.

Finalmente es interesante hacer notar que S. konzattii difiere por sus semillas subglobosas de S. tenuifolium y S. toluicense (que las tienen cóncavo-convexas), en cambio en tal carácter se asemeja a S. quadrangulatum y a S. arizonicum Rothr. Los dos últimos taxa carecen, sin embargo, de raíces tuberosas, propias de todas las demás especies anteriormente mencionadas. No se conoce la forma de las semillas de S. johnstonii ni de S. pringlei.

El nombre de la especie está dedicado a la memoria del Profesor Cassiano Konzatti (1862-1951), que siendo de origen italiano, hizo de México su patria adoptiva y siendo maestro de escuela de formación, hizo de los estudios botánicos su verdadera pasión. Publicó varios libros, algunos de su propio peculio, como es el caso de la limitada edición (1939 y 1943) de los 2 primeros volúmenes de su obra cumbre intitulada "Flora Taxonómica Mexicana", que consta de 14 tomos manuscritos, en su gran mayoría inéditos, a pesar de que desde 1981 se han dado nuevos pasos para publicarla.

Aun cuando pasó muchos años de su vida en Oaxaca, también exploró y colectó plantas en el Valle de México. Específicamente en 1922 se ocupó del estudio de la flora del Valle de Teotihuacán, cuyos resultados se imprimieron como parte de "La población del Valle de Teotihuacán". editada en varios tomos por la Secretaría de Agricultura y Fomento.

ERAGROSTIS MEXICANA, E. NEOMEXICANA, E. ORCUTTIANA, AND E. VIRESCENS:  
THE RESOLUTION OF A TAXONOMIC PROBLEM

Stephen D. Koch

Centro de Botánica, Colegio de Postgraduados, 56230 Chapingo, Edo.  
de México, México

Isidoro Sánchez Vega

Departamento de Biología, Universidad Nacional Técnica de Cajamarca,  
Cajamarca, Perú

Abstract

*Eragrostis mexicana*, *E. neomexicana*, *E. orcuttiana*, and *E. virescens* are united into a single species, *E. mexicana*, which is divided into subsp. *mexicana* and subsp. *virescens*. The last is a new combination.

Among the American species of *Eragrostis*, there is a group of four closely related species distinguished from the rest of the genus by an annual, weedy habit, a chromosome number of  $2n = 60$ , flowers with three stamens, and caryopses which are rectangularly prismatic, flat to prominently sulcate dorsally, and dark brown and reticulate on the surface. These species are *E. mexicana* (Hornem.) Link (including *E. limbata* Fourn.), *E. neomexicana* Vasey, *E. orcuttiana* Vasey, and *E. virescens* Presl.

Together, these four species are distributed contiguously from the southwestern United States, through Central America and western South America, to Argentina and Chile. *E. mexicana* and *E. neomexicana* have coincident distributions from southeastern California to Texas and south through Mexico, Central America, and northern South America. *E. orcuttiana* is restricted to California and adjacent parts of Nevada, and *E. virescens* is found on the eastern and western slopes of the Andes, from the equator to central Argentina and Chile, and in Uruguay, adjacent Argentina, and southeastern Brazil. In addition, all four species have been introduced at scattered locations around the world, but apparently they do not persist.

Judging from the number of misidentified specimens in herbaria these species have been a persistent source of taxonomic difficulty. This is especially true of *E. mexicana* and *E. neomexicana* in the southwestern United States and Mexico, and of *E. neomexicana* and *E. virescens* in northern South America. These difficulties have led to varying taxonomic treatments of *E. mexicana* and *E. neomexicana*.

Hitchcock (1950) and Harvey (1948), among others, regard them as distinct species, but McVaugh (1983), Beetle (1977), and Harvey (1975) unite them. *E. virescens* and *E. orcuttiana* have always been considered distinct from each other and from *E. mexicana* and *E. neomexicana*.

In order to clarify the status of these species and their relationships, the group was recently subjected to a detailed study (Sánchez 1979) that showed that all four species are best united under *E. mexicana*, with *E. mexicana* and *E. neomexicana* constituting one subspecies, and *E. orcuttiana* and *E. virescens* another. The objective of the present paper is to present a brief summary of the results and to make available the new combination they require. A more detailed version, in Spanish, is in preparation.

*Eragrostis mexicana* (Hornem.) Link

Caespitose annuals, 10-130 cm tall. Culms sometimes with a ring of glandular depressions beneath the nodes, these sometimes coalescing to form a continuous band. Leaf sheaths with or without glandular depressions on the principal and sometimes secondary nerves, papillose-pilose along the upper margins. Leaf blades 5-25 cm long, 3-7 mm wide, occasionally pilose below toward the base, rarely with glands on the abaxial side of the midrib. Inflorescence an open panicle (5-)10-40 cm long, 2-18 cm wide, sometimes with glandular depressions beneath the nodes and on the branches and pedicels. Pedicels divergent, scabrous, longer or shorter than the spikelets. Spikelets ovate to linear in outline, grey-green to purple, 4.0-9.5 mm long, 0.7-2.4 mm wide, with 5-13(-15) florets; rachillas persistent at maturity. Glumes deciduous at maturity, lanceolate, subequal, the lower 0.7-2.0(-2.3) mm long, the upper slightly longer. Lemmas ovate, acute, deciduous at maturity, glabrous or occasionally with a few hairs, 1.2-2.5 mm long. Paleas slightly shorter than the lemmas, persistent at maturity. Stamens 3; anthers purple, 0.2-0.4 mm long. Caryopses 0.5-1.0 mm long, dark brown, reticulate, ovoid to rectangular-prismatic, laterally compressed, shallowly to deeply sulcate on the dorsal side. Chromosome number  $2n = 60$ .

Habitat: Recently disturbed sites and cultivated fields in temperate semiarid zones.

Key to Subspecies

Spikelets ovate to oblong in outline, more than 1.4 mm wide; lower glume 1.2-2.3 mm long; sum of spikelet width and lower glume length 2.6-4.7 mm.....subsp. *mexicana*

Spikelets linear to linear-lanceolate, less than 1.5 mm wide; lower glume 0.7-1.7 mm long; sum of spikelet width and lower glume length 1.4-3.2 mm.....subsp. *virescens*



*Eragrostis mexicana* (Hornem.) Link subsp. *mexicana*

*Poa mexicana* Hornemann, Hort. Hafn. 2:953. 1815.

Type unknown. Harvey (1948) considered specimens in MA grown from seed sent by Sessé and Mociño as typical.

*Eragrostis mexicana* (Hornem.) Link, Hort. Berol. 1:190. 1827.

*Eragrostis limbata* Fournier, Mex. Pl. 2:116. 1886.

*Eragrostis neomexicana* Vasey, Contr. U.S. Natl. Herb. 2:542. 1894. TYPE: U.S.A.: New Mexico: Organ Mountains, in 1881, G.R. Vasey s.n. (lectotype [here designated]: U.S. Natl. Herb. no. 1761631, US!; isolectotypes: U.S. Natl. Herb. no. 822049 and 909912, US!).

Plants frequently with glandular depressions on the culms, leaf sheaths and blades, and axis, branches and pedicels of the panicle. Otherwise differing from subsp. *virescens* by the characters used in the key.

Distribution: From southeastern California to Texas and south through Mexico, Central and South America to approximately the equator; absent from the Amazon Basin.

The two elements that constitute this subspecies have been separated on the basis of spikelet color, plant height, and the presence or absence of glandular depressions beneath the culm nodes. *E. mexicana* consists of small (15-50 cm tall), eglandular plants with purple spikelets, and *E. neomexicana* comprises robust plants (75-120 cm tall) with grey-green spikelets and glands beneath the culm nodes and sometimes elsewhere. Examination of more than 1000 herbarium specimens demonstrated continuous variation in all these characters, although plants with purple spikelets tended to be smaller than those with grey-green spikelets.

On the other hand, it was found to be relatively easy to classify populations in the field: they consisted of either small plants with purple spikelets (*E. mexicana*) or larger plants with grey-green spikelets (*E. neomexicana*). However, it was also observed that the populations of small plants with purple spikelets were growing on poor sites with hard, compact soils, while those of larger plants with grey-green spikelets grew mainly in cultivated fields. This suggests that the two phenotypes are responses to different ecological situations. This was borne out by growing in the greenhouse plants from seed from both types of parents. All produced robust plants with grey-green or purple-tinged spikelets.

A search for other characters which would be useful in separating *E. mexicana* and *E. neomexicana* proved futile.

*Eragrostis mexicana* subsp. *virescens* (Presl) S.D. Koch et I. Sánchez V., comb. nov. Based on *E. virescens* Presl.

*Eragrostis virescens* Presl, Reliq. Haenk. 1:276. 1830.  
TYPE: Chile, Haenke s.n. (holotype: PR; fragments: US!).

*Eragrostis orcuttiana* Vasey, Contr. U.S. Natl. Herb. 1:269. 1893. TYPE: U.S.A. California: Chollus Valley, San Diego, Aug. 1885, *Orcutt 1313* (holotype: U.S. Natl. Herb. no. 1761633, US!).

Plants with glandular depressions absent or beneath the culm nodes only. Otherwise differing from subsp. *mexicana* by the characters mentioned in the key.

Distribution: In North America, restricted to California and adjacent counties of Nevada; in South America, along the western slopes of the Andes from Ecuador to Chile, in the Andean regions of Bolivia and Argentina, and in southeastern Brazil, Uruguay and adjacent Argentina.

*E. orcuttiana* and *E. virescens* have rarely been compared because of their widely disjunct distributions. The character used by Harvey (1948) to distinguish them, spikelets with more or fewer than eight florets was found to be ineffective since floret number varied between 5 and 12 in both areas. A search for other differences correlated with the different geographical areas gave negative results.

The most outstanding characteristic of this subspecies is its distribution, which conforms to a well-known pattern of disjunction between South America and California (e.g., Raven 1972). In this case it is believed that the Californian element probably resulted from introduction from South America by man, probably in Spanish colonial times.

This subspecies and subsp. *mexicana* intergrade in their area of contact in northern South America (but not in the contact zone in North America). This makes their separation somewhat arbitrary in this region, and it is one reason these two taxa are relegated to the category of subspecies.

#### ACKNOWLEDGEMENTS

The authors thank the Organization of American States for its financial support of the second author; the curators of the following herbaria for the loan of specimens: CAS, DS, ENCB, F, GH, MEXU, MICH, MO, MVFA, POM, RSA, SGO, SMU, TAES, TEX, UC, and US; and the Centro de Botánica, Colegio de Postgraduados, for financial support and the use of its facilities.

## LITERATURE CITED

- Beetle, A.A. 1977. Noteworthy grasses from Mexico. *Phytologia* 37: 317-407.
- Harvey, L.H. 1948. *Eragrostis* in North and Middle America. Ph.D. thesis, University of Michigan. Xerox University Microfilms, Inc., Ann Arbor, Michigan. Publ. 967.
- \_\_\_\_\_. 1975. *Eragrostis*. Pp. 171-201 in F.W. Gould, The Grasses of Texas. The Texas A & M University Press, College Station, Texas.
- Hitchcock, A.S. 1950. Manual of the Grasses of the United States. Ed. 2, rev. A. Chase. U.S. Dept. Agric. Misc. Publ. 200. Washington, D.C.
- McVaugh, R. 1983. Flora Novo-Galiciana 14. Gramineae. The University of Michigan Press, Ann Arbor, Michigan.
- Raven, P.H. 1972. Plant species disjunctions: a summary. *Ann. Mo. Bot. Gard.* 59(2):234-246.
- Sánchez V., I. 1979. Estudio biosistemático de *Eragrostis mexicana* (Hornem.) Link, *E. neomexicana* Vasey, *E. orcuttiana* Vasey y *E. virescens* Presl: Gramineae. M.S. thesis, Colegio de Postgraduados, Chapingo, México, México.

NEW NAMES AND COMBINATIONS, PRINCIPALLY IN THE ROCKY MOUNTAIN  
FLORA--V

William A. Weber  
University of Colorado Museum  
Campus Box 218, Boulder, CO 80309

The fourth paper in this series was published in *Phytologia* 55:1-11. 1984.

**AGROSTIS IDAHOENSIS** Nash var. **BAKERI** (Rydb.) W. A. Weber, *comb. nov.* *Agrostis bakeri* Rydb., *Bull. Torr. Bot. Club* 36:532. 1909. Harrington (1954) followed Hitchcock (1935) in placing *A. bakeri* in synonymy under *A. borealis* Hartm. (= *A. mertensii* Trin. cf. Widen [1971]). Examination of Baker's type numbers (RM) indicates that *A. bakeri*, except for the fact that some of the florets have a very inconspicuous straight awn, belongs with *A. idahoensis*. In fact, examination of *A. idahoensis* over its range shows that awns sometimes occur but may be overlooked. If the awned form of *A. idahoensis* is recognized at all, it probably should be at the varietal level.

The *A. "borealis"* complex still needs much careful study on a world-wide basis. Collections from Roan Mountain, N.C., variously reported as *A. rupestris* Chapm. (non All.) and *A. rubra* var. *americana* Scribn. are morphologically unlike *A. borealis*, under which Hitchcock placed it, and in fact key very near *A. rupestris* in *Flora Europaea*. It may be a local endemic. The Colorado populations of *A. borealis* have a more closed panicle as in some Greenland and Kamtchatka collections, unlike the open ones of Scandinavian plants.

**ARTEMISIA LACINIATA** Willd. ssp. **PARRYI** (A. Gray) W. A. Weber *comb. nov.* *Artemisia parryi* A. Gray, *Proc. Amer. Acad.* 7:361. 1868. Hall (1923) was fascinated by the singularity of *A. parryi*, which he compared with *A. macrobotrys* Ledeb. The Alaskan plant that he referred to *A. macrobotrys* is now recognized as *A. laciniatifomis* Komarov. Hall may not have seen material of the authentic Siberian *A. laciniata* Willd. If he had, he might have found even less difference between *A. parryi* and that species. The heads of *A. laciniatifomis* have more numerous flowers (45-156) and a branch of the inflorescence tends to have only one capitulum, while in *A. parryi* and *A. laciniata* the heads are much smaller and the branches have several heads. The only qualitative difference between them seems to be the more distinctly apiculate tips of the ultimate leaf-divisions in the latter, a variable feature in *A. parryi* and not obvious unless one compares the two types directly.

The habitat of *A. parryi* has never been mentioned in the literature or on herbarium labels. In the Creede area, where Belle K. Stewart collected it several times at "Dry Gulch, near Wason,

9,000-10,000 ft. alt." it forms spreading mats from thick rosy rhizomes crowned with numerous rosettes of deep green, almost glabrous leaves, among broken rocks and cobbles in the bottom of a narrow, dry streambed in the mouth of a ravine at the junction of the river valley and the mountain slopes. This is an unusual habitat for an Colorado Artemisia, but precisely the habitat in which I collected A. laciniata several times in the Chuya River drainage in southern Siberia.

Rather than being a southern isolated offshoot of the Alaskan A. laciniatifomis (Hall's macrobotrys), the Colorado plant represents a much wider disjunction involving the more remotely distributed A. laciniata of northeastern and Middle Asia. However, this is not surprising, since the pattern of Rocky Mountain-Asiatic disjunction is already well established (see also Chondrophylla nutans). In fact, the western North American Artemisia frigida is also a very common plant in the Russian Altai.

**ATRIPLEX BRANDEGEI** (A. Gray) Collotzi ex W. A. Weber, **comb. nov.** Grayia brandegei A. Gray, Proc. Amer. Acad. 11:101. 1876.

**ATRIPLEX GRAYI** Collotzi ex W. A. Weber, **nom. nov.** Chenopodium ? spinosum Hook., Fl. Bor. Am. 2:127. 1840; Grayia spinosa (Hook.) Moq. in DC., Prodr. 13. II. 119. 1840, **non** Atriplex spinosum D. Dietr., Synopsis Plantarum 5:536. 1852.

Collotzi (1966) developed compelling arguments for including Grayia within the genus Atriplex, but unfortunately his work was never published.

**CHONDROPHYLLA AQUATICA** (L.) W. A. Weber, **comb. nov.** Gentiana aquatica L., Sp. Pl. 1:229. 1753. This is, in fact, an earlier name for the Colorado plant that was called Gentiana fremontii Torr. (see discussion in the paper following in this issue).

**CHONDROPHYLLA NUTANS** (Bunge) W. A. Weber, **comb. nov.** Gentiana nutans Bunge, Fl. Altaica 1:244. 1829. For discussion of this species and its Colorado occurrence, see the paper following in this issue.

**CYLACTIS ARCTICUS** (L.) Raf. ex Jackson **ssp. ACAULIS** (Michx.) W. A. Weber, **comb. nov.** Rubus acaulis Michx., Fl. Bor.-Amer. 1: 298. 1803.

**CYLACTIS PUBESCENS** (Raf.) W. A. Weber, **comb. nov.** Rubus pubescens Raf., Med. Rep. iii, 2, p. 333. 1811.

**EUTREMA EDWARDSII** R. Br. **ssp. PENLANDII** (Rollins) W. A. Weber, **comb. nov.** Eutrema penlandii Rollins, Contrib. Gray Herb. 171:51. 1950.

**MINUOPSIS** W. A. Weber, **genus nov.** Based on Minuartia Sectio Pungentes Mattfeld, Bot. Jahrb. 57, Beibl. 126:28. 1921. Type species: Minuopsis nuttallii (Pax) W. A. Weber.

**MINUOPSIS NUTTALLII** (Pax) W. A. Weber, based on Arenaria nuttallii Pax, Bot. Jahrb. 18:30, in obs. 1893.

Arenaria pungens Nutt., in T. & G., Fl. N. Am. 1:179. 1838, non Clemente in Lagasca, Gen. et Spec. Plant. p. 15. 1838.

Minuartia nuttallii (Pax) Briquet, Ann. Conserv. Jard. Bot. Geneve XIII-XIV:385. 1911.

Alsinosopsis occidentalis Heller, Muhlenbergia 8:96. 1912.

Minuartia pungens (Nutt.) Mattfeld, Bot. Jahrb. 57, Beibl. 126:28. 1921.

**MUTTALLIA ARGILLOSA** (Darlington) W. A. Weber, comb. nov. Mentzelia argillosa Darlington, Ann. Mo. Bot. Gard. 21:153. 1934.

**POCILLA BILOBA** (L.) W. A. Weber, comb. nov. Veronica biloba L., Mantissa Pl. 2:172. 1771. The genus Pocilla (Dum.) Fourr. includes annuals with single axillary flowers and is cytologically distinct from Veronica by having the basic chromosome number of 7.

**SERIPHIDIUM VASEYANUM** (Rydb.) W. A. Weber, comb. nov. Artemisia vaseyana Rydb., N. Amer. Flora 34(3):283. 1916.

**TITHYMALUS SPATHULATUS** (Lam.) W. A. Weber, comb. nov. Euphorbia spathulata Lam., Encycl. 2:428. 1788.

**URTICA GRACILIS** Ait. ssp. **HOLOSERICEA** (Nutt.) W. A. Weber, comb. nov. Urtica holosericea Nutt., J. Acad. Phila. II, 1:183. 1848.

#### LITERATURE CITED

Collotzi, Albert William. 1966. Investigations in the genus Grayia based on chromatographic, morphological and embryological criteria. Masters Thesis, Utah State Univ., Logan, 38 pp. + 16 fig. (unpublished).

Hall, Harvey Monroe & Frederic E. Clements. 1923. The North American species of Artemisia. Carnegie Inst. Wash. Publ. 326. 31-156. 23 plates.

Harrington, H. D. 1954. Manual of the plants of Colorado. Sage Books, Denver. 666 pp.

Hitchcock, A. S. 1950. Manual of the grasses of the United States. U.S.D.A. Misc. Publ. 200. 1051 pp.

Widén, K. G. 1971. The genus Agrostis in eastern Fennoscandia: Taxonomy and distribution. Flora Fennica 5:109.

ADDITIONS TO THE FLORA OF COLORADO—XI

William A. Weber & Ronald Wittmann  
University of Colorado Museum  
Campus Box 218, Boulder, CO 80309

The tenth number of this series was published in *Phytologia* 55:11-13. 1984. Three-letter family acronyms are used, following Weber (*Taxon* 31:74-88. 1982).

NEW RECORDS FOR COLORADO  
(INDIGENOUS TAXA)

ARNICA ALPINA (L.) Olin ssp. TOMENTOSA (Macoun) Maguire, *Madrono* 6:153. 1942 (AST). PITKIN CO.-GUNNISON CO. BORDER: a col 1.5 mi S of Taylor Pass (along ridge to Taylor Peak), 12,650 ft. alt., on windswept bare clay flat with sparse vegetation (Chionophila jamesii), 3 Aug. 1980, 30 Aug. 1984, Katharine I. Matthews 491, 1745. Disjunct from Montana and northward.

CHONDROPHYLLA NUTANS (Bunge) W. A. Weber (GEN). PITKIN-GUNNISON CO. BORDER: ridge south of col, 1.5 mi S of Taylor Pass (along ridge to Taylor Peak), in Kobresia turf, 12,700 ft. alt., 29 Aug. 1984, K. I. Matthews 1744. SUMMIT CO.: tundra, W slope of Hoosier Ridge, 13,000 ft. alt., 31 Aug. 1948, Weber & Thornburg 4453.

Aven Nelson proposed the genus Chondrophylla for two Rocky Mountain species, C. americana and C. fremontii. He felt that the C. prostrata of Eurasia differed from its American counterpart although he did not elaborate. C. americana is now generally recognized to be synonymous with C. prostrata Haenke, and C. fremontii is synonymous with C. aquatica (L.) Weber (Gillett 1963). The genus Ciminalis, which for a time was thought to include these species, is now reserved for a monotypic species of the Alps.

In my Rocky Mountain Flora, ed. 5. 205. 1976, I reported what I considered specific differences between these taxa because in previous editions I had incorrectly synonymized fremontii under prostrata. Mrs. Aven Nelson (in litt.) had argued correctly that the taxa were indeed morphologically and ecologically quite distinct and as I applied closer observation in the field I saw the merit of her case.

Noel Holmgren, in Intermountain Flora, 4:8. 1984, listed my arguments for the distinctions, but concluded, however, "I have not found these characters so well correlated as Weber has suggested, and therefore recognize them as one species."

In the Flora USSR (1967, Vol. 18 [English translation], pp. 420-429), C. prostrata and C. aquatica are placed (sub Gentiana) in Series Prostratae Grossh. and Series Aquaticae Grossh. These differ markedly in the former having the capsule linear-oblong, much longer than broad, and the latter having the capsule obovoid, not more than 4 times as long as broad (in C. aquatica it is "ob-

ovoid-spherical"). I confess I was not aware of this additional distinction but in connection with the addition of C. nutans to the Colorado Flora I became aware of this strong qualitative difference; it can be used to separate C. prostrata and C. nutans, on the one hand (both of which have elongate capsules), from C. aquatica which has very short capsules that open widely to form an open two-lipped cup at maturity.

Holmgren gives a range of capsule length in C. prostrata as 4-7 (14) mm long, which suggests that he had both species and was lumping the variation range. This assumption is proven correct by reference to the plate on page 9 which shows a flowering branch with corolla and open capsule of C. prostrata, elongate and dehiscent only at the apex (no explanation is given as to the parts shown). To the right of this figure is shown a capsule of C. aquatica, with its characteristic obovoid shape and deep dehiscence. Captions indicate the stipe and the capsule. Clearly two taxa should be recognized in the Intermountain Flora.

These observations were made in the course of study of an unusual Chondrophylla discovered by Miss Matthews in her alpine studies in the Elk Mountains of Colorado. This population of plants differed from all other Colorado collections in having extremely long, blackish stipes up to almost 3 cm long, and nodding flowers. This plant clearly belongs to Series Prostrata but differs from C. prostrata in the characters mentioned, the latter having relatively short stipes that barely extend the capsule beyond the flower tube, and strictly erect flowers on relatively shorter stems.

This material belongs to C. nutans (Bunge) Weber, heretofore known only from Asia! I had collected it myself in the type area of the headwaters of the Chuya River in southern Altai in Siberia and fortunately have good matching material in the herbarium. In working over our collections of C. prostrata from Colorado, I discovered another collection that I had made almost forty years ago on Hoosier Ridge. Thus the list of Middle Asiatic disjuncts in Colorado continues to grow.

The treatment of Gillett (1963) is confusing. He described the capsules of both C. prostrata and C. aquatica as being equal in length (1.5 cm), which is not true. His illustration (Fig. 11) is quite incorrect, since it does not distinguish properly between the stipe and the capsule. Actually, only the flared portion is capsule. The habit sketches are reasonably correct, but the small drawing of the opened corolla shows a capsule that is more like that of C. prostrata than of C. aquatica. The illustration (Fig. 10) of C. prostrata is quite correct as to the small plant and the opened corolla, but the larger plant with the long filiform stipe suggests that the artist was looking at C. nutans! Possibly that species is actually more widely distributed in Northwestern North America than we realize.

ERIOGONUM LEPTOCLADON var. LEPTOCLADON T. & G., Pac. RR Rept. 2:129. 1877 (PLG). MESA CO.: Rabbit Valley, between Mack and Utah State line, S of Hwy I-70, Young 204. Fls. yellow.



GAILLARDIA SPATHULATA A. Gray, Proc. Amer. Acad. 12:59. 1877 (AST). MESA CO.: Beaver Mesa, above John Brown Canyon, 7,000 ft. alt., Dolores River Canyon, pinon-juniper-sagebrush, 16 June 1982, Young (COLO 401520).

HEUCHERA VERSICOLOR Greene. Lfl. Bot. Obs. Crit. 1:112. 1905 (SAX). LAS ANIMAS CO.: west terminus of Mesa de Maya between Raton Pass and Trinidad; Fisher's Mesa, on vertical face of cap-rock facing north and east, aspen level, 8 July 1984, John H. Robertson 6. The race represented here is var. versicolor. The main area for this species is central and southern New Mexico and Arizona.

MUHLENBERGIA THURBERI (Scribn.) Rydb., Bull. Torr. Bot. Club 32:601. 1905 (POA). DELTA CO.: Escalante Canyon, 20-21 Sept. 1981, Siplivinsky 2520; 1 Sept. 1977, Ratzloff (COLO 318394). MESA CO.: Colorado National Monument, 1 Sept. 1982, Siplivinsky 5087; Unaweap Canyon, 11 July 1981, Siplivinsky 1539.

WOODSIA PLUMMERAE Lemmon, Bot. Gaz. 7:6. 1882 (WDS). LAS ANIMAS CO.: along Purgatoire River, T30S R59W; cliffs at spring, cool N-facing slope of canyon, 5 Sept. 1983, David Cooper (COLO 402549).

#### NOTEWORTHY RANGE EXTENSIONS OR REDISCOVERIES

BAEOTHRYON PUMILUM (Vahl) Löve & Löve, Univ. Colorado Studies Ser. Biol. 17:14. 1965 (CYP). Scirpus pumilus Vahl; Trichophorum pumilum Schinz & Thell. PARK CO.: Mosquito Range: Four Mile Creek, 0.5 mi W of Four-Mile Campground, 3200 msm; in saturated moss (Cratoneuron commutatum) mat along a small rill entering a Salix brachycarpa fen, together with Kobresia simpliciuscula and K. sibirica (in the depressions) and K. myosuroides (dominant on higher ground adjacent), calcareous drainage, 1 Sept. 1984, Weber & Wittmann 17467. While not strictly a new record, the cited collection represents the first time this species has been found since Hall & Harbour collected it, without specified locality, in 1862. One of Colorado's most elusive rarities, known in the contiguous U.S. only from Colorado and Convict Creek in the Californian Sierra Nevada. Otherwise known from Canada and Alaska, one locality in Scandinavia (North Norway), the Alps, Caucasus, Central Asia and Mongolia.

CIRSIIUM HESPERIUM Eastw. (AST). LAS ANIMAS CO.: between Cor dova Pass and Cucharas Pass, SW of Spanish Peaks, 11,000ft. alt., along wet rill in opening of spruce-fir forest, 24 Aug. 1985, Weber & Hogan 17534. Previously known only from the San Juan Mts. (Slumgullion Pass area), west of the Continental Divide.

GAURA NEOMEXICANA Woot. ssp. COLORADENSIS (Rydb.) Raven & Gregory (ONA). BOULDER CO.: base of outer foothills of Front Range, 1,600 msm, Lee Hill Road just N of Boulder, 22 Sept. 1984,

Weber & Phipps 17471. Only one plant was found despite a thorough canvassing of the area. This tends to be the pattern for this taxon; everywhere it is rare, with only one or two plants seen. In 1985 a search for it in the same area was unsuccessful.

LEPTODACTYLON WATSONII (A. Gray) Rydb. (PLM). LAS ANIMAS CO.: Mesa de Maya; Lizard Head, a promontory at highest point of eastern section of the mesa, NE of Branson, 6,900 ft. alt., T33S R56W SE1/4 Sec. 31, around rocks at the very edge of the promontory, 23 Aug. 1985, Weber & Hogan 17525. Previously known only from a few scattered sites west of the Continental Divide.

PROSOPIS GLANDULOSA Torr., Ann. Lyc. N.Y. 2:192. 1827 (FAB). LAS ANIMAS CO.: Mesa de Maya, in the gap between east and west sections, on Willard Loudon Ranch (20,000 acres) NW of Branson, 5,500-6,000 ft. alt., Sec. 9, T35S R55W, Cobert Mesa North Quadr. (1972); N-facing slope of Philips (Hardesty) Canyon between Kelly and Nestor branches, 23 Aug. 1985, Weber & Hogan 17516. Two shrubs, originally 2 m tall, badly winterkilled, with new growth only 1 m tall. Known to the Loudon family from the time of the original homestead (1901-02). This is the northernmost locality known for the species, and the first herbarium record for Colorado since Greene collected it "in mountains between the Purgatory and Apishapa, 30 mi N of the state line", on Jan. 21, 1880.

#### ADVENTIVE TAXA

CAMPISIS RADICANS (L.) Seem. (BIG). MESA CO.: established along fencerows, Grand Junction, Young 200.

CHRYSANTHEMUM COCCINEUM Willd. (AST). PITKIN CO.: Norrie Colony E of Meredith, 8,500 ft. alt., meadows and forest margins near Fryingpan River, 3 Aug. 1984, Reid (COLO 400842).

HELIANTHUS TUBEROSUS L. (AST). MESA CO.: established along irrigation ditches, Grand Junction, Young 219.

HIERACIUM AURANTIACUM L. (AST). PITKIN CO.: Norrie Colony E of Meredith, 8590 ft. alt., meadows and forest margins near Fryingpan River, 3 Aug. 1984, Reid (COLO 400821).

MACLURA POMIFERA (Raf.) C. K. Schneider (MOR). MESA CO.: established and becoming a pest along fencerows, River Road, Grand Junction, Young 214.

MORUS ALBA L. (MOR). MESA CO.: established along fencerows, ditches and seeps, Grand Junction, Young 218.

#### LITERATURE CITED

Flora of the USSR, Vol. XVIII: Metachlamydeae. 1967. English Version by Israel Program for Scientific Translations. 600 pp.

Gillett, John M. 1963. The gentians of Canada, Alaska and Greenland. Canad. Dept. Agric. Res. Branch Publ. 1180. 99 pp.

Holmgren, Noel. 1984. Gentianaceae, in Intermountain Flora, 4: 4-23. New York Botanical Garden.


A NEW SPECIES OF TETRACHYRON (ASTERACEAE - HELIANTHEAE)

FROM OAXACA, MEXICO.

B.L. Turner

Department of Botany, University of Texas, Austin Tx. 78713

Mexico, in its more remote, poorly collected regions, continues to yield many localized endemics, some of them remarkably distinct. This is attested to by the following novelty in Tetrachyron which follows upon the heels of a thorough monographic study of the genus by Wussow and Urbatsch (1979) who recognized but 5 species in the group. The genus was formerly placed under the wing of Calea, but properly segregated in my opinion. Contrary to the views of Wussow and Urbatsch, I think that Tetrachyron is close to, if not within, the broad limits of the tribe Coreopsideae as envisioned by Turner and Powell (1977). That is, Tetrachyron appears to be an ancestral group within or near this tribe, not especially like Coreopsis, Bidens, etc., but in the mold of the Mexican genera Guardiola, Espejoa, etc., as discussed by Turner and Powell (1977, p. 725).

TETRACHYRON TORRESII B.L. Turner, sp. nov. 

T. brandegei accedens sed foliis amplioribus ovatis vel deltoideis dentatis; flores capituli paucioribus.

Reportedly a suffruticose herb up to 40 cm high, but seemingly a shrub or subshrub of larger proportions. Stems terete, grey and noticeably lenticelate, the secondary shoots with densely clustered knobby nodes. Leaves opposite, 3-5 cm long, glabrous; petioles 3-10 mm long, with a tapering incurved wing throughout; blades ovate to trianguloid, 3-nervate from near the base, the margins dentate, especially below, the apices acute. Heads 5, turbinate, borne in short, terminal, subumbellate, clusters, the branches glabrous. Involucres 3-4 mm long, 2-3 seriate, subimbricate, glabrous; bracts ovate-lanceolate, somewhat scarious, yellowish. Ray florets 3-5, pistillate, fertile; tube ca 1 mm long; limb tubulo-funnelform 2.5-3.0 mm long, the lobes acute, ca 0.6 mm long. Achenes (immature) ca 1.5 mm long, glabrous, somewhat 4-sided; pappus of 4 hyaline scales ca 0.4 mm long.

TYPE: MEXICO. OAXACA: Distr. de Tehuantepec, 8.9 km N de Lechiguiri, 10 Dec 1983, R. Torres C. et al. 4314, (holotype TEX; isotypes MEXU, to be distributed).

Related to T. brandegei: but immediately distinct by its larger, ovate to trianguloid, dentate leaves and fewer-flowered heads. According to label data it occurs in relic deciduous forests dominated by Liquidambar.

It is a pleasure to name this remarkable species for its only known collector, Mr. R. Torres of UNAM, who has assembled a fine series of "comps" from throughout Mexico.

#### LITERATURE CITED

Turner, B.L. and A.M. Powell, 1977. Helenieae - systematic review. In, *The Biology and Chemistry of the Compositae* 2:700-737. (eds. Heywood et al.) Academic Press, London.

Wussow, J.R. and L.E. Urbatsch. 1979. A systematic study of the genus Tetrachyron (Asteraceae: Heliantheae). *Syst. Bot.* 4:297-318.

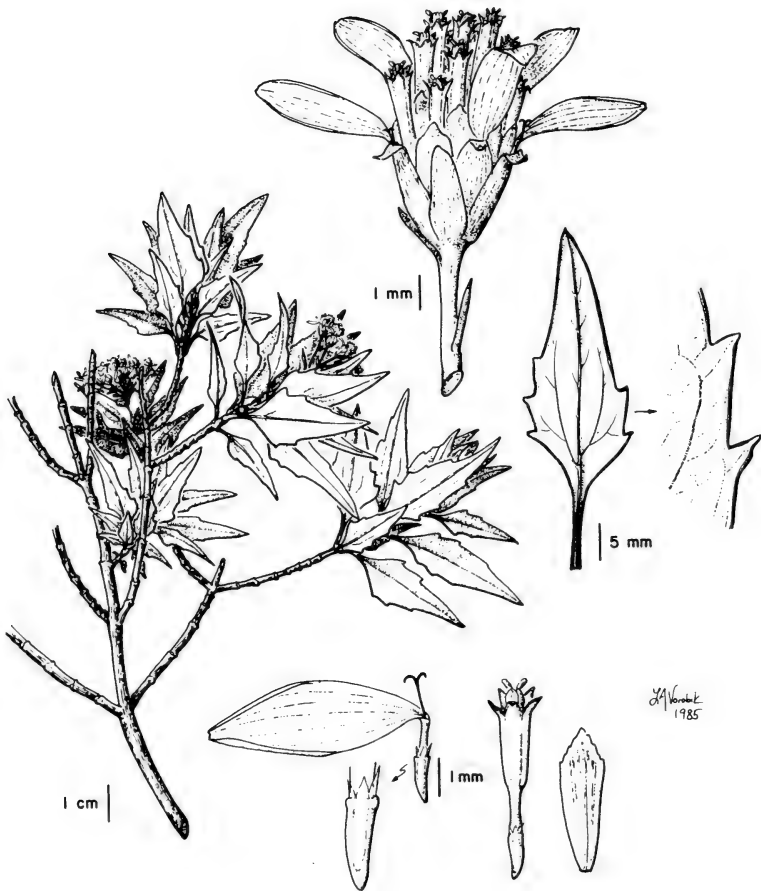


Fig. 1. TETRACHYRON TORRESII, from holotype.

NEW SPECIES AND COMBINATIONS IN *BELLOA* (INULEAE-ASTERACEAE)

Abundio Sagástegui-Alva  
Herbarium Truxillense (HUT)  
Universidad Nacional de Trujillo, Trujillo, Perú

and

Michael O. Dillon  
Department of Botany  
Field Museum of Natural History, Chicago, IL 60605-2496

ABSTRACT-- Three new species of *Belloa* (Asteraceae) are described from Perú: *B. turneri* Sagást. & Dillon, *B. spathulifolia* Sagást. & Dillon, and *B. plicatifolia* Sagást. & Dillon; and the following combinations are made: *B. cerrateae* (Ferreya) Sagást. & Dillon, *B. longifolia* (Cuatr. & Arist.) Sagást. & Dillon, *B. pickeringii* (A. Gray) Sagást. & Dillon, and *B. radians* (Benth.) Sagást. & Dillon.

Botanical exploration in the Andes of northern Perú continues to yield new Asteraceae. In preparation for an upcoming treatment of the Inuleae (Asteraceae) for the Flora of Peru, the following species descriptions and combinations are made.

*Belloa turneri* Sagást. & Dillon, sp. nov. Fig. 1.

Herbae perennes usque ad 20 cm altae; caules erecti simplices, dense sericeo-lanati. Folia basalia sessilia, rosulata, oblongo-lanceolata vel lineari-lanceolata, 2-4 cm longa, 3-5 mm lata, coriacea, marcescentia, bicoloria, basi attenuata, apice acutae, inferne argenteo-tomentosae, superne lanuginosus, margine integrae; folia caulina, alterna, sessilia, linearia vel lanceolata, 1-3 cm longa, 1.5-3 mm lata, margine integra. Capitulescentiae spiciformes, bracteatae. Capitula disciformia, 5-6 mm alta, ca. 5 mm lata; phyllaria ca. 25, ca. 4-seriata, externa ovata, 3.5-4.5 mm longa, 2.5-3.5 mm lata, intima linearia vel oblongo-linearia, 5-6 mm longa, 1-2 mm lata. Flores marginales feminei, pluriseriati; corollae filiformae, ca. 3.5 mm longae. Flores disci hermaphroditi 10-12; corollae anguste tubulosae, 3-3.5 mm longae. Achaenia oblonga, ca. 1 mm longa, glabra, glandulosa; pappi setae ca. 4 longae, basi connatae, albae.

TYPE: PERU. Dept. Cajamarca. Prov. Contumazá: alrededores del Pozo Kuán, ladera, 3600-3800 m, 13 Jun 1981, A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10087 (HUT, holotype; F, HUT, MO, TEX, isotypes).

Perennial herbs to 20 cm tall; stems erect, unbranched, cylindrical, densely sericeous-lanose. Basal leaves sessile, rosulate, oblong-lanceolate to linear-lanceolate, 2-4 cm long, 3-5 mm wide, coriaceous, marcescent, discolorous, basally attenuate, apically acute, mucronulate, parallel-nerved, the lower surface silvery-tomentose, the upper surface lanuginous, the margins entire, the cauline leaves alternate, sessile, linear to lanceolate, 1-3 cm long, 1.5-3 mm wide, the margins entire. Capitulescences spiciform, bracteate. Capitula disciform, 5-6 mm high, 5 mm wide; involucre campanulate; phyllaries ca. 25, ca. 4-seriate, imbricate, stramineous, the outer ovate, 3.5-4.5 mm long, 2.5-3.5 mm wide, concave, lanuginous, acute, the inner linear to oblong-linear, 5-6 mm long, 1-2 mm wide, planar, glabrous, apically acute; marginal florets pistillate, pluriserial, the corollas filiform, ca. 3.5 mm long; disc florets hermaphroditic, 10-12, the corolla narrowly tubular, 3-3.5 mm long. Achenes oblong, ca. 1 mm long, brownish, glabrous, glandular; pappus bristles ca. 4 mm long, fused basally, white.

DISTRIBUTION: Frequent in open areas within "jalca" formations of northern Perú (Departments of Ancash and Cajamarca, 3100-3800 m) and southern Ecuador (Province of Loja, 2400-2600 m).

Belloa turneri is distinctive within the genus, possessing rosulate basal leaves and robust, erect, spicate capitulescences. It most closely resembles B. lopezmirandae Cabr. of Dept. La Libertad, Perú; however, the latter has smaller capitula with cylindrical involucre and fewer florets (ca. 20 pistillate, 1-2 hermaphroditic). It is known by the local name of "champito" in Ancash.

We take great pleasure in naming this species for Dr. Billie L. Turner of the University of Texas at Austin, a noted synantherologist and contributor to the Flora of Peru.

Additional material examined: ECUADOR. Prov. Loja: Catacacha, 2400-2600 m, 17 Apr 1944, Solís 7949 (F). PERU. Dept. Ancash. Prov. Huaraz: Cerro San Cristóbal, 3800 m, 8 Jul 1977, Evangelista s.n. (F, HUT, MO). Dept. Cajamarca. Prov. Contumazá: Pampa de la Sal, 3500 m, 27 Jun 1983, Sagástegui, Mostacero & Alvitez 10731 (F, HUT, MO); Prov. San Miguel: Taulis Alto (jalca), 3100 m, 20 Jun 1980, Sagástegui, Mostacero & Alvitez 9547 (F, HUT, MO).

**Belloa spathulifolia** Sagást. & Dillon, sp. nov. Fig. 2.

Species haec a Belloa longifolia (Cuatr. & Arist.) Sagást. & Dillon foliis anguste spathulatis 2-4 mm latis differt. Capitula disciformia, flosculis femineis 15-16, corollis ca. 4 mm longis, pappis ca. 4 mm longis.

TYPE: PERU. Dept. La Libertad. Prov. Santiago de Chuco: entre Chota Motil y Shorey, jalca, 3200 m, 6 Dec 1984, A. Sagástegui A., J. Mostacero L. & M. Diestra Q. 11695 (HUT, holotype; F, MO, isotypes).

Cespitose, perennial herbs to 3 cm; rhizomes oblique, roots filiform. Leaves sessile, rosulate, spathulate to oblanceolate-spathulate, 2-3.5 cm long, 2-4 mm wide, coriaceous, marcescent, expanded basally and partially sheathing the stem, both surfaces densely silvery-tomentose, the margins entire. Capitulescences solitary or 2-3-headed glomerule, sessile. Capitula disciform, 7-8 mm high, ca. 5 mm wide; involucre narrowly campanulate; phyllaries ca. 24, 4-seriate, imbricate, stramineous, the outer ovate, ca. 4 mm long, ca. 2 mm wide, lanuginous, obtuse, the inner linear-oblong, 7-8 mm long, ca. 2 mm wide, glabrous, obtuse; marginal florets pistillate, 15-16, the corollas filiform, ca. 4 mm long, the style branches exerted; disc florets hermaphroditic, ca. 10, the corollas narrowly tubular, ca. 5 mm long. Achenes obovate to oblong, ca. 1 mm long, brown, glabrous, glandular; pappus bristles ca. 4 mm long, fused basally, white.

DISTRIBUTION: Infrequent in open spaces between clumps of Stipa ichu within the "jalca" formations of northern Perú (Department of La Libertad, 3100 m).

Belloa spathulifolia most closely resembles B. longifolia with its cespitose, rosulate habit; however, the latter has much wider leaves (6-10 mm), larger capitula and more numerous pistillate florets (ca. 80).

**Belloa plicatifolia** Sagást. & Dillon, sp. nov. Fig. 3, F-K.

Herbae perennes usque ad 5-20 cm altae; caules erecti vel adscendentes, ramosi, foliacei. Folia alterna, disticha, sessilia, orbicularia vel suborbicularia, 5-14 mm longa, 3-7 mm lata, plicata, marcescentia, basi attenuata, subamplexicaulia, apice rotundata, utrinque dense lanata. Capitulescentiae solitariae, e foliorum axillis superioribus natae. Capitula disciformia, (6-) 7-8 (-9) mm alta, 3-4 mm lata, subsessilia; phyllaria 15-20, 4-5-seriata, exima ovata, 4-6 mm longa, 3-4 mm lata, apice subacuta, intima linearia vel lanceolata, 7-8 mm



longa, 1-1.5 lata, apice acuta. Flores marginales feminei 12-14, uniseriati; corollae filiformes, 4-5 mm longae. Flores disci hermaphroditici ca. 10; corollae anguste tubulosae, 4-5 mm longae. Achaenia obovata vel oblonga, 1-1.5 mm longa, glabra, glandulosa; pappi setae 5-6 mm longae, basi connatae, albae.

TYPE: PERU. Dept. Cajamarca. Prov. Contumazá: Cascabamba, arriba de Contumazá, ladera, 3200 m, 14 Jun 1981, A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10117 (HUT, holotype; F, HUT, MO isotypes).

Perennial herbs to 5-20 cm tall; stems branched, erect to ascending, leafy to the apices. Leaves alternate, sessile, distichous, orbicular to suborbicular, 5-14 mm long, 3-7 mm wide, marcescent, folded, basally attenuate, subamplexicaulous, apically rounded, both surfaces densely lanate, the margins entire. Capitulescences solitary in upper leaf axils, subsessile. Capitula disciform, (6-) 7-8 (-9) mm high, 3-4 mm wide; involucre cylindrical; phyllaries 15-20, 4-5-seriate, imbricate, scarious, stramineous, hyaline at margin, the outer ovate, 4-6 mm long, 3-4 mm wide, concave, dorsally lanuginous, subacute, the inner linear to lanceolate, 7-8 mm long, 1-1.5 mm wide, glabrous, acute; marginal florets pistillate, 12-14, uniseriate, the corollas filiform, 4-5 mm long; disc florets hermaphroditic, ca. 10, the corollas narrowly tubular, 4-5 mm long. Achenes obovate to oblong, 1-1.5 mm long, brown, glandular; pappus bristles 5-6 mm long, fused basally, white.

DISTRIBUTION: Frequent among sheltered rocky sites in "jalca" formations of northern Perú (Departments of Cajamarca and La Libertad, 3000-3500 m).

Belloa plicatifolia is morphologically distinct and has no apparent close relatives. Its erect lanate branches with folded, distichous leaves give the stems a flattened appearance unknown elsewhere in the genus.

Additional material examined: PERU. Dept. Cajamarca. Prov. Cajabamba: Cajabamba-Luchubamba, 3800 m, 17 Nov 1983, Sagástegui et al. 11199 (F, HUT, MO). Prov. Cajamarca: Cumbemayo, 3200 m, <sup>4</sup> May 1985, Sagástegui & Tellez 12686 (F, HUT, MO). Prov. Contumazá: Cascabamba, 3050 m, 8 Jun 1977, Sagástegui et al. 9022 (F, HUT, MO); Cascabamba, 3100 m, 12 Jun 1981, Sagástegui et al. 10010 (F, HUT, MO); Cascabamba, 3000 m, 27 Jun 1983, Sagástegui et al. 10719 (F, HUT, MO). Dept. La Libertad. Prov. Otuzco: Salpo, Cerro Ragache, 3500 m, 23 May 1984, Sagástegui et al. 11631 (F, HUT, MO).

## NEW COMBINATIONS

The following species are transferred to Belloa. All possess glabrous and glandulous achenes, pappus bristles fused at the base, and style branches with rounded apices.

Belloa cerrateae (Ferreyra) Sagást. & Dillon, comb. nov.

Mniodes cerratei Ferreyra, Bol. Soc. Peruana Bot. 8(1-2): 80. 1980. TYPE: Perú, Dept. Ancash, Prov. Bolognesi, Paso de Chonta, Dist. de Ticllos, 4400 m, 29 Apr 1956, E. Cerrate 2549 (USM, holotype).

This taxon has heterogamous capitula and other characteristics typical of Belloa. All species of Mniodes are dioecious.

Belloa longifolia (Cuatr. & Arist.) Sagást. & Dillon, comb. nov. (Fig. 3, A-E).

Lucilia longifolia Cuatr. & Arist., Fl. Venezuela 10: 367. 1964.

This species is distributed from Venezuela to northern Perú. The Peruvian elements were initially thought to be new and an illustration prepared. It is included here as a supplement to the original illustration in the Flora de Venezuela.

Belloa pickeringii (A. Gray) Sagást. & Dillon, comb. nov.

Lucilia pickeringii A. Gray, Proc. Amer. Acad. Arts 5: 138. 1862.

Belloa radians (Benth.) Sagást. & Dillon, comb. nov.

Gnaphalium radians Benth., Planta Hartwegiana p. 207. 1839.

Gnaphalium evaccoides Schultz-Bip., Bonplandia 4: 54. 1856, nom. nud.

Lucilia radians (Benth.) Cuatr., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 33: 138. 1936.

Lucilia radians (Benth.) Steyermark, Fieldiana, Bot. 28 (3): 642. 1953.

## REFERENCES

- Cabrera, A. L. 1958. El género Belloa Remy. Bol. Soc. Argent. Bot. 7: 79-85.
- Steyermark, J. A. 1953. Botanical Exploration in Venezuela-III. Fieldiana, Bot. 28(3): 449-678.

## ACKNOWLEDGMENTS

We thank Dr. Timothy Plowman for critically reviewing an early draft of the manuscript. Illustrations were prepared by Segundo Leiva Gonzáles, Universidad Nacional de Trujillo. This study was made possible by a grant from the NSF-Science In Developing Countries Program (INT-8512104). Field work by the senior author was supported, in part, by the Missouri Botanical Garden.

## EXPLANATION OF FIGURES

Fig. 1. Belloa turneri. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, style branches of pistillate floret; I, achene. (Drawn from Sagástegui et al. 10087, HUT).

Fig. 2. Belloa spathulifolia. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, anther; I, style branches of pistillate floret; J, achene. (Drawn from Sagástegui et al. 11695, HUT).

Fig. 3. Belloa longifolia. A, habit; B, capitulum; C, pistillate floret; D, hermaphroditic floret; E, achene. (Drawn from Sagástegui et al. 10060, HUT). Belloa plicatifolia. F, habit; G, capitulum; H, pistillate floret; I, hermaphroditic floret; J, style branches of pistillate floret; K, achene. (Drawn from Sagástegui et al. 10117, HUT).

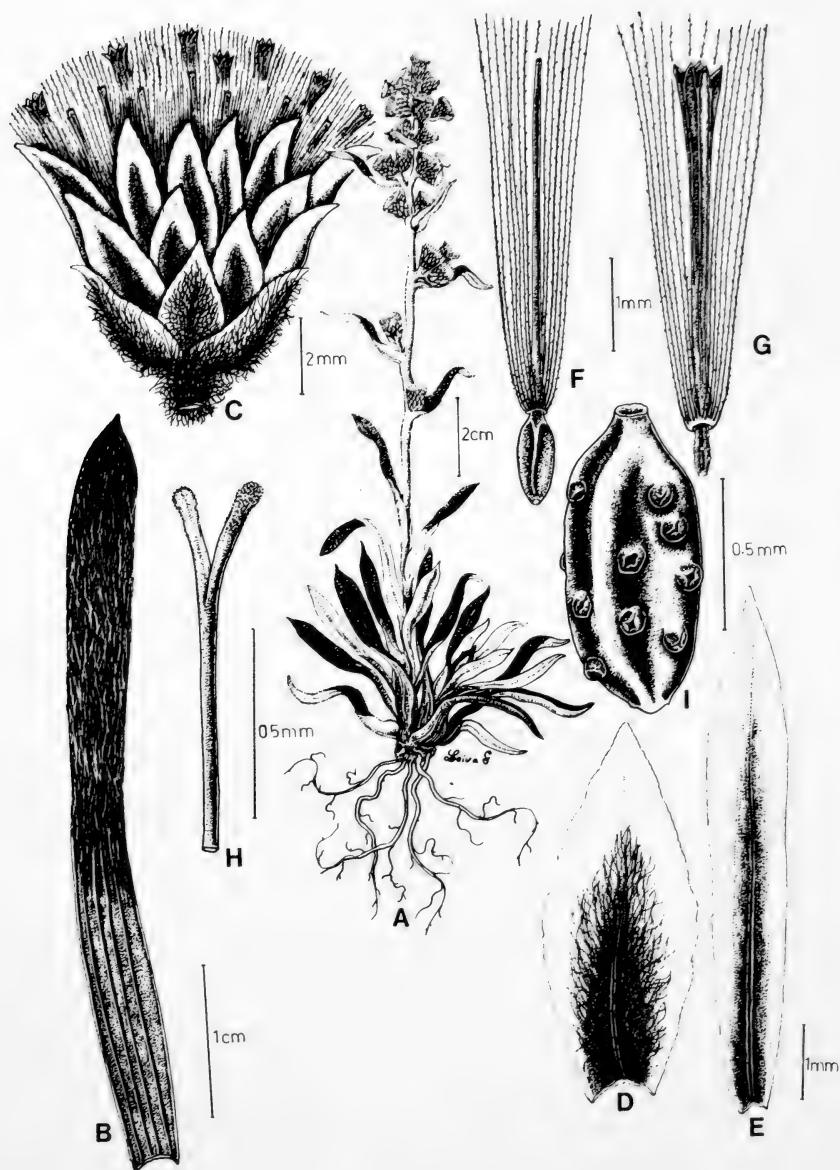


FIG. 1

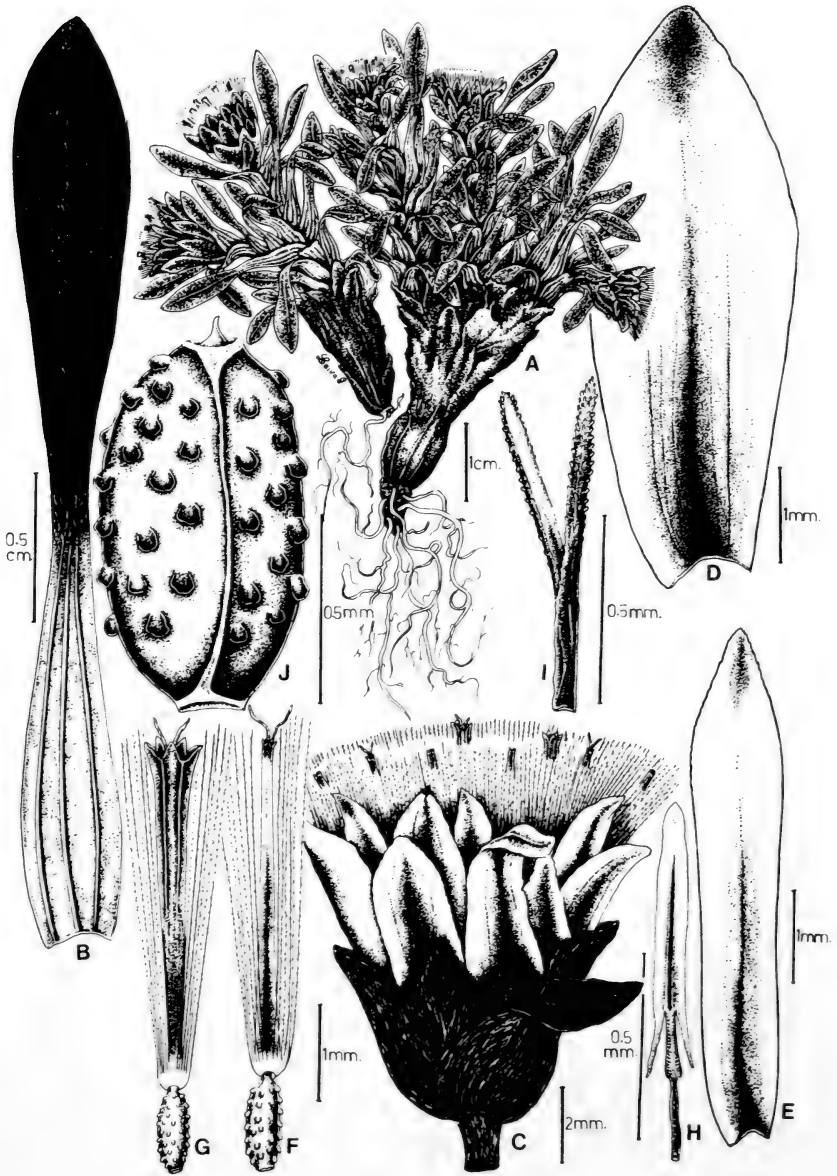


FIG. 2

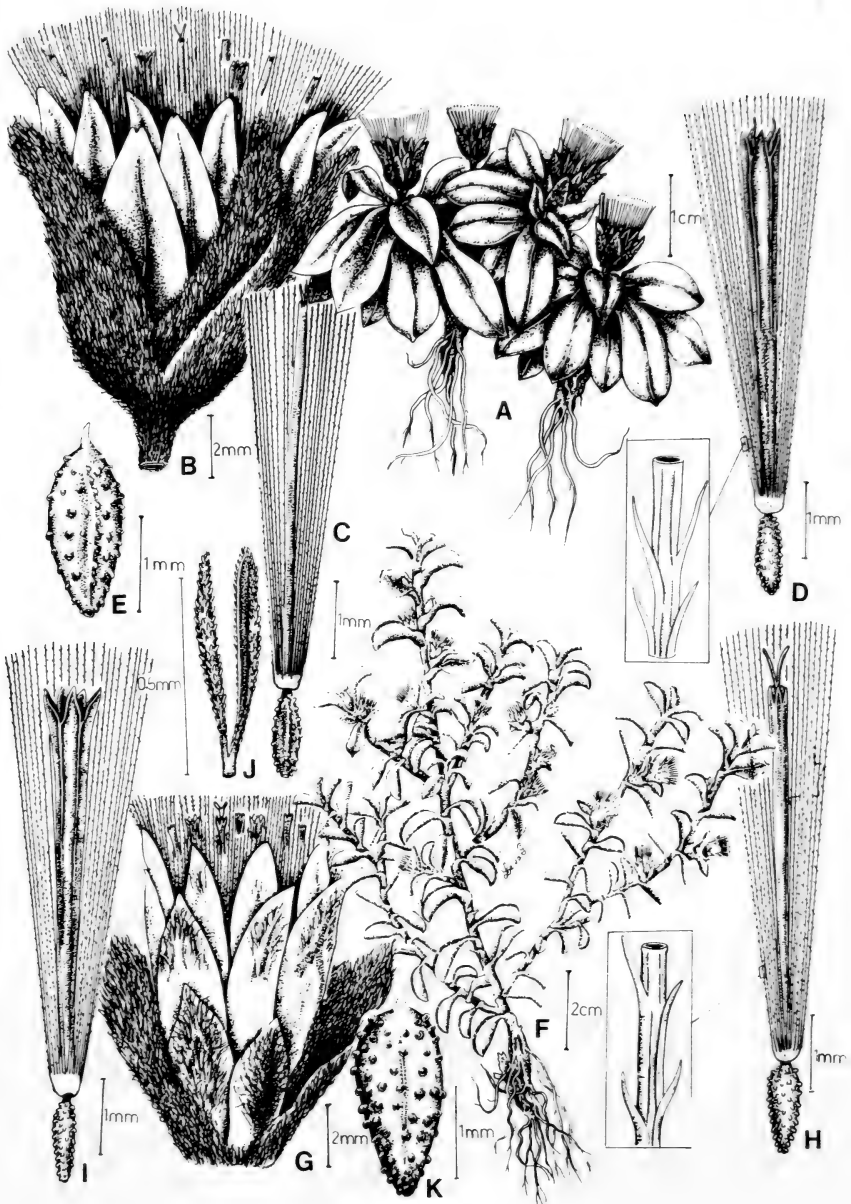


FIG. 3

NOTES ON THE GENUS CLERODENDRUM (VERBENACEAE). X

Harold N. Moldenke

This paper is a continuation of the notes on this genus begun by me in *Phytologia* 57: 157 (1985) and most recently continued in the issue immediately preceding the present one.

**CLERODENDRUM** Burm.

Additional bibliography: Mold., *Phytologia* 58: 329--359. 1985.

Chevalier (1913) lists an unidentified species of this genus, represented by *Chevalier 6521*, from upper Chari, Central African Republic, which he describes as a "Liane s'élevant de 4 à 5 mètres de hauteur, fleurs blanches".

**CLERODENDRUM CALAMITOSUM** L.

Additional bibliography: Stapf, *Trans. Linn. Soc. Lond.*, ser. 2, 4: 522. 1896; Koord., *Meded. Lands Plant. Bogor.* 19: 558. 1898; Woodrow, *Journ. Bomb. Nat. Hist. Soc.* 12: 360. 1899; Koord. & Val., *Meded. Lands Plant. Bogor.* 42 [Beijdr. Boorsma, *Bull.* 7]: 212. 1900; Vorderman, *Teysmannia* 11: 217. 1900; Boorsma, *Bull. Inst. Bot. Buitenz.* 14: 8. 1902; T. Cooke, *Fl. Presid. Bomb.*, ed. 1, 3: 433. 1906; Gamble in King & Gamble, *Journ. Asiat. Soc. Beng.* 74 (2 extra): 827. 1908; Gerth van Wijk, *Dict. Plantnames*, imp. 1, 1: 335. 1911; Hosseus, *Bot. Centralbl. Beih.* 28 (2): 429. 1911; Craib, *Contrib. Fl. Siam vicot.* 165. 1912; Koord., *Exkursionsfl.* 3: 138. 1912; E. D. Merr., *Fl. Manila*, imp. 1, 403. 1912; Gerth van Wijk, *Dict. Plantnames*, imp. 1, 2: 111 & 876. 1916; Heyne, *Nutt. Plant. Ned. Ind.*, ed. 1, 4: 119--120 & xxii. 1917; H. Hallier, *Meded. Rijks herb Leid.* 37: 74--75. 1918; R. N. Parker, *For. Fl. Punjab*, ed. 1, 400. 1918; H. J. Lam, *Verbenac. Malay. Arch.* 251, 257, & 363. 1919; Bakh. in Lam & Bakh., *Bull. Jard. Bot. Buitenz.*, ser. 3, 3: 74, 82, 108, & viii. 1921; E. D. Merr., *Bibl. Enum. Born. Pl.* 516. 1921; E. D. Merr., *Philipp. Journ. Sci.* 19: 377. 1921; E. D. Merr., *Enum. Philip. Flow. Pl.* 3: 400. 1923; Ridl., *Fl. Malay Penins.* 2: 629. 1923; R. N. Parker, *For. Fl. Punjab*, ed. 2, 400. 1924; Heyne, *Nutt. Plant. Ned. Ind.*, ed. 2, 1: 24 (1927), ed. 2, 2: 1321--1322 (1927), and ed. 2, 3: 1645. 1927; Stapf, *Ind. Lond.* 2: 238. 1930; Backer, *Onkruidfl.* 2 [Handb. Suiker.-Cult. 7]: 548--549. 1931; Schwenke, *Zytol. Untersuch. Verb. Ind.* 1931; Kloppenburg-versteegh, *Wenk. Raadgev. Betreff. Gebr. 38. Pl.*, ed. 4, 60. 1934; L. H. Bailey, *Lists Florists Handl. Verbenac.* [mss.]. 1935; Patermann, *Beitr. Zytol. Verbenac.* 38--39, 48, [55], & [56], pl. 4, fig. 40--46 & pl. 5, fig. 10. 1935; Dop in Lecomte, *Fl. Gén. Indo-chin.* 4: 851 & 867--868. 1935; Fletcher, *Kew Bull. Misc. Inf.* 1938: 431. 1938; Mold., *Alph. List Comm. Vern. Names* 4, 18, & 26. 1939; Mold., *Lilloa* 4: 332. 1939; Mold., *Prelim. Alph. List Inv. Names* 18, 21, & 53. 1940; Mold., *Suppl. List Comm. Names* 10 & 11. 1941; Sorgdrager, *Pharm. Tijd. Ned. Ind.* 4. 1941; Mold., *Alph. List Inv. Names* 16, 19, & 56. 1942; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 60--65, 76, & 89. 1942; Mold., *Phytologia* 2: 98. 1945; Savage, *Cat. Linn. Herb.* 110. 1945; Blume, *Cat. Gewass.*,

imp. 2, 82. 1946; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Cit. 1: 9, 22, 43, 46, 69, 78, 131, 220, & 225. 1946; Mold., Alph. List Inv. Names Suppl. 1: 7. 1947; Mold., Alph. List Cit. 2: 353, 358, 410, 413, 489, 560, 562, 563, 579, 581, 601, & 618 (1948), 3: 749, 814, 837, 946, & 963 (1948), and 4: 1008, 1065, 1094, 1096, & 1154. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 76, 138, 139, 141, 143, 144, 146, 158, & 180. 1949; Mold. in Humbert, Fl. MadAG. L&S: 149, 178--180, & 267, fig. 28 (6 & 7). 1956; Syngae in Chittenden, Roy. Hort. Soc. Dict. Hort., ed. 2, 1: 504 & 505. 1956; T. Cooke, Fl. Presid. Bomb., ed. 2, imp. 1, 2: 513. 1958; Anon., Kew Bull. Gen. Ind. 77. 1959; Mold., Résumé 88, 157, 167, 175, 179, 183, 187, 189, 190, 193, 194, 197, 198, 215, 261, 268, 271, 362, 391, & 448. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Hundley & Ko in Lance, Trees Shrubs Burma, ed. 3, 202. 1961; L., Mant. Pl., imp. 2, 1: 90. 1961; Gerth van Wijk, Dict. Plantnames, imp. 2, 1: 335 (1962) and imp. 2, 2: 111 & 876. 1962; Mold., Résumé Suppl. 4: 7. 1962; Backer & Bakh., Fl. Java 2: 610. 1965; Burkill, Dict. Econ. Prod. Malay Penins. I: 589--590. 1966; T. Cooke, Fl. Presid. Bomb., ed. 2, imp. 2, 2: 513. 1967; E. D. Merr., Fl. Manila, imp. 2, 403. 1968; Gerth van Wijk, Dict. Plantnames, imp. 3, 1: 335 (1971) and imp. 3, 2: 111 & 876. 1971; L., Mant. Pl., imp. 3 [Cramer, Hist. Nat. Class. 7:] 90. 1971; Mold., Fifth Summ. 1: 148, 264, 272, 285, 299, 304, 315, 322, 329, 332, 358, 441, 453, & 461 (1971) and 2: 663, 732, 863, & 972. 1971; Wittstein, Etymol.-bot. Handwörterb., imp. 2, 206. 1971; Backer, Atlas 220 Weeds [Handb. Cult. Sugar-cane 7:] pl. 522. 1973; Farnsworth, Pharmacog. Titles 9 (2): iv & 115. 1974; Hosozawa, Kato, & Munakata, Phytochem. 13: 308--309. 1974; Mold., Phytologia 28: 454 & 455. 1974; Asher, Guide Bot. Period. 1: 616. 1975; Mold., Phytologia 31: 396. 1975; Anon., Biol. Abstr. 61: AC1.581. 1976; Mold., Phytologia 34: 267. 1976; Hsiao, Fl. Taiwan 6: 121. 1980; Mold., Phytol. Mem. 2: 140, 252, 259, 275, 288, 295, 306, 312, 320, 322, 348, 384, 387, 390, 394, & 534. 1980; Manilal & Sivarajan, Fl. Calicut. 233. 1982; Mold., Phytologia 50: 258. 1982; Nair & Ansari, Journ. Econ. Tax. Bot. 3: 605 & 606, fig. 1--4. 1982; Sivarajan & Manilal, Journ. Econ. Tax. Bot. 3: 414--815. 1982; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 468. 1983; Mold., Phytologia 57: 37, 334, & 338 (1985) and 58: 185, 197, 211, 344, & 358--359. 1985.

Illustrations N. L. Burm., Fl. Indica pl. 44. 1768; W. J. Hook., Curtis Bot. Mag. 88 [ser. 3, 18]: pl. 5294. (in color). 1862; Lem., Illust. Hort. 10: pl. 358. 1863; Patermann, Beitr. Zytol. Verbenac. pl. 4, fig. 40--46, & pl. 5, fig. 10. 1935; Mold. in Humbert, Fl. Madag. 174: 179, fig. 28 (6 & 7). 1956; Backer, Atlas 220 Weeds [Handb. Cult. Sugar-cane 7:] pl. 522. 1973; Nair & Ansari, Journ. Econ. Tax. Bot. 3: 606, fig. 1--4. 1982.

A branched shrub or subshrub, mostly 0.5--1 m. (sometimes to 2 m.) tall; stems erect, terete, rhizomatous, sometimes tomentose; branches and twigs slender, very obtusely tetragonal, unarmed, gray or brownish, densely or sparsely puberulent, very medullose, the older ones glabrous; nodes not annulate; principal internodes 1.5--4.5 cm. long; leaves decussate-opposite or approximate, the uppermost some-



times alternate, wide-spreading, petiolate; petioles slender, 0.5--4 cm. long, densely puberulent; leaf-blades thin-chartaceous or sub-membranous, bluish-green or bright-green on both surfaces, oblong or elliptic or tending to be widest above the middle, sometimes ovate-elliptic or oval, 2.5--14 cm. long, 1.5--8 cm. wide, apically acute or obtuse in outline, marginally rather coarsely and irregularly crenate-dentate or dentate-serrate from  $\frac{1}{2}$  the way up to the apex with broadly triangular apically acute teeth, basally acute or obtuse and centrally cuneate into the petiole, pubescent or lightly pulverulent to glabrate above, more or less pulverulent-puberulent (especially along the larger venation) beneath or becoming subglabrate on the lamina, those subtending the cymes much smaller; midrib slender, flat above, prominulous beneath, usually more densely puberulent on both surfaces than the lamina; secondaries slender, 4--6 pairs, ascending, rather straight, more or less irregularly joined near the margins and sending branches to each tooth-tip, prominulous beneath, flat above; vein and veinlet reticulation very slender, usually obscure or indiscernible above, the larger portions slightly prominulous beneath; inflorescence axillary or supra-axillary, leafy, the cymes solitary, opposite, crowded toward the tips of the twigs, widely divaricate, 3--10-flowered, 1--3 times dichotomous, 6--11 cm. long, 3--5 cm. wide, puberulent throughout, often forming large and apparently terminal panicles; peduncles very slender, terete, 1.8--4.5 cm. long, puberulent, mostly light in color and surpassing the subtending leaves; pedicels very slender and elongate, 5--21 mm. long, puberulent, those under the central flowers often longer; bractlets spatulate or linear, small, usually few; prophylla linear-subulate, 2--4 mm. long, puberulent; bracteoles minute; flowers very fragrant at night with the odor of jasmine, expanding at night; calyx green or often red-tinged, deeply 5-parted to about the middle or almost to the base, 6--10 mm. long, spreading, externally puberulent, its lobes elliptic or lanceolate to linear, to 7 mm. long and 3 mm. wide, apically acute or acuminate; corolla white or cream-color, about 3.5 cm. long, its tube mostly cream-color, cylindrical-infundibular, about 2.5 cm. long, usually 3--4 times as long as the calyx, externally puberulent or pubescent, internally glabrous, the lobes oblong or narrowly obovoid, about 8 mm. long and 5 mm. wide, apically obtuse, omnifarious or subequal with the odd one narrower; stamens 4, didynamous, much exserted; filaments filiform, curvate, cream-color; anthers brown; pistil cream-color; style filiform, to 4.5 cm. long, exserted; stigma bifid, the branches somewhat unequal; ovary ovoid, about 2 mm. wide, 4-celled, 4-ovulate; fruiting-calyx accrescent, wide-spreading in star-like fashion; fruit drupaceous, violet-black to black, globose, about the size of a cherry, shiny.

This species is found from Indochina and Malaya to the Philippine Islands, Sumatra, Java, and Borneo, usually regarded as native only in Indonesia, probably only escaped and naturalized elsewhere. It is widely cultivated in parts of the United States, West Indies, Central and South America, Europe, India, Indonesia, the Molucca and Sunda Islands, and Mauritius. It is not yet known from Madagascar or the Comoro Islands, but is to be expected in gardens there. It

tends to escape readily from cultivation in tropical regions and has become a weed in cultivated areas of Kerala, India, and in sugar plantations elsewhere.

In the Linnean Herbarium, genus 789 [810], *Clerodendron* [spelled thus on the outside cover, *Clerodendrum* on the inside cover], sheet no. 4 is inscribed "*calamitosum*" in Linneus' own handwriting. There are three specimens on the sheet, only the upper ones are Linnean; the lower one is inscribed "2 e Batavia D. Banks J. E. S[mith]" and was added later according to Savage. All three specimens are correctly identified and the two upper ones (really only fragments) should be regarded as the type of the species.

It is to be noted that Jackson (1893) gives the nativity of the species as "Malaya"; Loudon (1830) and Sygne (1956) aver that it was introduced into cultivation in England in 1823 from the "E. Indies".

Clarke (1885) tells us very truly that the species "appears closely allied to *C. phlomoides*" while Hallier (1918) claims that it is also very closely related to *C. garrettianum* Craib, *C. griffithianum* C. B. Clarke, *C. klemmei* Elm., *C. mindorense* Merr., and *C. fastigiatum* (Hunter) H. J. Lam.

Collectors have found this plant growing in grasslands, along paths and roadsides, on campo on terra firme, in "abandoned land, cachuerinhã, in cultivated and recently cultivated areas, in sandy soil, at 100--750 m. altitude, in flower from January to April, June to August, October, and November, and in fruit in July. Blume (1826) asserts that it flowers throughout the year, while Bojer (1837) says "Fl. à diverses époques de l'année". Cooke (1906) asserts that in BOMBAY it flowers in September and October.

The corollas are described as having been "white" on Arnoldo-Broeders 3520 & 3530, Bruinier 109, Ducke s.n., Hallier 4487a, Pancho 2946, Silva s.n., Van Steenis 7804, and Zollinger 3180, "milk-white" on Hallier 4487, "creamy-white" on Beguin 981 and Clemens & Clemens 7964, "cream" on Kiah S.110, and "red" on Beumée A.258 -- if the Beumée description is accurate, a color form designation, at least, is indicated.

The species is said to be "spontaneous (?)" at Manaus, Brazil, according to Silva, while Ducke found it growing in abandoned land, also in Amazonas, Brazil. Pancho collected it from cultivated material and reports it cultivated "throughout" the Philippine Islands; Kiah found it in cultivation in Singapore, noting: "the original from Java". Bailey (1935) reports it offered to the horticultural trade by a dealer in Singapore. Cruz describes it as a "weed" in the Philippines. Ducke describes it as a "tree", but this is doubtfully accurate.

Merrill (1923) reports the species from Luzon, Mindanao, and Basilan in the Philippines, where, he says, it is "Chiefly in cultivation for ornamental purposes, occasional in waste places about towns. Malay Peninsula, Sumatra, Java."

Vernacular and common names recorded for *C. calamitosum* are "Baum des Elendes", "calamitous clerodendrum", "cheira de noite", "glaseterplant", "hurtful clerodendron", "jasmin de Bernardes",

"kajoe gambir", "kedji beling" [a name also applied to *Desmodium gangeticum* DC.], "kembang boegang", "kembang boegang", "ketji bëling", "kümmerlicher Losbaum", "menado", "péragu calamiteux", "pitja beling", "puan bouga", "rampige lotboom", "romiet", and "thawka".

The specific epithet chosen by Linneus for this species may be translated as "the reverse of being useful in medicine", but there seems to be no recorded evidence of the plant having any harmful properties. In fact, Sorgdrager reports its being used for medicine in Java. Backer & Bakhuizen (1965) tell us that it is "cultivated [in Java] as an ornamental or medicinal plant, and in many places (especially in dry regions) naturalized in settled areas; village groves, coconut groves, forest borders, roadsides". Burkill (1966) reports its use as a bedding plant. He speaks of the species as "A native of Java, which is cultivated in gardens in Malaya". He quotes Heyne (1917, 1927) to the effect that "It is one of the plants used by Javanese trick-performers who chew glass. The performer first chews the leaves of this or of one of the other plants which may be substituted, and then chews the glass. To what extent chewing the plant induces salivation is unrecorded. The chewing of glass, without injury to the gums and other parts of the mouth, is attributed to good teeth, coolness, and sufficient assurance. The Javanese argue that the leaf, which enables glass to be treated thus, must be good also for stone in the kidney, and accordingly administer it."

*Clerodendrum calamitosum* serves as host plant for the fungus *Aecidium clerodendri* P. Henn. in the Philippines.

Hosozawa and his associates (1974) obtained a "new diterpenoid 3-epicaryoptin from *Clerodendron calamitosum* L. It is interesting in view of biogenesis that caryoptin is not found, but 3-epicaryoptin is observed in this plant. This new compound has a bitter taste and possesses antifeeding activity against the larvae of *Spodoptera litura* F."

Burman's original (1768) description of *Volkameria alternifolia* is "ramis inermibus, foliis alternis ovatis dentatis, floribus terminalibus. Puan-Bomga. Javanis. Rami simplicissimi glabri, cortice albicante. Folia alterna patentia petiolata ovata dentibus inaequalibus acuminata. pedunculi longissime terminales".

Poiret (1804) discusses the early history of this taxon: "Cette espèce diffère du *Clerodendrum fortunatum* par la disposition de ses fleurs en une panicule étalée, par ses feuilles ovales & non lanceolées, très-irrégulièrement dentées à leurs bords.

"Sa tige est droite, ligneuse, garnier de feuilles pétiolées, opposées (alternes d'après Burman), glabres, nues à leurs deux faces, ovales, obtuses ou aiguës, mais arrondies à leur sommet, entières & rétrécies à leur base, dentées irrégulièrement à leurs bords, portées sur des pétioles qui n'ont qu'un tiers de leur longueur. Le sommet des tiges se divise en quelques rameaux courts, fortis de l'aisselle des feuilles, eux-mêmes un peu feuillés, & se terminant chacun par une panicule partielle de fleurs, dont l'ensemble forme une panicule générale très-étalés. Les fleurs sont un peu plus petites que dans les autres espèces, longuement pédonculées. Leur calice est divisé (d'après la figure donnée par Burman) en cinq foli-

oles lanceolées, aiguës; le tube de la corolle est presque trois fois de la longueur du calice, & les divisions de son limbe sont courtes, ovales & réfléchies. Cette plante croît à l'île de Java.

"Deux questions importantes & difficiles à résoudre se présentent relativement à cette espèce. Linné regarde son *Clerodendrum calamitosum* comme le *Volkameria alternifolia* de Burman; mais il n'est point d'accord avec ce botaniste sur deux points essentiels. Linné dit que sa plante a les feuilles opposées, tandis que les feuilles alternes sont un des caractères de la plante de Burman; qu'il les décrit & les représente telles; en outre, ce dernier auteur rapporte sa plante aux *Volkameria*. Apparemment qu'il en avoit observé les fruits, quoiqu'il ne nous en parle pas, & qu'il avoit reconnu que les offelets contenoient chacun deux semences.

"Linné a donc observé la même plante, & a reconnu qu'elle n'avoit qu'une seule baie & des feuilles opposées. Comment en a-t-il conclu que c'étoit la même que celle dont parle Burman? Deux mots à ce sujet euffent levé tous les doutes, & nous auroient appris que Burman avoit commis une erreur, & sur la disposition des feuilles, & sur le caractère des fruits de cette plante. Je ne sais pas au reste si Linné a parlé de cette plante ailleurs que dans l'ouvrage que j'ai cité. Il est possible encore que la position des feuilles varie dans cette plante, & qu'elles soient quelquefois alternes à l'extrémité des rameaux. Nous avons vu, par exemple, à l'article *pedali*, que Burman avoit décrit & représenté le *Pedaliium murex* avec des feuilles alternes, tandis que les individus de cette plante, rapportés par les voyageurs, & que nous avons examinés, avoient tous les feuilles opposées, très-semblables pour le reste à la plante de Burman." Merrill (1921) avers that "Both species were described from Javan material, Burman's clearly being synonymous with the one described by Linnaeus one year earlier....both descriptions were probably based on material of similar origin."

Houlliet (1867) comments that "Il en est des plantes comme des gens, chez les unes comme chez les autres, on en trouve dont le nom n'est pas flatteur; celle qui fait l'objet de cette note se trouve dans ce cas. En effet, le mot latin *calamitosum*, en français calamiteux, sonne mal à l'oreille, ce qui se comprend: il signifie calamité, c'est-à-dire fléau, etc., une mauvaise chose enfin. Hâtons-nous de dire qu'il n'en est pas ainsi pour le cas qui nous occupe et que le *Clerodendron calamitosum* L., est au contraire, une très-belle et bonne plante, malheureusement trop rare et trop peu répandu. Elle est originaire de Java....Le *Clerodendron calamitosum*, auquel on ne pourrait guère reprocher que de n'être pas nouveau, est une très-bonne plante qu'il serait très-avantageux de répandre dans les cultures. Il a le grand avantage d'être excessivement floribond (les boutures à peine reprises se couvrent de fleurs), de fleurir à partir du mois d'octobre jusqu'en janvier, février, par conséquent à une époque où les fleurs sont rares. On le multiplie de boutures qu'on étouffe sous cloche, à partir de février et mars. Bien que cette espèce soit robuste, elle s'accommode néanmoins très-bien de la serre chaude."

Hooker (1862) comments that "This is a modest, unobtrusive plant, with its pure white blossoms, as compared with the gorgeous scarlet-

flowered species now commonly cultivated in our stoves, such as *Clerodendron infortunatum*, *squamatum*, *fallax*, *glandulosum*, *Bethuneanum*, etc. It is native of Java, but though figured and described by Burmann, in his "Flora Indica", nearly a century ago, it has only recently been known in our gardens."

Sivarajan & Manilal (1982) note that "Clarke....has reported this species from Malacca and Java. From India, Cooke (1906) has recorded it as an ornamental, grown in Bombay gardens. In South India, the species has been recorded only from Andhra Pradesh....The authors have made the collections from Feroke and Ramanattukara near Calicut in Kerala, where it thrives in waste grassy places on the roadsides with their abundant beautiful white flowers during August-September."

Hasskarl (1855) describes his var. *glabriusculum* as "foliis ovato-ellipticis utrinque acutis, vix in prima juventute pube obsessis, glabriusculis (1--2 poll. longis, 8--10 lin. latis) grosse serrato-dentatis." On the other hand, his var. *molle* has "foliis oblongo-ellipticis in utraque pagina minutissime molliterque puberulis, utrinque attenuatis, minute serrato-dentatis (2--3,5 poll. longis, 10--16 lin. latis). -- Habitat Javam orientalem, unde cl. Zollinger varietatem hanc insignem affulit." He goes on to say that "Deze beide variëteiten, zijn kleine heesters van slechts een paar voeten hoogte en gelijken zeer veel op elkander; ze zijn wegens hunne opstaande bloemtrossen, met geelachtig witte, betrekkelijk neg al groote bloemen en milden bloei wel waardig, in tuinen aangeplant te worden. De vermenigvuldiging geschiedt zoo wel door zaden, als door wertelspruiten. De eerste behoort hier te huis en de laatste is door den heer Zollinger uit Banjoewangi towgezenden."

It is worth recording here that the *Clerodendron calamitosum* var. *glabriusculum*, referred to above, is based on an unnumbered Horsfield collection from Java deposited in the Utrecht herbarium; *C. phlomoïdes* f. *luxurians* is based on another Horsfield collection, this one from Pajittau, Java, deposited in the British Museum herbarium; and *Verbena clerodendron* is based on *Froes 20462* in the Britton Herbarium at the New York Botanical Garden.

Nair & Ansari (1982) cite *Ansari 64713* and *Supt. Agr. Res. Sta. s.n.* from Kerala, India, and comment that "During a recent plant exploration tour in the Cannanora district of Kerala state, a common weed was found growing near human settlements. This on critical studies was identified as *Clerodendron calamitosum* L., a native of Malaya and Java. A very old herbarium specimen of this plant collected around 1930 from a garden in Kasaragod of this district [was later found in the] Madras Herbarium. From the collector's note on this sheet it is evident that the plant was introduced for its ornamental value and was restricted to that garden at that time. However, within these 50 years it [has been] naturalised well in this district. Now this plant has become one of the very common weeds of this district growing among coconut groves, road-sides and other cultivated and fallow fields."

Ridley (1923) cites *Maingay s.n.* from Malacca, but adds "no doubt a garden plant."

Hosseus (1911) cites *Hosseus 84* from Thailand, but Fletcher (1938)

says of this collection "I have not seen this plant and am unable to say what it may be".

Hallier (1918) cites Blume 2277a, Reinwardt 1273 and Zollinger 3180 from Java, Korthals s.n. from Sumatra, Hallier 4487 from Basilan, and Hallier 4487a from Luzon in the Philippines. He quotes Ridley and Gamble in the assertion that it is in Malacca only as a garden escape.

Merrill (1921) regards *C. eriosiphon* Schau. and its var. *parvifolium* Miq. as synonyms of *C. calamitosum*, citing only Korthals s.n. from Kalimantan. I regard *C. eriosiphon* as conspecific with *C. disparifolium* Blume.

It should be pointed out here that the *C. Smith* s.n. [Molucca], *Staunton* s.n. [Sunda], *J. B.* s.n., *Zollinger 731*, *Kollman* s.n., and *Horsfield* s.n. in the British Museum herbarium do not actually indicate on their labels that they came from cultivated material, but it seems most probable that they did. Also, it may be noted here that the Burman (1768) work in the bibliography of this taxon is sometimes erroneously cited as "1767".

Material of *Clerodendrum calamitosum* has been misidentified and distributed in some herbaria as *C. colebrookianum* Walp., *C. fragrans* Vent., *C. phlomidoides* L., and *C. serratum* Spreng. On the other hand, the *Hosseus 84x*, distributed as *C. calamitosum*, actually is *C. urticifolium* (Roxb.) Wall.

Citations: BRAZIL: Amazonas: *Ducke* s.n. [29.IV.1941] (Be--43399, W--2592936); *M. B. da Silva* s.n. [Marco 1950] (N). Pará: *Froes 20462* (Be--15975, N, W--2439080). MASCARENE ISLANDS: Mauritius: *Bélanger* s.n. [Herb. Reichenbach f. 129850] (V). INDIA: Andhra Pradesh: *Bahadur 166* [Herb. Hyderabad. 533] (Hi--209883). Kerala: *Manilal 8* (Ac). CAMBODIA: *Bejand 308* (N). GREATER SUNDA ISLANDS: Bawean: *Buwalda 3302* (Bz--72900). Celebes: *Koorders 19511b* [132] (Bz--19031, Bz--19032); *Noerkas 2* (Bz--19029, Bz--19030). Java: *Backer 2621* (Bz--18959), *3454* (Bz--18993), *6413* (Bz--18961, Bz--18962), *6892* (Bz--18995, Bz--18996), *6946* (Bz--18994), *7019* (Bz--18960), *12099* (Bz--18958), *26474* (Bz--18975), *26574* (Bz--18997), *34995* (Bz--18977), *34996* (Bz--18983, Bz--18984, Bz--18985), *34997* (Bz--18986), *34998* (Bz--18987, Bz--18988, Bz--18989), *34999* (Bz--18979), *35000* (Bz--18990), *35238* (Bz--18982); *Becking 344-95* (Bz--18974), *602-281* (Bz--18991); *Beume 1520* (Bz--18970), *3972* (Bz--19001), *4436* (Bz--18999), *4945* (Bz--18981), *5565* (Bz--18978), s.n. [I.1917] (Bz--18969); *Bijhouwer 50* (Bz--18973); *Blokhuis* s.n. (Bz--18998); *Blume* s.n. (L, M); *Bremekamp* s.n. (Bz--19002); *Gutterink 3168* (Bz--18963); *Herb. Banks* s.n. (N--photo); *Herb. Hort. Bot. Jav.* s.n. (Pd); *Herb. Linneus 810/4* (Ls--type, N--photo of type); *Horsfield* s.n. (Ut--49912); *Junghuhn* s.n. (L); *Kalshoven 1647* (Bz--18967); *Kollmann* s.n. (M); *Koorders 27211b* [620\*] (Bz--19010, Bz--19011), *41367b* [319\*] (Bz--19008, Bz--19009); *Ploem* s.n. (Bz--19004); *Scheffer G.10* (Bz--19003); *Scholte 2374* (Bz--18957); *Ultee 49* (Bz--18968); *Vorderman* s.n. [Soerakarta 1899] (Bz--19006, Bz--19007), s.n. [Batavia] (Bz--19005); *Wisse 45* (Bz--18964), *122* (Bz--19000), *819* (Bz--18992); *Wolff von Wulfing 1212* (Bz--18965), *1217* (Bz--18966), *1246* (Bz--18971). Madura: *Backer 19042* (Bz--19019), *19342* (Bz--19012), *19637* (Bz--19011, Bz--19023), *19957* (Bz--19020, Bz--19021), *20330* (Bz--

19016), 20571 (Bz--19017, Bz--19018), 20758 (Bz--19015), 20867 (Bz--19013, Bz--19014). Sabang: *Beume* A.258 (Bz--19034). Sarawak: *Kudi* s.n. [Herb. Sarawak For. Dept. S.33733] (Ld). Sumatra: *Bouman-Houtman* 22 (Bz--19033); *L'Azing* 3822 [822] (Bz--19036). Tebingtinggi: *Bruinier* 109 (Bz--19035). LESSER SUNDA ISLANDS: Bali: *Van Steenis* 7804 (Bz--19024); *Blinnemeijer* 1579 (Bz--19037). MOLUCCA ISLANDS: Amboina: *Docters van Leeuwen-Reijnvaan* 8658 (Bz--19026, Bz--19027); *Rant* 581 (Bz--19025). Ternate: *Anang* 127a (Bz--72990); *Beguin* 981 (Bz--19028). PHILIPPINE ISLANDS: Luzon: *Clemens* 7030 (Ca--274253), 7089 (Ca--274182); *E. D. Merrill* 3312 (N, W--438291), 3348 (N, W--438828), 3459 (N, W--438441). Mindoro: *M. T. Cruz* 178 (Ur). CULTIVATED: Borneo: *Buebidge* s.n. (K). Brazil: *Coelho de Moraes* 1165 (Ld); *Pickel* 2263 (W--1473300). Curaçao: *Arnoldo-Broeders* 3520 (Ba, Ft--9832). Egypt: *Din* 123 (Gz); *Mahdi* s.n. [25/11/1968] (Gz). England: *Herb. Hort. Bot. Reg. Kew* 15 (K, N); *Mornay* 77/1857 (K). Germany: *Herb. Martius* s.n. [H. B.] (Br). India: *Bourne* 2773 (K); *Gamble* 17135 (K); *Herb. Blatter* 15484 (Xa), 35277 (Xa); *Jaffrey* s.n. [Madras Hort. Gard. 1856] (Ed). Java: "*J. B.*" s.n. (Bm); *Bakhuizen* 3209 [321] (Ut--24893), s.n. [4 Juni 1918] (Bz--18956); *Herb. Hort. Bot. Bogor.* XI.G.63 (Bz--25749), XII.B.VI.2 (Bz--26242), XV.K.A. XLVI.16 (Bz--26468), s.n. (Bz--18976); *Horsfield* s.n. [Pajittau] (Bm, Bm, Bm); *Kollmann* s.n. (Bm); *Sorgdrager* 71 (Bz--18972); *Zollinger* 731 (Bm). Mauritius: *Bouton* s.n. [1831] (P); *Herb. Hooker* s.n. (K). Molucca Islands: *C. Smith* s.n. (Bm, Bm). Philippine Islands: *Pancho* 2946 (Ba); *Quisumbing* s.n. [F. C. Gates 7908] (Mi); *Vidal* 3452 (K). Russia: *Herb. Fischer* s.n. (L, L, L); *Herb. Hort. Bot. Imp. Pet. s.n.* [1835] (L, L). Sarawak: *Clemens* & *Clemens* 7964 (N). Singapore: *Kiah* S.110 (Ba). Straits Settlements: *J. W. Anderson* 9 (K). Sunda: *Staunton* s.n. (Bm). Trinidad: *W. E. Broadway* s.n. [Trin. Bot. Gard. Herb. 8360] (R); *McLean* s.n. [Trin. Bot. Gard. Herb. 5884] (R). Venezuela: *Bailey & Bailey* 1757 (Ba); *Vogel* 1176 (Mu). LOCALITY OF COLLECTION UNDETERMINED: *Blackburn* s.n. (T, T); *Collector undesignated* 295 (Bz--19038); *Herb. Bogoriense* 18980 [Bel-lara] (Bz); *Thunberg* s.n. (S). MOUNTED ILLUSTRATIONS: *N. L. Burm.*, Fl. Indica pl. 44. 1768 (Ld); *Hook.*, *Curtis Bot. Mag.* 88 [ser. 3, 18]: pl. 5294. 1862 (Ld); *Nair & Asari*, *Journ. Econ. Tax. Bot.* 3: 606, fig. 1--4. 1982 (Ld).

*CLERODENDRUM CALCICOLA* Britton, *Bull. Torr. Bot. Club* 39: 9--10 [as "*Clerodendron*"]. 1912; *Mold.*, *Prelim. Alph. List Inv. Names* 18 & 19. 1940; *Mold.*, *Alph. List Inv. Names* 16. 1942.

Synonymy: *Clerodendron* (?) *calcicola* Britton, *Bull. Torr. Bot. Club* 39: 9. 1912. *Clerodendron calcicola* Britton apud Prain, *Ind. Kew. Suppl.* 5, imp. 1, 61. 1921. *Clerodendron* ? *calciculum* Britton ex *Mold.*, *Prelim. Alph. List Inv. Names* 18 & 19 in syn. 1940. *Clerodendrum calciculum* Britt. apud Alain in León & Alain, *Fl. Cuba*, imp. 1, 4: 319 & 322. 1957.

Bibliography: *N. L. Britton*, *Bull. Torr. Bot. Club* 39: 9--10. 1912; *Fedde & Schust.*, *Justs Bot. Jahresber.* 40 (2): 334. 1915; *Prain*, *Ind. Kew. Suppl.* 5, imp. 1, 61. 1921; *Mold.*, *Prelim. Alph. List. Inv. Names* 18 & 19. 1940; *Mold.*, *Known Geogr. Distrib. Verben-ac.*, ed. 1, 24 & 89. 1942; *Mold.*, *Alph. List Inv. Names* 16. 1942;

Mold., *Alph. List Cit.* 1: 64, 187, & 188 (1946), 2: 486 (1948), and 3: 867. 1949; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 2, 43 & 180. 1949; Alain in León & Alain, *Fl. Cuba*, imp. 1, 4: 319 & 322. 1957; Mold., *Résumé* 51, 261, 271, & 448. 1959; Prain, *Ind. Kew.*, imp. 2, 61. 1960; Mold., *Fifth Summ.* 1: 95, 441, & 462 (1971) and 2: 863. 1971; Alain in León & Alain, *Fl. Cuba*, imp. 2, 2: 319 & 322. 1974; Mold., *Phytol. Mem.* 2: 88 & 531. 1980; Mold., *Phytologia* 57: 478. 1985.

A shrub or small tree, to 8 m. tall; branchlets and twigs stout, tough, with very small pith, very obtusely tetragonal or subterete, gray or buff in color, pulverulent-puberulent, becoming only sparsely so in age; bark flaky, in narrow strips; nodes not annulate; principal internodes 1.5--8.5 cm. long; leaves decussate-opposite; petioles stout, 5--14 mm. long, pulverulent-puberulent or becoming subglabrate in age; leaf-blades coriaceous, gray-green above, bright- or yellow-green beneath, shiny, oblong-elliptic, 4--10 cm. long, 2.2--5.2 cm. wide, apically rounded or subacute, marginally subentire or denticulate and sometimes subrevolute, basally cordate or subcordate-emarginate, glabrous above except for the midrib and sometimes more or less impressed-punctate, short-pubescent with stiffly spreading hairs on all the venation beneath; midrib stout, impressed and often slightly strigillose-pubescent above, very prominent beneath; secondaries stoutish, 5--8 per side, impressed above, very prominent beneath, arcuate-ascending; vein and veinlet reticulation very abundant, impressed or subimpressed above, all (to the finest portions) pronouncedly and conspicuously prominent beneath; inflorescence axillary or terminal, small, not abundant; cymes abbreviated, few-flowered, in the fruiting stage 1.5--2.5 cm. long and 1--2.5 cm. wide, subfasciculate; peduncles very much abbreviated and tuberculate or obsolete; fruiting-pedicels stout, 5--8 mm. long, more or less pubescent or puberulent; corolla white; fruiting-calyx indurate, shallowly cupuliform, about 2 mm. long and 6 mm. wide, externally more or less puberulent, its rim subentire and more or less revolute or irregularly split; immature fruit about 8 mm. long

The type of this little-known species was collected by N. L. Britton and J. F. Cowell (no. 9871) on limestone rocks at Corrientes Bay, Pinar del Río, Cuba, between March 10 and 12, 1911, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been collected in immature fruit in April. Alain (1957) avers that it is endemic to the coasts of Matanzas and Pinar del Río. Britton (1912) comments that it is "Apparently related to *C. spinosum* Urban of Santo Domingo which has similar leaves with bristle-tipped teeth and villous petioles!"

Citations: CUBA: Matanzas: Ekman 17208 (N, S, W--2113458). Pinar del Río: Britton & Cowell 9871 (N--type); Ekman 17208 (B), 18499 [Herb. Roig 3122] (Es), 18799a (B, N, S, W--2113459), 18799b (B, S); Roig 3245 (Es, Ha, N), 8544 (Es).

CLERODENDRUM CALYGINUM Turcz., *Bull. Soc. Imp. Nat. Mosc.* 36 (2): 222 [as "*Clerodendron*"]. 1863; Mold., *Known Geogr. Distrib. Verbenac.*, ed. 1, 55 & 89. 1942 [not *Clerodendron calycinum* Zipp., 1919].



Synonymy: *Clerodendron calycinum* Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 222. 1863.

Bibliography: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 222. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 90, 118, & viii. 1921; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 55 & 89. 1942; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 128 & 180. 1949; Mold., Résumé 165 & 448. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Mold., Fifth Summ. 1: 282 (1971) and 2: 863. 1971; Mold., Phytol. Mem. 2: 271 & 534. 1980.

Turczaninow's original (1863) description of this species is: "(*Euclerodendron squamata*). Cl. caule ramisque tetragonis cum petiolis atque inflorescentia adpresse pilosis; foliis petiolatis ovatis aut oblongo-ovatis, acutis vel acuminatis, basi cordatis integerrimis vel obsolete denticulatis, utrinque punctis piliferis exasperatis, subtus pallidioribus glandulis peltatis praeter pilos tectis; cymis axillaribus, inferioribus longissime pedunculatis, paniculam late pyramidatam constituentibus; calycis inflato-campanulati 5-partiti, dense glandulosi, dentibus lanceolatis acuminatis tubum suum multoties superantibus, tubo corollae parum longioribus. India orientalis, Moulmeyn, Griffith No. 296."

Jackson (1893) reduces this taxon to synonymy under *C. infortunatum* L., while Bakhuizen (1921) reduces it to *C. viscosum* Vent. It does not seem to me that it belongs to either of these species because of its leaf-shape, which is far too oblong, based on a photograph of the type, cited below, and not sufficiently cordate at the base. Of the two, it more nearly approaches some narrow-leaved forms of *C. viscosum*.

The *C. calycinum* Zipp., referred to in the synonymy (above), is a synonym of *C. minahassae* Teijsm. & Binn.

Citations: BURMA: Tenasserim: Griffith 296 (Ld--photo of type).

*CLERODENDRUM CAMPBELLII* Hort. ex Anon., Notes Roy. Bot. Gard. Edinb. List Seeds Coll. 1923: 60 [as "*Clerodendron*"]. 1923; Mold., Prelim. Alph. List Inv. Names 19 nom. nud. 1940; Mold., Alph. List Inv. Names 16 nom. nud. 1942.

Synonymy: *Clerodendron campbellii* Hort. ex Anon., Notes Roy. Bot. Gard. Edinb. List Seeds Coll. 1923: 60. 1923.

Bibliography: Anon., Notes Roy. Bot. Gard. Edinb. List Seeds Coll. 1923: 60 (1923) and 1931: 33. 1931; L. H. Bailey, List Florists Handl. Verb. [mss.]. 1935; Mold., Prelim. Alph. List Inv. Names 19. 1940; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 72 & 89. 1942; H. N. & A. L. Mold., Pl. Life 2: 52. 1943; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 158 & 180. 1949; Mold., Résumé 215, 261, & 448. 1959; Bolger, Rees, Ghisalberti, Goad, & Goodwin, Biochem. Journ. 118: 197--200. 1970; Bolger, Rees, Ghisalberti, Goad, & Goodwin, Tetrahed. Lett. 35: 3043. 1970; Farnsworth, Pharmacog. Titles 5 (11): v & item 13561. 1970; Bolger, Rees, Ghisalberti, Goad, & Goodwin, Biores. Ind. 7: 264 & 376. 1971; Farnsworth, Pharmacog. Titles 5, Cum. Gen. Ind. (1971)

and 6 (10): v & title 18271. 1971; Mold., Fifth Summ. 1: 358 & 441 (1971) and 2: 863. 1971; Hegnauer, Chemotax. Pfl. 6 [Chem. 21]: 671. 1973; Farnsworth, Pharmacog. Titles 6, Cum. Gen. Ind. [32]. 1973; Goad & Goodwin in Reinhold & Liwschitz, Prog. Phytochem. 3: 124, 137, 168--169, 177, & 182--184. 1973; T. W. Goodwin in Runeckles & Mabry, Terpenoids 110 & 236. 1973; Sucrow, Caldeira, & Slopianka, Chem. Ber. 106: 2236--2245. 1973; "J. H. B.". Biol. Abstr. 57: 4223. 1974; Mold., Phytol. Mem. 2: 348 & 534. 1980.

Through the kindness of my friend and colleague of many years, Dr. Peter Hyypio, I have finally been able to determine where this binomial was first effectively (albeit not validly) published. It was mentioned, without description, in the seed list of the Edinburgh botanical garden from 1923 to 1956, almost every year, usually without the "Hort." following the name (except in the earlier years). The only deviation was in 1931 when the name was followed by the hybrid symbol, "X".

It seems most probable that the plant was named in honor of James John Campbell who was the foreman of the Glass Department of the garden's staff at that time, rather than in honor of Thomas Campbell as we stated in our 1948 work.

A communication to me from Ian Hedge, dated 29 August 1985, has this to say: "Your query about *Clerodendrum campbellii* interested us and for some of the older staff members [of the Edinburgh Botanic Garden] the name rang faint bells. After quite a lot of scrabbling about in the literature, garden records, herbarium and talking with people, the story seems to be as follows.

"First of all the epithet was never validly published and we assume that at the time of Jimmy Campbell (who was assistant curator in charge of the Glass Department here up till about the end of the last war), his name got linked with a form (cultivar) of *Clerodendrum thomsonae* with variegated leaves. It then, wrongly, got into the RBG [Royal Botanic Garden] seed lists as *C. campbellii*; it is not to my knowledge anywhere in Notes Roy. Bot. Gard. Edinburgh.

"Although we have no herbarium specimens so labelled, we found in our photographic slide collection a photograph with the label *C. campbellii*; it is the variegated plant and, as far as one can be sure, *C. thomsonae* (of the fascinating nomenclatural history).

"I have not worked through all the old seed lists of the Garden here and thus could not be sure of the date when the name got into print. The assistant curators of the different departments in the Garden were usually responsible for making up the seed lists for their department.

"It is quite an interesting story - especially as the chemists have been at work on it, with the resultant confusion!"

Bolger and his associates (1970) report the isolation of a new sterol from this plant and this is further elaborated by Sucrow and his co-workers (1974) as a naturally occurring "(24S)-24-ethylcholesta-5,22,25-triene-3 $\beta$ -ol (24S) and its (24R)-epimer from butynylcarbinols with 1-dimethyl-amino-1-methoxy-1-propene in a Claisen rearrangement via the amides.... The known hydrogenation of the products led to porifasterol (24R) and stigmasterol (24S) re-

spectively."

Bailey (1935) reports this plant offered to the horticultural trade only in Edinburgh, presumably by the garden referred to above.

This taxon will be further treated here under *Clerodendrum thomsonae* f. *variegatum*, which see.

**CLERODENDRUM CANESCENS** Wall., Numer. List [49], no. 1804 hyponym [as "*Clerodendron*"] 1829; Steud., Nom. Bot. Phan., ed. 2, 1: 382 & 383 in syn. 1840; Schau. in A. DC., Prodr. 11: 665. 1847.

Synonymy: *Clerodendron canescens* Wall., Numer. List [49], no. 1804. 1829. *Clerodendron canescens* Wall. apud Kawakami, List Pl. Formos. 84 sphalm. 1910. *Clerodendron canescens* Vahl ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Clerodendrum viscosum* sensu Li ex Hsiao, Fl. Taiwan 4: 421 in syn. 1978 [not *C. viscosum* Vent., 1803].

Bibliography: Wall., Numer. List [49], no. 1804. 1829; Steud., Nom. Bot. Phan., ed. 2, 1: 382 & 383. 1840; Walp., Repert. Bot. Syst. 4: 105 & 106. 1845; Schau. in A. DC., Prodr. 11: 665. 1847; Benth. in W. Hook., Journ. Bot. Kew Gard. Misc. 5: 136. 1853; Buek, Gen. Spec. Syn. Candoll. 3: 105. 1858; Benth., Fl. Hongk. 272. 1861; C. B. Clarke in Hook. f., Fl. Brit. India 4: 589. 1885; Maxim., Bull. Acad. Imp. Sci. St.-Petersb. 31: 83 & 84. 1886; Maxim., Mém. Biol. 12: 518. 1886; 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. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 175. 1895; Kawakami, List Pl. Formos. 84. 1910; Dunn & Tutcher, Kew Bull. Misc. Inf. Addit. Ser. 10: 204 & 205. 1912; J. Matsumura, Ind. Pl. Jap. 2 (2): 531. 1912; Hickel, Bull. Soc. Dendr. France 12: 139. 1913; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 90, 108, & viii. 1921; Sasaki, List Pl. Formos. 351. 1928; Dop in Lecomte, Fl. Gén. Indo-chine 4: 851 & 862. 1935; Kanehira, Formos. Trees, ed. 2, 648--649 & 718. 1936; Mold., Suppl. List Inv. Names 11. 1941; Mold., Alph. List Inv. Names 16. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 56, 58, 59, 72, & 89. 1942; Mold., Phytologia 2: 98. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 1: 560. 1946; Mold., Alph. List Cit. 1: 103 & 284 (1946), 2: 409, 562, 643, & 644 (1948), 3: 658, 666, 702, 718, 719, 811, & 828 (1949), and 4: 1010--1012, 1102, 1129, 1149, 1234, & 1254. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 131, 133--136, 158, & 180. 1949; Sonohara, Tawada, & Amano, Fl. Okin. 132. 1952; St. John, Nomencl. Pl. 109. 1958; Mold., Résumé 168, 171--175, 215, 261, & 448. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560. 1960; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 694. 1961; Liu, Illust. Nat. Introd. Lign. Pl. Taiwan 2: 1213, fig. 1021. 1962; Mold., Résumé Suppl. 14: 10. 1966; Yamazaki in Hara, Fl. East. Himal. 268. 1966; Mold., Resume Suppl. 16: 9. 1968; Mold., Fifth Summ. 1: 272, 287, 292--294, 299, 313, 358, 438, & 441 (1971) and 2: 863. 1971; Kooiman, Act. Bot. Neerl. 24: 462. 1975; Hsiao, Fl. Taiwan 4: 420 & 421 (1978) and 6: 121. 1980; Mold., Phytol. Mem. 2: 259, 277, 281--283, 291, 304, 348, & 534. 1980; H. N. & A. L. Mold. in Dassan. & Fosb., Rev. Handb. Fl. Ceyl. 4: 475. 1983; Mold., Phytologia 58: 211 & 345. 1985.

Illustrations: Liu, *Illust. Nat. Introd. Lign. Pl. Taiwan* 2: 1213, pl. 1021. 1962;

A shrub or undershrub, 1--4 m. tall, erect; stems often unbranched, woody or semi-woody, sometimes 2--3 cm. in diameter; branches and branchlets (when present) medium-stout, obtusely tetragonal, densely short-villous with grayish-brown divergent hairs (or subtomentose to white-tomentose), the hairs eventually wearing off; nodes not annulate, slightly flattened; leaf-scars only slightly elevated; principal internodes 1--4.5 cm. long; leaves decussate-opposite; petioles stout, 1.8--10 cm. long, very densely villous with divergent or subreflexed multicellular grayish-brown hairs; leaf-blades membranous, very brittle and fragile in drying, dark-green above (but brunnescens in drying), lighter beneath, ovate or broadly ovate, 7.5--16 cm. long, 5.6--12.2 cm. wide, apically short-acuminate or acute to obtuse, marginally subentire or entire (when immature) or rather irregularly and remotely dentate with rather shallow apically apiculate teeth except at the base and apex, basally subcordate or cordate to truncate, puberulent or sparsely strigillose-pilose above with scattered hairs on the lamina (denser on the larger venation), densely villous beneath especially on the midrib and larger venation with hair similar to that on the petioles; midrib slender, flat above, prominent and very rapidly diminishing in size as the apex is approached beneath; secondaries very slender, 5--7 per side, arcuate-ascending, flat above, prominent and densely villous beneath, joined in many loops near the margins; veinlet reticulation abundant, delicate, indiscernible above, flat beneath; inflorescence cymose, umbellate, solitary or paired in the upper leaf-axils or aggregate in a terminal cluster, long-pedunculate; peduncles stout, 4--9 cm. long, densely brown-villous with spreading hairs like the branchlets, usually bi- or tri-parted at the apex in umbellate fashion, the branches very short, equal, densely bracteate and densely flowered; bracts very abundant and conspicuous, forming a pseudo-involucre under the umbellate flowers, each elliptic, 1--2.5 cm. long, 7--12 mm. wide, apically and basally acute or subacuminate, marginally entire, short-pubescent on both surfaces; flowers large, odorless or fragrant (depending on time of day); calyx green, membranous, about 1 cm. long, externally pubescent, 5-lobed; corolla white, the tube slender, about 1.5 cm. long; stamens exserted; fruiting-calyx enlarged, red, patelliform, the lobes purple, enclosing the fruit; fruit at first green, then red, finally bluish-black or black, composed of 4 nutlets.

The species is based on *Wallich 1804*, collected from material cultivated in the Botanical Garden at Calcutta and originally from China, deposited in the East India Company Herbarium at Kew.

Collectors have encountered the plant in open forests and thickets, forest edges, and open valleys, growing in clumps in shaded canyons and small ravines, in light woods and rocky ground, on open hillsides, and along streamsides, at altitudes of 60--1000 m., in flower in February, April to July, September, October, and December, and in fruit from May to July and September to November. Tsiang describes it as an undershrub in dense mixed woods in Kwangtung;

Keng found it as an undershrub in shady woods; Taan refers to it as abundant on clay slopes; Lau says that it is only "rare" in thickets in loam on dry cliffs; while Lei reports it fairly common as scattered shrubs in sandy soil on dry gentle slopes in forests, but "rare on dry level land" on Hainan island.

Dunn & Dutcher (1912) found it "On Mt. Victoria and other places" in Hong Kong, Lantau Island, New Territory, Swatow, Daiheung, and Macao, blooming there in May. Sonohara and his associates (1952) describes it as a naturalized ornamental on Okinawa. Yamazaki (1966) reports it as native to Indochina, southern China, and Formosa and naturalized in India.

Hsiao (1978) reports *C. canescens* from northern, central, and eastern Formosa, as well as mainland China, citing from Formosa *Faurie 299*, *Hsieh & Kao s.n.* [1955], *Masamune s.n.* [1938], and *Price 299 & 707*.

The corollas are described as "white" by most authors [e.g., Dunn & Tutcher (1912) and Yamazaki (1966)] and on *Ching 2001*, *Ferris 12092*, *Hu 10102*, *Lau 1464*, *Lei 627*, *Liang 63080*, *McClure 3188*, *Taam 1458*, and *Tsui 209*, but on *Tsang 802*, *Tsang & Fung 271*, and *Tsui 526 & 625* they are said to have been "red" -- probably the fruiting-calyx, not the corollas, is here being referred to, but if the corollas were truly red, then, obviously, an undescribed color form of the species is indicated. In some other species with normally white corollas, a red-flowered form has been noted by collectors, but, again, it is not certain (to me) that the writers of the labels accompanying the collections did not inadvertently make an error in writing "flowers red" instead of "fruit red", especially since most collectors' handwritten notes use the abbreviations "fls." and "frs."

Clarke (1885) reports *Clerodendrum canescens* cultivated in India and regards it as "closely allied to *C. bracteatum* Wall.", which is most certainly true. Maximowicz (1886) cites *Reeves s.n.* from southern China and quotes Bentham (1861) as describing it as "frequens in planitie" in Hong Kong, but noting "Extra Chinam non inventum". Actually, *C. canescens* is known from at least six provinces of mainland China.

Jackson (1893) mis-cites this species to Wallich's no. "1800", which is the type collection of *C. bracteatum* Wall., instead of to his no. 1804. Steudel's 1840 publication is sometimes cited as published in "1841", the titlepage date for the whole work. Steudel, as well as more recent authors, including Merrill, regarded *C. canescens* as conspecific to and a synonym of *C. viscosum* Vent., but this is not correct. The two taxa are abundantly distinct, as will be brought out in my forthcoming discussion of the latter species. Similarly, *C. haematocalyx* Hance is regarded as conspecific with and a synonym of *C. canescens* by Matsumura (1912) and Liu (1962), but Hance's plant is plainly *C. villosum* Blume.

Common and vernacular names recorded for *C. canescens* are "kai tim foh", "kusagina", "kwai tim foh", "shirage-kusagi", "taai se shue", and "woolly glorybower".

Hansford (1961) lists *C. canescens* as a host for the fungus *Meliola clerodendri* P. Henn. in Tonkin, Vietnam, based on *Bon 5857*.

Dunn & Tutcher (1912) give the following key (nomenclature brought

up-to-date by me) to the species of *Clerodendrum* known to them from China:

1. Inflorescence axillary.
    2. Calyx truncate, scarcely toothed.....*C. inerme*.
    - 2a. Calyx acutely 5-fid.....*C. fortunatum*.
  - 1a. Inflorescence terminal, paniculate.
    3. Panicle compact.
      4. Calyx-teeth subulate.....*C. philippinum*.
      - 4a. Calyx-teeth ovate, acuminate.....*C. canescens*.
    - 3a. Panicles lax.
      5. Corolla scarlet; leaves with peltate scales.....*C. kaempferi*.
      - 5a. Corolla whitish; leaves without scales.....*C. cyrtophyllum*.
- Hsiao (1978) gives the following key to the specific and subspecific taxa known to him from Formosa (Taiwan):
1. Twining vines.....*C. thomsonae*.
  - 1a. Erect shrubs.
    2. Inflorescence axillary, 3-flowered; calyx truncate...*C. inerme*.
    - 2a. Inflorescence terminal, in many-flowered cymes or panicles; calyx lobed.
      3. Inflorescence in globose cymose heads; bracts foliaceous.
        4. Calyx and bracts shorter than or as long as the fruits, with large peltate glands.....*C. philippinum*.
        - 4a. Calyx and bracts much longer than the fruits, without peltate glands.....*C. canescens*.
      - 3a. Inflorescence of lax cymes or elongated thyrsi; bracts linear, small.
        5. Leaves with many sand-like glands beneath.
          6. Leaf-margins shallowly toothed, not lobed; inflorescence bright-red.....*C. intermedium*.
          - 6a. Leaves 3--5-lobed; inflorescence orange-red.....*C. paniculatum*.
        - 5a. Leaves without sand-like glands beneath.
          7. Leaf-blades elliptic-lanceolate; corolla-tube short, to 1 cm. long.....*C. cyrtophyllum*.
          - 7a. Leaf-blades ovate to elliptic; corolla-tube oblong, to 3.5 cm. long.
            8. Branchlets, leaves, and inflorescence densely covered with rust-colored tomentum.....*C. trichotomum* var. *ferrugineum*,
            - 8a. Branchlets, leaves, and inflorescences glabrous or only slightly puberulous.
              9. Sepals reddish; leaf-blades ovate, pubescent.....*C. trichotomum*.
              - 9a. Sepals greenish; leaf-blades ovate-lanceolate, subglabrous.....*C. trichotomum* var. *fargesii*.

Material of *C. canescens* has been misidentified and distributed in some herbaria as *C. bracteatum* Wall., *C. foetidum* Bunge, *C. fragrans* Vent., *C. haematocalyx* Hance, *C. paniculatum* L., *C. trichotomum* Thunb., and *C. viscosum* Vent.

On the other hand, the Collector undetermined s.n., Jenkins s.n. [Assam], and Thomson s.n., distributed as *C. canescens*, actually are

*C. bracteatum* Wall., while Ekeberg s.n. is *C. fortunatum* L., Amano 6251 is *C. lindleyi* Decaisne, and Henry 393 is *C. philippinum* f. *multiplex* (Sweet) Mold.

Citations: INDIA: Assam: Hooker & Thomson s.n. [Mont. Khasia] (W--2497099). CHINA: Chekiang: Ching 2001 (Ca--281837, W--1246860); Keng 1127 (Ca--362132). Fukien: Ging 5391 (Ca--322194). Hunan: Fan & Li 90 (Bz--20946). Kiangsi: Lau 3982 (S, W--1752728); Tsiang 10197 (N). Kwangtung: F. A. McClure 1193 [Herb. Canton, Chr. Coll. 13114] (Ca--287645); Tak s.n. [Herb. Lingnan Univ. 17383] (Ca--373905); Tsiang 2772 (N); Tsui 209 (N), 526 (Ba, Ca--612259, N, W--1754710), 625 (Bz--20949); Ying 749 (Ca--358095). Yunnan: Ferris 12092 (Du--330692); Maire 2949 (N, W--775707); C. Schneider 1661 (W--776193). Province undetermined: Chun & Ting 562 (Ac). CHINESE COASTAL ISLANDS: Hainan: Chun 6618 (N); Chun & Tso 43444 (N); Lau 1464 (N), 3044 (Bi, S); Lei 627 (B, Ba, Bz--20948, Ca--611528, Mi, N, W--1754221), 693 (B, Ba, N, W--1754261); Liang 63080 (Mi, Mu, N); F. A. McClure 3188 [Herb. Canton Chr. Coll. 9736] (Ld--photo, N--photo, Ph); Tak 634 [Herb. Lingnan Univ. 17383] (Ca--356523), 802 [Herb. Lingnan Univ. 16301] (Ca--326087); Tsang 802 [Herb. Lingnan Univ. 16301] (Ba, Bz--19039, Ca--13853, N, S, W--1249552); Tsang & Fung 271 [Herb. Lingnan Univ. 17805] (N). Lantau: McClure, Herb. Lingnan Univ. 13114 (N, S); Ying 667 (Du--200924). HONG KONG: Chan 1059 (Mi); Chun 6429 (Ca--357802); Ford s.n. [14-6-93] (N); Hu 10102 (W--2731181); Taam 1458 (Ca--82679, Mi, N, W--2063736); Weiss 1929 (Bz--20947); Wilford 405 (K, Ld--photo, N--photo); C. Wright s.n. [Hong Kong] (T, W--44910); Ying 667 (N, W--1513065). MACAO: Gaudichaud 621 (W--2497074); Hillebrand s.n. (K). VIETNAM: Tonkin: Pêtelot 6174 (N, N, W--1759392). TAIWAN: Asai 21485 (Ca--344609); Huang 1537 (Ba); Price 707 (K, N); Simada 312 (Ca--345393). CULTIVATED: India: Herb. Hort. Bot. Calcut. s.n. (K); Wallich 1804 (Bm--isotype, Bm--isotype, K--isotype, K--isotype, Pd--isotype), 6315A (Pd). MOUNTED ILLUSTRATIONS: Liu, Illust. Nat. Introd. Lign. Pl. Taiwan 1213, pl. 1021. 1962 (Ld).

CLERODENDRUM CAPITATUM (Willd.) Schum. & Thonn., Beskr. Guin. Pl.

287. 1827 [not *C. capitatum* Hook., 1862, nor Klotzsch, 1937].

Synonymy: *Volkameria capitata* Willd. in L., Sp. Pl., ed. 4 [5], 3 (2): 384. 1802. *Volkameria foliis ovatis, integerrimis, scabris; floribus terminalibus, capitatis, calyce folioso* Willd. ex Lam., Encycl. Méth. Bot. 8: 691 in syn. 1808. *Clerodendron capitatum* Schum. & Thonn. ex Walp., Repert. Bot. Syst. 4: 673. 1845. *Clerodendron capitatum* Schum. ex W. J. Hook., Curtis Bot. Mag. 74 [ser. 3, 4]: pl. 4355. 1848. *Volkameria capitata* Willd. apud W. J. Hook., Curtis Bot. Mag. 74 [ser. 3, 4]: pl. 4355 in syn. 1848. *Clerodendron capitatum* Schum. & Thou. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893. *Clerodendron francavilleianum* Buchinger ex J. G. Baker in Thiseit.-Dyer, Fl. Trop. Afr. 5: 305 in syn. 1900. *Clerodendron capitatum* var. *subdentatum* DeWild., Étud. Fl. Katanga 1: 117. 1903. *Clerodendron capitatum* var. *subcordatum* DeWild., Étud. Fl. Katanga 1: 117. 1903. *Siphonanthus capitata* S. Moore, Journ. Linn. Soc. Lond. Bot. 37: 198. 1905. *Clerodendron obanense* Wernh.,

Cat. Talb. Niger. Pl. 91. 1913. *Clerodendrum francavilleianum* Buchinger ex B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 64 in syn. 1936. *Clerodendron capitatum* var. *subcordatum* DeWild. ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Clerodendron capitatum* var. *subdentatum* DeWild. ex Mold., Alph. List Inv. Names 16 in syn. 1942. *Clerodendrum capitatum* var. *capitatum* [Willd.] ex Huber in Hutch. & Dalz., Fl. W. Trop. Afr., ed. 2, 2: 440 & 443. 1963. *Clerodendrum capitatum* Schum. ex Mold., Fifth Summ. 1: 461 in syn. 1971. *Clerodendrum capitatum* var. *capitatum* Huber ex Mold., Phytol. Mem. 2: 390 in syn. 1980. *Clerodendrum capitatum* var. *capitatum* (Willd.) Schum. & Thonn. ex Mold., Phytol. Mem. 2: 391 in syn. 1980.

Bibliography: Willd. in L., Sp. Pl., ed. 4 [5], 3 (2): 384. 1802; Poir. in Lam., Encycl. Méth. Bot. 8: 691. 1808; Pers., Sp. Pl. 3: 364. 1819; Schum. & Thonn., Beskr. Guin. Pl. 287. 1827; Schum. & Thonn., Kongl. Dansk. Vidensk. Selsk. Afhandl. 4: 61. 1829; Walp., Repert. Bot. Syst. 4: 101 & 109. 1845; Schau. in A. DC., Prodr. 11: 657 & 673. 1847; W. Hook., Curtis Bot. Mag. 74 [ser. 3, 4]: pl. 4355. 1848; Hook. f. & Benth. in W. Hook., Niger Fl. 486. 1849; Buek, Gen. Spec. Sym. CANDOLL. #: 105 & 502. 1858; Seem., Bonplandia 10: 250. 1862; Lefroy, Bull. U. S. Nat. Mus. 25: 97. 1884; Oliv. in W. Hook., Icon. Pl. 16 [ser. 2, 6]: pl. 1559 in textu. 1887; Gürke, Engl. Bot. Jahrb. 18: 172 & 173. 1893; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 560. 1893; Gürke in Engl., Pflanzenw. Ost-Afr. C: 340. 1895; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 1219. 1895; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 294, 305--306, & 518. 1900; K. Schum., Justs Bot. Jahresber. 28 (1): 496. 1902; DeWild., Ann. Mus. Congo Bot., ser. 4, 1: 117 (1903) and ser. 5, 3: 132. 1909; A. Chev., Sudania 1: 43. 1911; DeWild., Ann. Mus. Cong. Belg. Bot., ser. 5, 3: 468. 1912; A. Chev., Étud. Fl. Afr. Cent. Franç. 1: 244. 1913; DeWild., Bull. Roy. Soc. Bot. Belg. 51 (3) [ser. 2, 1]: 91, 203, 280, & 294. 1913; Prain, Ind. Kew. Suppl. 4, imp. 1, 166. 1913; Wernh., Cat. Talb. Niger. Pl. 91. 1913; J. H. Holland, Kew Bull. Misc. Inf. Addit. Ser. 9 [Useful Pl. Nigeria 3]. 3: 523. 1915; S. Moore, Journ. Bot. Brit. 57: 249. 1919; A. Chev., Expl. Bot. Afr. Occ. Franç. 1: 507--508, 1920; DeWild., Bull. Jard. Bot. Brux. 7: 165. 1920; Fedde & Schust., Justs Bot. Jahresber. 42: 252. 1920; Bakh. in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 75, 86, & viii. 1921; DeWild., Pl. Bequaert. 2: 256. 1922; Irvine, Pl. Gold Coast 11 & 109. 1930; Stapf, Ind. Lond. 2: 238. 1930; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 273. 1931; Watt & Breyer-Brandwijk, Med. Poison. Pl. S. Afr., ed. 1, 155 & 230. 1932; B. Thomas, Engl. Bot. Jahrb. 68: [Gatt. Clerod.] 9, 10, 14, 38, 64--66, 92, & 93. 1936; Dalz., Useful Pl. W. Trop. Afr. 454. 1937; Mold., Prelim. Alph. List Inv. Names 19 & 22. 1940; Mold., Alph. List Inv. Names 16, 17, 19--21, 40, & 56. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 45--51, 72, & 89. 1942; Mold., Phytologia 2: 98. 1945; Jacks., Ind. Kew., imp. 2, 1: 560 (1946) and imp. 2, 2: 1219. 1946; Mold., Alph. List Cit. 1: 31, 71, 74, 141, & 204. 1946; Hill & Salisbury, Ind. Kew. Suppl. 10: 55. 1947; Mold., Alph. List Inv. Names Suppl. 1: 6. 1947; H. N. & A. L. Mold., Pl. Life 2: 52 & 85. 1948; Mold., Alph. List Cit. 2: 407, 501, 504, 563--565, 600, 607, & 608



(1948), 3: 761 (1949), and 4: 983, 1153, & 1154. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 109--118, 120, 158, & 180. 1949; Kerharo & Bouquet, Pl. Méd. Tox. Côte Iv. 231. 1950; Roberty, Pet. Fl. Ouest-Afr. 179. 1954; Syngne in Chittenden, Roy. Hort. Soc. Dict. Hort., ed. 2, 1: 505. 1956; Jaeger, Bull. Soc. Bot. France 104: 192. 1957; Prain, Ind. Kew. Suppl. 4, imp. 2, 166. 1958; Mold., Résumé 133, 135--139, 141, 143, 145, 146, 149, 150, 215, 261--263, 267, 270, 272, 344, 391, 426, & 448. 1959; Mold., Résumé Suppl. 1: 9. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 3, 1: 560 (1960) and imp. 3, 2: 1219. 1960; Dale & Greenway, Kenya Trees 582. 1961; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 689 & 694. 1961; Irvine, Woody Pl. Ghana 752 & 753, pl. 32. 1961; Jaeger, Wonderf. Life Fls. 104, [162], & 170, pl. 86. 1961; Lind & Tallantire, Some Comm. Flow. Pl. Uganda, ed. 1, 147 & 238. 1962; Watt & Breyer-Brandwijk, Med. Poison. Pl. S. Afr., ed. 2, 1047 & 1372. 1962; F. White, For. Pl. North. Rhodes. 365 & 367. 1962; H. Huber in Brenan & al., Kew Bull. 17: 174 & 576. 1963; H. Huber in Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 2. 2: 440 & 443. 1963; Lawton, Kirkia 3: 61. 1963; Meikle, Kew Bull. 17: 174. 1963; Seaforth, W. Afr. Journ. Biol. Appl. Chem. 7: 28, 29, & 31. 1963; Anon., Assoc. Étud. Tax. Fl. Afr. Trop. Ind. 1963: 60. 1964; Langsdale-Br., Osmoston, & Wils., Veg. Uganda 112. 1964; Mold., Résumé Suppl. 11: 6 (1964) and 12: 6. 1965; Hepper, Bull. Inst. Fond. Afr. Noire 27: 495. 1965; Grout de Beaufort & Schnell, Mem. Inst. Fond. Afr. Noire 75: 9 & 41--43, pl. 9, fig. C & D. 1966; Mold., Résumé Suppl. 13: 4. 1966; Schnell & Grout de Beaufort, Contrib. Étud. Pl. Myrmecod. 41--43, pl. 9, fig. C & D. 1966; Berhaut, Fl. Senegal, ed. 2, 109 & 114. 1967; Mold., Résumé Suppl. 15: 6 (1967) and 16: 13. 1968; H. Rose, Bull. Mus. Natl. Hist. Nat. Paris, ser. 2, 39: 1008. 1968; Mold., Résumé Suppl. 18: 6. 1969; Richards & Morony, Check List Fl. Mbala 236. 1969; El-Hamidi, Pl. Med. 18: 279. 1970; Farnsworth, Pharmacog. Titles 5 (11): v & title 14758. 1970; Gillett, Numb. Check-list Trees Kenya 46. 1970; Morley, Wild Fls. World pl. 60c. 1970; Vergiat, Journ. Agric. Trop. Bot. Appliq. 17: 334--335. 1970; Willaman & Li, Lloydia 33, Suppl. 3a: 220. 1970; Farnsworth, Pharmacog. Titles 5, Cum. Gen. Ind. 1971; Lind & Tallantire, Some Com. Flow. Pl. Uganda, ed. 2, 146--147, 238, 254, 256, & 259. 1971; Mold., Fifth Summ. 1: 209, 210, 212, 214, 215, 217--221, 223, 225, 227, 228, 232, 233, 235, 239, 240, 242, 245, 249, 250, 358, 412, 441, 442, 445, 452, 457, & 461 (1971) and 2: 621, 732, 863, & 968. 1971; Den Outer, Meded. Landbouwhogs. Wagen. 72-21: 7 & 15. 1972; Lewalle, Bull. Jard. Bot. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: 76 & [230]. 1972; F. Perry, Fls. World 304 & 313. 1972; Jaeger & Mold., Phytologia 30: 387, 389--393, 404, & 405, fig. 1--5. 1975; Mold., Phytol. Mem. 2: 200, 201, 203--213, 215, 217, 218, 222, 223, 225, 229, 230, 232, 235, 236, 238, 240, 348, 390, 391, 437, 461, & 534--535. 1980; Munz & Stauson, Ind. Illust. Living Things Outside N. Am. 127 & 336. 1981; Reis & Lipp, New Pl. Sources Drugs 251. 1982; Mold., Phytologia 57: 346, 479, & 481 (1985) and 58: 198, 302, 303, & 330. 1985.

Illustrations: W. J. Hook., Curtis Bot. Mag. 74 [ser 3, 4]: pl. 4355 (in color). 1848; Irvine, Woody Pl. Ghana pl. 32 (b). 1961;

Jaeger, *Wonderf. Life Fls.* [162], pl. 86. 1961; Grout de Beaufort & Schnell, *Mem. Inst. Fond. Afr. Noir* 75: 43, pl. 9, fig. C & D. 1966; Morley, *Wild Fls. World* pl. 60c (in color). 1970; F. Perry, *Fls. World* 304 (in color). 1972; Jaeger & Mold., *Phytologia* 30: 390--393, fig. 1--5. 1975.

A small, handsome, erect, or scrambling to subscandent or scandent shrub or subshrub, often producing basal runners, 1--4 m. tall, sometimes a woody liana to 6 m. long, or even a tree to 10 m. tall [fide Chevalier], sometimes appearing to be herbaceous [fide Morteham]; stems hollow, ridged, with very stout spines (phyllopodia) to 1.5 cm. long, often with internodal, 2 mm. wide, circular orifices made by in-dwelling ants, often unbranched; branches and branchlets, when present, slender, mostly subterete (when young) or obtusely tetragonal (when older), more or less densely uncinat-puberulent with appressed whitish hairs and more or less densely hirsute with intermingled, stiff, spreading, brownish or fuscous, multicellular hairs 1--1.5 mm. long, the latter densest on young growth and wearing off in age; nodes not annulate, very slightly or not at all flattened; leaf-scars often very much elevated and prominent as spur-like projections 1--2 mm. long on older wood; principal internodes 1--4.5 cm. long, often with circular openings to internal ant-dwellings; leaves decussate-opposite or subopposite, often only approximate (or apparently alternate) with the members of a pair to 2.5 cm. apart, or even subternate, the lower and mature ones very long-petiolate, the upper and immature ones only short-petiolate; petioles very slender, 0.4--5.5 cm. long, deeply canaliculate above with the 2 parallel margins densely brown- or ferruginous-hirsute like the young branchlets, the lower (convex) side near the apex often also sparsely hirsute, basally very slightly, if at all, ampliate, leaving a spine-like stub after falling; leaf-blades membranous, dark- or bluish-green above, somewhat lighter beneath, obovate-oblong or elliptic, or the smaller ones subovate, ovate, or obovate, 4.5--30 cm. long, 2--10 cm. wide, apically rather long-acuminate or cuspidate on the lower (larger) leaves, acute or short-acuminate on the upper (smaller) ones (the acumen mostly apically rather blunt), marginally entire or undulate to rather obscurely sinuate-dentate with 1--4 teeth on each margin at and above the middle, basally acute on larger leaves, obtuse or rounded to subcordate on smaller ones, puberulent on both surfaces or very sparsely scattered-pilose above, glabrescent in age, scattered-pilose and punctate on the lamina beneath, more densely pilose or hirsute on the midrib and larger veins beneath, or the younger ones subpilose and the older ones ferruginous-hairy on the veins (especially beneath); midrib slender, flat or subimpressed above, prominent beneath; secondaries slender, 3--9 per side, ascending, usually arcuate only near the margins, plainly joined in many loops several mm. from the margins, usually subimpressed above, rather sharply prominulent beneath; vein and veinlet reticulation fine, slightly subprominulent on both surfaces or the larger portions subimpressed above and sharply prominulent beneath; inflorescence showy, terminal, sessile, globose, the panicles umbellate-capitate, densely many-flowered, conspicu-

ously bracteose, 15--23 cm. wide, sometimes also borne on the older wood; bracts numerous, foliaceous, short-stalked, elliptic or lanceolate, 1.5--2.7 cm. long, usually about equaling the subtended calyx, clustered in involucrate fashion, 3-veined, pilose on the venation like the leaves and along the margins, apically subulate-acuminate, basally acute or rounded, reticulate; peduncles obsolete or short and hairy; inflorescence-branches obsolete or very much abbreviated and completely hidden by the imbricate bracts, long-pilose like the branchlets; flowers conspicuous, showy, very fragrant; calyx large, tubular-campanulate, 1--2 cm. long, 7--10 mm. wide, pale-green, eventually turning wine-red, lax, deeply 5-parted, its tube short, infundibular, internally glabrous, externally pilose or glabrous and marked with peltate glands, the segments oblong or ovate, 10--12 mm. long, basally united, apically acute, densely ciliate, nearly equal, membranous, erecto-patent, reticulate, externally brown-pilose (especially marginally), often purple or purple-tipped; corolla white, creamy-white, or greenish-white to pale-pink, showy, to 12.5 cm. long, infundibular, externally densely glandular-pubescent, the tube very slender or filiform, elongate, 3--12 cm. long (depending on stage of development), externally glandular-pilose, geniculate below the limb and there ampliate, internally basally puberulent, the segments 5, ovate or subobovate to oblong, 1--1.5 cm. long, 5--7 mm. wide, subequal, apically obtuse, regularly radiate-spreading or sub-oblique, finally recurved, 3--5-veined; stamens inserted at the apex of the corolla-tube, long-exserted; filaments 3.5--4 cm. long, usually 2--3 times the length of the corolla-lobes, upwardly curvate; anthers red; style long-exserted, 10--12 cm. long, glabrous; ovary globose, externally glabrous; fruiting-calyx persistent, accrescent, wine-red; fruit drupaceous, bilobed, composed of 4 nutlets, enclosed by the fruiting-calyx until mature, brilliant dark-purple to black when ripe; seeds "black on one side, with an orange-red aril showing on the other" (*vide Meyer 8036*).

The species is based on Herb. Willdenow 11682 from the Guinea coast, so designated by Thomas (1936). Collectors have encountered the species in forests, gallery and tropical rainforests, dense thickets, relict forests of *Parinari excelsa*, the understory of dense forests of *Chrysophyllum pruniforme*, *Blighia welwitschii*, *Ficus* sp., *Trecoulea africana*, *Macrolobium limba*, *Anthocleista nobilis*, *Pteris marginata*, and *Bolbitis acrostichoides*, along riverbanks, and along roadsides in recently cultivated land, at altitudes of 280--2300 m., in flower from June to January and in March, and in fruit in April and from July to November. The corollas are uniformly described as having been "white" by all collectors who have bothered to record the color (*viz.*, Angus 2796, Barter s.n., Chevalier 6294, 6516, & 13994, Lebrun 5130, Vogel 34 & s.n., and Zenker & Staudt 428, but is given as "snow-white" on Dummer 265 and "creamy-white" by Bakhuizen (1921) and by Sygne (1956).

*Clerodendrum capitatum* var. *butayei* DeWild. and var. *butayeri* De Wild. are regarded by me as belonging in the synonymy of *C. angolense* Gürke. *C. capitatum* var. *conglobatum* Thomas is regarded by me as valid (*q.v.*), var. *cordatum* Peter is a synonym of *C. frutescens*

S. Moore, and var. *talbotii* (Wernh.) Thomas is also valid (q.v.); *C. capitatum* Hook. is a synonym of *C. whitfieldii* Seem. and *C. capitatum* Klotzsch is *Aegiphila macrantha* Ducke.

The *C. capitatum* var. *subcordatum* DeWild., referred to in the synonymy (above) is based on *Verdick 422* in the Brussels herbarium.

Bakhuizen (1921) and Baker (1900) include in the synonymy of *C. capitatum* the following taxa: *C. mossambicense* Klotzsch, *C. robustum* Klotzsch, and *C. stenanthum* Klotzsch -- the first of these I regard as a valid taxon distinct from *C. capitatum*, the second is regarded by me as *C. fischeri* var. *robustum* (Klotzsch) Thomas, and the last is a synonym of *C. mossambicense*. Bakhuizen also includes *C. whitfieldii* Seem. as a synonym of *C. capitatum*, but I regard it as a valid taxon. Some other authors include *C. talbotii* Wernh., *C. fructosum* S. Moore, and *C. hirsutum* G. Don in the synonymy of *C. capitatum*, but I regard the first as *C. capitatum* var. *talbotii* (Wernh.) Thomas, the second as a valid species, and the last as a synonym of *C. umbellatum* Poir.

*Clerodendrum obanense*, included in the synonymy (above), is based on *Talbot 2081* from Oban, deposited in the British Museum herbarium.

*Clerodendrum capitatum* is described by Irvine (1961) as "almost a tree", while on *Claessens 542*, *Lebrun 5130* and *Mullenders 2326* it is referred to as a "liana"; on *Mortehan 1097* it is said to be "a herbaceous plant". *Claessens 542* exhibits leaves arranged in approximately ternate fashion on the branches. On *Chevalier 13994* the plant is described as a "tree 10 m. tall with white latex" (!) [surely an error in observation]. Langsdale-Brown and his associates (1964) describe it as "a climber in both young and old *Piptadenia-Albizia-Celtis* forests" in Uganda.

Roberty (1954) describes it as "Variable, avec une forme géopyrophyte ou septentrionale, à tiges simples et dressées, non dénommée, et diverses formes méridionales, parfois très, longuement lianescentes."

Willdenow's original (1802) description is: "*Volkameria capitata*. W. † V. foliis ovatis integerrimis scabris, floribus terminalibus capitatis, calyce foliaceo. W. Kopffdrüsiges Volkamerie. W. Habitat in Guinea. † (v. s.). Rami obtuse tetragoni canescentes glabri, a petiolorum rudimentis obtusis prominentibus tuberculati. Folia opposita remota oblongo-ovata acuminata, acumine obtuse mucronato, integerrima venosa, utrinque a pilis dissitis scabriuscula. Flores albi in capitulo terminali breve pedunculato quinquefloro. Calyx campanulatus, limbo tripartito, laciniis maximis oblongis foliaceis mucronatis reticulato-venosis ciliatis. Corollae tubus filiformis longissimus bipollicaris et ultra, limbo quinquepartito inaequali, laciniis oblongis obtusis. Stamina longissime exserta. Fructus ignotus. W."

*Clerodendrum* [not *Clerodendron*] *capitatum* (Willd.) Schum. & Thonn. was apparently originally published in *Beskr. Guin. Pl.* 287 (1827). Pritzel gives the date of this publication as "1828", but the title-page of Schumann & Thonning's paper is imprinted "1827" and the late Dr. John Hendley Barnhart, eminent bibliographer at the New York Botanical Garden, has personally checked carefully and agrees with 1827

as the valid date of publication. The Index Kewensis gives the citation as "Dan. Vid. Selsk. Afh. 4: 61. 1828. Afr. trop." It appears that volume 3 of this series was published in 1828 and volume 4 in 1829, although Kew gives the date as "1828" for volume 4. Dr. Barnhart informed me that he at first thought that vol. 4 contained the original publication and that the other reference was a reprint of it, but after checking through five reliable bibliographic sources he has come to the conclusion that the formerly regarded reprint was the actual original publication.

Hooker (1848) comments that "There never was a period, perhaps, when so many splendid new plants were introduced to our stoves and greenhouses as at the present; and these, it must be confessed, come very much through the instrumentality of our eminent and spirited Nurserymen, and the encouragement given by them to Collectors abroad. The late volumes of the Botanical Magazine will bear me out in this assertion; and the subject now figured is certainly not among the least splendid of recent arrivals. It is from the collection of Messrs. Lucombe, Pince, and Co. of Exeter, and was imported by them through Mr. Whitfield from Sierra Leone. It consequently requires stove heat, and it has the merit of flowering while the plants are small. . . Notwithstanding some slight discrepancies, I have every reason to believe this is the *Volckameria capitata* and equally the *Clerodendron capitatum* of Schumacher, more fully described in the Plants of Guinea. It is a species so little known to Botanists that in DeCandolle's Prodrômus it is placed among 'species denuo recognoscendae'. The length and spread of the corollas are so considerable, that at first sight the capitata character is not distinctly visible; but it will be seen that the bases of the flowers, the calyxes, are collected into a dense head. The fragrance is no less remarkable than the beauty of the flowers and foliage."

Gürke (1893) claims that *C. capitatum* is closely related to *C. fischeri* Gürke, which differs chiefly in its large, very thickly coriaceous, subrotund leaf-blades with very prominent venation, and this statement is quite true. Baker (1900) claims it to be "near *C. buchneri* Gürke. He refers to *C. capitatum* as "Ein kleiner, etwas kletternder Strauch mit langgestielten eiförmigen, zuweilen grobgezähnten, dünnhäutigen Bl[ätter] u. köpfchenförmigen Blütenständen, deren nach allen Seiten abstehende, bis 6 cm lange weisse Bl[üthen] einen sehr schönen Anblick gewähren."

Common and vernacular names recorded for *C. capitatum* include "agbul u uwagh", "ayeti", "bibok", "bimbo", "abran", "ekisekeseke", "é titimol", "fermöme", "firi-fore", "fuemömi", "furu-fure", "illiri", "iye", "koloko vuma", "korlejiga", "makanchete", "mashayi", "motuam", "nyekpe", "nyékpe", "obranmotuam", "ododobed", "pfufulla", "pipe-tree", "pipetree", "purtul", "taasen dua", "taasendua", "tabeteo", "tabeto", "tasendua", "tataba", "tete", "trömen", "tromen", and "volkamier capité". The name "furu-fure" is also applied to *C. umbellatum* Poir. and probably to other species as well; the name "mashayi" means "something to drink or smoke with", i.e., a pipe.

Jaeger (1957) reports that the corolla-tubes of *C. capitatum* are

regularly penetrated by the tongues on moths and butterflies for the nectar therein contained.

Watt & Breyer-Brandwijk (1962) report the use of this species as a purgative in Zambia and central Africa, where the natives also "rub the powdered root bark, with other ingredients, into scarifications on the abdominal wall to relieve intestinal troubles". In Tanganyika the hollow stems are used to make smoking pipes.

Seaforth (1963) reports alkaloids and saponins present in this plant. Vergiat (1970) notes that "Pour se parfumer, les femmes indigènes réduisent les fleurs en poudre puis se passent cette poudre sur le cou. La décoction des feuilles, en ablution dans le cas de courbature. Les rameaux tubulaires servent à confectionner les sifflets d'appel fétichiste pour les génies Ngakola et Mbotche. Les feuilles associées à celle de kenga, Zingibéracée, *Costus Schlechteri*, servant à jeter des sorts. Si on les dépose la nuit sur le toit d'une case, on cause une affection à l'occupant. Pour le guérir et le délivrer du maléfice, on lui donne à boire la décoction de la racine après y avoir ajouté quelques gouttes d'huile de palme."

El-Hamidi (1970) reports that in the Sudan the roots of this species are used in treating skin inflammations and swellings. In Zambia the stems "hollowed out by ants", are much sought after by the natives for making pipes for sucking up beer.

Willaman & Li (1970) report finding an unidentified alkaloid in parts of the plant.

Irvine (1961) tells us that "The hollow stems are used as tobacco pipes [in Ghana], and to convey palm-wine from the felled tree to the pot beneath. Good straight poles are made from the stems of this ornamental shrub in Nyasaland (Clements). The root is taken hot for severe stomach pains in Nyasaland (Clements, Herb. Oxf.). A root decoction is drunk on the Iv[ory] Coast for orchitis and elephantiasis of the scrotum, the leaf-pulp with *Capsicum* pepper being used as an enema for the same purpose. This preparation is applied to generalized oedemas. A decoction of leafy stem-tips is considered febrifugal and a decoction of leaves and inflorescences is used for bathingcankers, and as a gargle for toothache." Much the same information is given by Kerharo & Bouquet (1950).

Hansford (1961) records the fungus, *Meliola clerodendri* Hansf., from this host in Ghana, based on Hughes in IMI.43563 & 43587 and *Meliola clerodendricola* P. Henn., based on Deighton CB.1013 and Vanderyst 34386, 43100, 43117, 43136, & 43140, the Deighton collection from Ghana and the Vanderyst collections from Zaire.

Epiphytic hepatics were found on and removed from the leaves of Lebrun 5130 by Dr. D. P. Rogers,

DeWildeman (1909) cites Gentil & Gillet 2764, Gillet s.n., Les-crauwet 24 & 87, and Seret 135 from Zaire. Chevalier (1913) cites Chevalier 6089 & 10772 from upper Ubangi and 6294 & 6516 from upper Chari, in the Central African Republic, describing the plant as an "Arbuste de 1 a 2 metres de hauteur, baies noirs....fleurs blanches".

Thomas (1936) cites Willdenow 11682 from the Guinea coast; Kersting A.65 from Togo; Vogel 1841 from Ghana; Barter 342, Elliot s.n., Mac Gregor 23, and Millen 45 from Nigeria; Ledermann 4354 & 5212 from the

Cameroons; and *Mechow* 137 from Angola.

Irvine (1961) describes the habitat of *C. capitatum* in Ghana as coastal savannas and closed forests, giving its overall distribution, as known to him, as "Senegambia to Cameroons, Upper Nile Land, Uganda, E. Africa, and the Rhodesias", citing from Ghana *Dalziel* 143, *Deighton* 3430, *Fishlock* 40, *Howes* 945, *Irvine* 748, 873, & 1973, *Vigne* 1331, 2523, & 3445, and *Vogel* s.n.

Huber (1963) cites *Bergaut* 423 & 3157 from Sénégal; *Brooks* 8, *Frith* 125, *Hayes* 502, and *Ingram* s.n. from Gambia; *Chevalier* 832bis, 2573, & 2751 and *Jaeger* 11 from Mali; *Esp. Santo* 3088 from Guinea Bissau; *Caille in Herb. Chevalier* 14678 and *Jacques-Félix* 1880 from the Republic of Guinea; *King* 156b, *Marmo* 289, *Miszewski* 47, and *Thomas* 2233 & 2379 from Sierra Leone; *Harley* 792 from Liberia; *Chevalier* 21938 from Ivory Coast; *Dalziel* 143, *Darke* WACRI.890, *Irvine* 748 & 1973, and *T. Vogel* s.n. from Ghana; *Kersting* A.65 & A.191 from Togo; *Barter* s.n., *Dalziel* 107, *Lely* 435 & 497, and *Noble* 6 from Northern Nigeria; *Barter* 342, *Newberry* 60, *Onochie* FHI.33354, *Punch* 42, and *Talbot* 341 & s.n. from Southern Nigeria; and *Mann* 1975 from the Cameroons. He lists the species, in its typical form, also from Angola, Egypt, Zaire, Sudan, Zambia, and Nyasaland, calling it an "Erect or scrambling shrub". Gillett (1970) lists it from Kenya.

*Jaeger* & *Moldenke* (1970) give its overall distribution as "native to central and eastern Africa". *Bakhuizen* (1921) lists it from cultivation in Java, and *Syngé* (1956) reports it still cultivated in "stoves" in England. *Rose* (1968) reports it cultivated in France.

*Baker* (1900) cites *Thierry* s.n. from Sénégal; *Ingram* s.n. from Gambia; *Whitfield* s.n. from Sierra Leone; *Vogel* s.n. from Ghana; *Barter* 342 & s.n., *Irving* 111, & *Millen* 45 from Nigeria; *Johnston* s.n. and *Mann* 1957 from the Cameroons; *Wakefield* s.n. from Kenya; *Hannington* s.n., *Holst* 4256, and *Thomson* s.n. from Tanganyika, several *Peters* collections from Mozambique; and *Buchanan* 1489, *Cameron* 2, *Carson* 63 & s.n., and *Whyte* s.n. from Uganda.

*Reis* & *Lipp* (1982) cite *Angus* 2796 from Zambia.

*Grout de Beaufort* & *Schnell* (1956) describe and illustrate the internodal holes made in the stems of this plant by ants, based on *Chevalier* 18846 from Guinea, *Poisson* s.n. from Dahomey, and *Zenker & Staudt* 428 from the Cameroons. They also depict the cauline spines.

*Chevalier* (1920) cites *Chevalier* 14678 from the Republic of Guinea, 832bis, 2573bis, & 2751 from Mali, 21938 from Ivory Coast, and 13994 from Nigeria. In his 1913 work he cites his nos. 6089, 6294, 6516, & 10772 from the Central African Republic. In his 1911 work he cites his no. 2751 from middle Niger Republic.

*Seemann* (1862) cites unnumbered *Barter*, *Brass*, *Irving*, and *Vogel* collections, as well as *Vogel* 14 & 34 in the British Museum herbarium. He notes that "Eduard Vogel fand sie an verschiedenen Stellen im Innern Afrikas und Theodor Vogel, sowie fast alle Sammler an der Westküste Afrikas". He claims that it is distinguishable from the related *C. whitfieldii* by the spiny branches and smaller leaves and that the two species form a distinct group in the genus because of the foliose bracts and capitate inflorescences.

*Hooker* & *Bentham* (1849) cite unnumbered *Vogel* and *Whitfield*

collections from, respectively, Nigeria and Sierra Leone. DeWilde-  
man (1912) cites *Claessens 180 & 542* from Zaire. Berhaut (1967)  
cites *Berhaut 423 & 3157* from Sénégal; Richards & Morony (1969) cite  
*Lawton 139* from Mbala. Hepper (1965) gives the species' distribu-  
tion as Sénégal to Sudan and Malawi, citing his no. 2762 from North-  
ern Nigeria.

Hutchinson & Dalziel (1931) cite *Barter 342, Elliott 90, Ingram s.n., Irving 111, Mann 1957, Millen 45, Talbot 341 & 2081, Thierry s.n., T. Vogel s.n., and Whitfield s.n.* from western tropical Africa, giving the species' overall distribution as "Senegal and French Sudan to N. and S. Nigeria! Cameroons Mt., 3,000 ft.! Extends to Upper Nile Land and E. Africa."

Thomas (1936), in formally typifying this taxon, writes the original Willdenow reference as "Sp. Pl. 3, 1 (1800) 384" and the Schumann & Thonning description as "Beskrivelse af Guineiske Planter (1827) 61. Jackson (1893) abbreviates this as "Dan. Vid. Selsk. Afh. iv. (1828) 61".

Lefroy (1884) reports *Clerodendrum capitatum* as "Wild around the rectory;--probably introduced" -- but this is presumably a misidentification of *C. philippinum* f. *multiplax* (Sweet) Mold.

It should perhaps also be noted here that the Gürke (1893) reference in the bibliography of *C. capitatum* is sometimes mis-cited as "1894" and the DeWildeman (1913) reference as "1914" -- in each case this is the misleading titlepage date for the entire volume.

An artificial key to help distinguish *C. capitatum* from some of its related species is given by me under *C. buchneri* Gürke in this present series of notes (q.v.),

Material of *Clerodendrum capitatum* has been misidentified and distributed in some herbaria as *C. barteri* Baker. On the other hand, *Bainbridge 690 & 727, Barter 342, Buchanan 1489, Chancellor 269, Enti Sp.40, Gbile & Olorunfemi FHI.20478, Germain 6880, Harris s.n., Shantz 532, and Zenker 364, 3222, & 3285*, distributed as typical *C. capitatum*, actually are *C. capitatum* var. *conglobatum* (J. G. Baker) Thomas, while *Allen 463* and *Peter 37434* are *C. buchneri* Gürke, *Barbosa 1289, Exell, Mendonca, & Wild 608, Garcia 469, Mendonca 1241, and Torre 610 & 6774* are *C. fischeri* Gürke, *Watmough 225* is *C. frutectorum* S. Moore, and *Torre 3008, 3018, 4341, 5882, 6785, & 8012* are *C. swynnertonii* S. Moore.

Citations: ETHIOPIA: F. G. Meyer 8036 (W--2520043). GAMBIA: A. J. Brooks & (K). SIERRA LEONE: Jaeger 8613 (Ld), 9824 (Ld). GHANA: Dalziel 143 (K, N); Fishlock 40 (K, Ld--photo, Mi--photo, N--photo). NIGERIA: Talbot 2081 [Mo. Bot. Gard. Type Photos A.849] (Gz--photo, N--photo). CAMEROONS: Zenker & Staudt 428 (Ca--617153). ZAIRE: Brande 710 (Br); Bredo s.n. [Bambesa et environs '33] (Br); Claessens 180 (Br, N), 542 (Br, N); Dewulf 160 (Br, Br); Graer 103 (Br); Hulstaert 1303 (Br); Lebrun 5130 (Br, Br); Mestdagh A.849 (Br); Montehan 884 (Br), 1097 (Br); Mullenders 2326 (Br); Overlaet 147 (Br); Reygaert 159 (Br), 1122 (Br), 1297 (Br, N); Van den Brande 1929 (Br); Vanderyst 21552 (Br), 21914 (Br), 22172 (Br); Verdick 422 (Br); Witte 1532 (Br). UGANDA: Bagshawe 1247 (W--1349260); Dümmer 265 (W--633514); C. M. Harris 449 (Br). TANZANIA: Tanganyika: Peter 25029 [O.IV.346] (B). ANGOLA: Cuanza Sul.: Gossweiler 9845 (W--1579414).

[to be continued]



## BOOK REVIEWS

Alma L. Moldenke

"AMA HANDBOOK OF POISONOUS PLANTS" by Kenneth F. Lampe M.D. & Mary Ann McCann, xi & 432 pp., 11 tab. & 437 color photos. Chicago Review Press (IL 60610) for the American Medical Association, Chicago, Illinois. 1985. \$18.95.

The purpose of this publication "is to provide physicians and other health care professionals with an easily used reference for the management of plant intoxications...and as a field guide for the recognition of dangerous and injurious plants". Section I discusses plants of the United States, Canada and the Caribbean producing systemic intoxications; Section II plant dermatitis and Section III mushroom poisoning. The text material is basically usable with treatment reported from medical rather than botanical sources which are only intended as historical and cultural records. The format of the book resembles that of the Audubon field guides. What a pity that the AMA did not choose the same Chanticleer Press or one of similar quality for the illustrations. With a few exceptions the AMA pictures have more black border than picture space and do not show enough of the plant characteristics for sure recognition by today's well trained MDs whose training no longer includes botany.

"ANNUAL REVIEW OF ENTOMOLOGY" Volume 29, edited by Thomas Mittler & associates, x & 521 pp., 52 b/w fig. incl. 4 photo. & 16 tab. Annual Reviews, Inc., Palo Alto, California 94306. 1984. \$27.00 U.S.A. & \$30.00 foreign.

Like the previous and subsequent issues, this one contains interesting important papers well explained and documented. The first one is a worthy tribute to F. S. Bodenheimer (1897--1959), idealist, scholar, scientist, who did so much for practical entomology especially in Israel. Some others are: celestial and noncelestial astro-navigation in insects' strategies, spiders as a stable assemblage of biological control agents, many defense mechanisms of termites, pollination activities, ecology and sociobiology of bumblebees, induction of detoxication enzymes in insects helping "their survival in a chemically unfriendly environment" (which study the PHYTOLOGIA publishers have watched developing because of their daughter-in-law's research with the author L. C. Terriere).

"CARNIVOROUS PLANTS" by Adrian Slack, Second Impression. 1985. 240 pp., 16 color pl., 102 b/w photo. & 4 draw. MIT Press, Cambridge, Massachusetts 02142. 1985. \$12.50 paperbound.

This paperbound reissue of the 1980 hardcover, very fine English publication is welcomed for its interestingly readable, informative and well written text and its fine illustrations that cover the whole field very well for the naturalist as well as for the trained botanist.

"THE NATURAL HISTORY OF OTTERS" by Paul Chanin, xi & 179 pp., 17 color pl., 50 b/w fig. incl. 7 maps, & 20 tab. Facts on File Publications, Inc., New York, N. Y. 10016. 1985. \$17.95.

This is a fine publication, rich in content, because it relates so much in interesting, succinct and well organized fashion. Most of the author's field observations were on the Eurasian otter, *Lutra lutra*. He follows Davis (1978) rather than Harris (1968) in lumping all American river otters as *L. canadensis*. The worldwide geographic distribution maps give the continental land and oceanic ranges. There is much ecologically oriented content about food, relations with other animals, social organization, communication, life history and relations over the past 200 years with man's capture for pelts, run-off of pesticides, and commercial riverside development. Only if man "is willing to acknowledge and respect the needs of the other species on the planet will the otters survive and, perhaps, prosper."

"LA FLORA DE LA ESPANOLA II" by Alain Henri Liogier in Universidad Central del Este Vol. 44 Serie Cientifica XV, 420 pp., 106 line draw. & 1 b/w photo. 1983. \$15.00 paperbound.

"LA FLORA DE LA ESPANOLA III" by Alain Henri Liogier in Universidad Central del Este (San Pedro de Macoris, Dominican Republic) Vol. LVI Serie Cientifica 22, 431 pp. and 115 line draw. 1985. \$20.00 paperbound.

The first installment in this series was published in 1981 in PHYTOLOGIA MEMOIRS III as "Antillean Studies I FLORA OF HISPANIOLA I -- *Celastrales*, *Rhamnales*, *Malvales*, *Thymeleales*, *Violales*" (\$20.00 from the author). The classification followed is mainly that of Engler, with some modifications by Hutchinson. Prominent among the 46 families in II are the *Annonaceae*, *Lauraceae*, *Cruciferae* and *Rosaceae*. Likewise prominent among the 13 families in III are the *Leguminosae s.l.* and *Rutaceae*. The many drawings in all volumes emphasize diagnostic characteristics, are clear cut, well detailed and often taken from Little & Wadsworth's tree studies and other excellent sources. It is certainly wise to put such well prepared material to this additional use. We hope that the author - our esteemed friend - will have the time, energy, and resources to complete this very worthwhile undertaking.

New York Botanical Garden Library



3 5185 00288 2593

Inasmuch as we do no editing, papers accepted for publication *must* be submitted in *exactly* the form that the author wants to have them published. They will then be photographed and printed by photo-offset in exactly the form as submitted except that we will add page numbers and running-heads.

Typescripts should be prepared single-spaced on clean white heavy bond smooth and opaque paper. Elite type is probably the most space-economical. Typescript text must not exceed a rectangle  $5\frac{5}{8}$  inches wide (horizontal) by  $8\frac{5}{8}$  inches high (vertical), not including the running-head and page number.

The title of the paper should be typed in all uppercase (capital) letters with 2 blank lines above the title and one beneath; then the name of the author in ordinary upper- and lower-case letters, along with his address (if so desired); followed by 2 blank lines; then the first line of text. It is usually best to leave a blank line between paragraphs.

All scientific plant and animal names and group names should be typed either in italic type (if available) or underscored. Any corrections in the text made by the author must be complete and neat as they will be photographed as they are.

The finished typescript as submitted by the author will be reduced from the  $8\frac{5}{8} \times 5\frac{5}{8}$  inch size as submitted to  $6\frac{2}{8} \times 4$  inches by the printer. It is therefore advisable to place a centimeter or millimeter scale on all text figures and plates included.

Use a *new* heavily inked black typewriter ribbon and be sure to *clean* the type on the typewriter after each several pages of typing.

Cost of publication at present is \$11.00 US per page, with no subsequent rebates, but this rate may vary depending on inflation and costs, so it is best to inquire as to current rates. The page charges are due *with* the typescript and no paper will be published before payment is received in full. Each author will receive gratis a proportionate share of the printed copies remaining after paid subscriptions are filled, but if separates (reprints or offprints) are desired, these will be charged extra in accord with the current rate for offprints provided by the printer. The cost of all such separates ordered must also be paid for in advance at the time the typescript is sent. No orders for separates will be accepted later, nor can additions or corrections be accepted.

Authors are asked to indicate in light pencil on the *reverse* side of each page of their typescript the page number so that no mistakes in sequence occur.

All manuscripts accepted will be published in the next issue, so that the size of the numbers may vary greatly. A volume will contain 512 pages. This plan insures prompt publication of all accepted manuscript.

Illustrations will be published according to the desires of the authors. No extra charge is made for line drawings, such as are ordinarily reproduced in zinc, or for diagrams, tables, or charts, provided they conform to certain limitations of size and proportion. An extra charge will be made for halftones, depending on their size, as fixed by the engraver.

Articles dealing with research in all lines of botany and plant ecology, in any reasonable length, biographical sketches, and critical reviews and summaries of literature will be considered for publication.