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ESPECIES, VARIEDADES Y COMBINACIONES NUEVAS DE CACTACEAS DEL VALLE DE MEXICO

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Coryphantha bussleri (Mundt) Scheinvar comb. nov. Bas. Mammillaria bussleri Mundt, Monatsschr. Kakt. 11 : 47, 1902; Quehl, Ibid. 22 : 97, 1913; Backbg., Die Cact. 5 : 3054, 1961.

Se trata de una planta que Mundt (op. cit.) señala como existente en Cuesta Blanca, entre Esperanza y San Agustín del Palmar, en los límites entre los Estados de Puebla y Veracruz.

La autora encontró una foto de dicha especie en el Herbario de Smithsonian Institution (US), anexada a una carta que Berger envió a Rose, fechada de 19 de julio de 1920. De dicha carta se deduce que C. bussleri ha sido confundida con C. ottonis, ya que ambas poseen flor blanca y espina central recta, con el ápice ligeramente ganchudo.

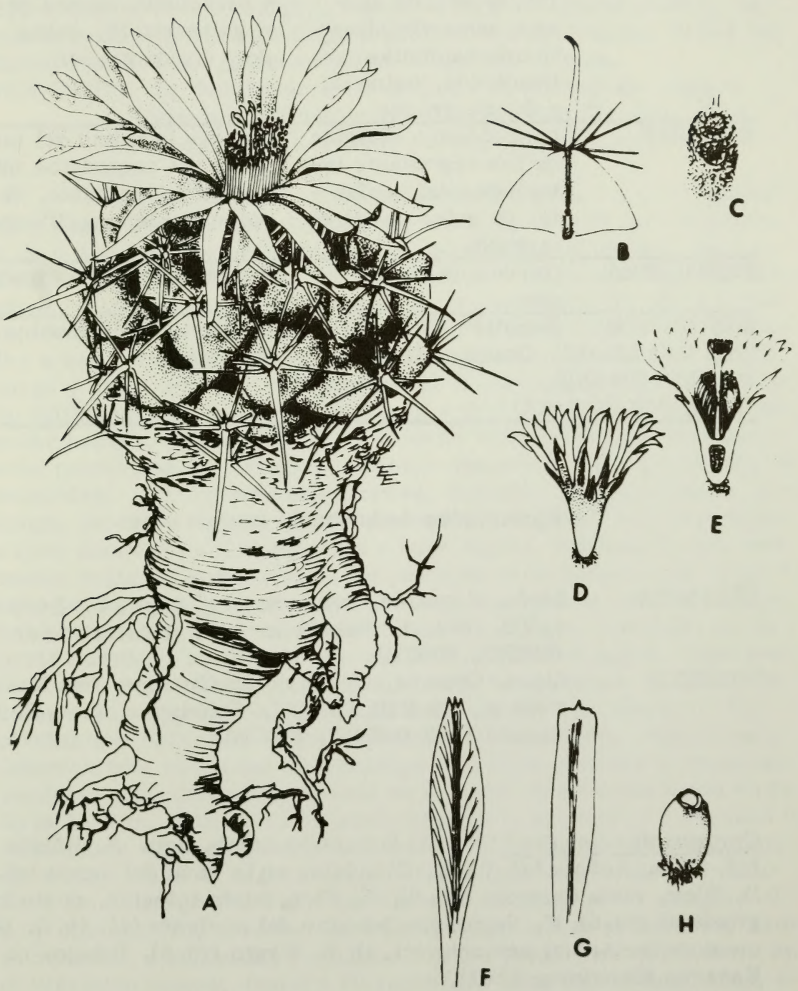
Backeberg (op. cit.) transcribe las descripciones y características mencionadas por Mundt y por Quehl y expresa la opinión de que se trata de una especie diferente pero cercana a C. ottonis, lo que podría ser confirmado cuando se volviera a encontrar plantas silvestres que permitieran hacer un detallado estudio de la morfología de ambas.

Durante el desarrollo del estudio de las Cactáceas del Valle de México, se encontraron plantas que fueron identificadas como C. bussleri, distribuidas en el Municipio de Zapotlán, Estado de Hidalgo, y en el Municipio de Otumba, Estado de México, en suelos derivados de rocas volcánicas, con afloramientos de caliche, en matorral xerófilo espinoso, entre 2400 y 2600 m de altitud.

C. bussleri difiere de C. ottonis por las siguientes características:

	C. bussleri	C. ottonis
RAIZ PRINCIPAL	napiforme, un poco más angosta que el tallo, blanca, no revestida de corteza de otro color: raíces secundarias también napiformes	sin una raíz principal, con numerosas raíces napiformes, oblongas y paralelas entre sí, amarillentas, recubiertas de corteza que se desprende con facilidad, de color castaño

	C. bussleri	C. ottonis
TUBERCULOS	dirigidos hacia afuera, de color verde oscuro brillante	ascendentes, de color verde oscuro grisáceo
GLANDULAS DE LOS TUBERCULOS	surco con 2 (3) glándulas rojas; fieltro blanco	surco con 1 glándula anaranjada en su base; fieltro amarillento
AREOLAS	circulares	elípticas
COLOR DE LAS ESPINAS RADIALES	amarillento pasando a grisáceo con el ápice amarillo	grisáceo verdoso
COLOR DE LAS ESPINAS CENTRALES	rojizo pasando con el tiempo a color ambarino, con el ápice castaño rojizo	castaño amarillento con el ápice más oscuro
FLOR	hasta de 3.9 cm	de 4 a 6 cm de largo
PERICARPELO	de ± 0.5 cm de largo, verde, con escasas y cortas escamas	de ± 0.9 cm de largo, verde claro o blanco amarillento, desnudo
SEGMENTOS EXTERIORES DEL PERIANTO	de ± 2 cm de largo, borde entero, ápice finamente dentado, blancos con banda mediana variando de color de rosa a violeta	de ± 2.5 cm de largo, borde ondulado, ápice irregularmente dentado, blancos con amplia banda castaño verdosa
SEGMENTOS INTERIORES DEL PERIANTO	angostamente oblanceolados, de ± 2.2 cm de largo y ± 0.4 cm de ancho, blancos con la base verdosa y banda mediana purpúrea a violeta, con bordes enteros y ápice finamente dentado	oblanceolados, de ± 2.5 cm de largo y ± 0.5 cm de ancho en la parte mediana; colores diversos: blanco, marfil, rosa claro o rosa fuerte, con bordes finamente dentados
ESTAMBRES	conniventes alrededor del estilo, alcanzan 1/3 superior del largo del estilo y el 1/2 del largo de los segmentos interiores del perianto; filamentos blanco verdosos; anteras de color amarillo oscuro	no conniventes, ± 1 cm abajo de los lóbulos del estigma y alcanzan 1/3 del largo de los segmentos interiores del perianto; filamentos blancos; anteras de color amarillo dorado oscuro



Coryphantha bussleri (Mundt) Scheinvar comb. nov.

	C. bussleri	C. ottonis
GRANO DE POLEN	perreticulado, semitectado, tricolpado, prolato, de 32 (39) 47 µ de largo x 33 (39.5) 46 µ de ancho, superficialmente con espínulas abundantes, exina de ± 3 µ de grosor	tectado, pericolpado, esférico, de 47 (58) 64 µ de diámetro, superficialmente equinulado y foveolado, colpos generalmente 12, exina de ± 4 µ de grosor
ESTIGMA	casi alcanza el ápice de los segmentos interiores del perianto, de color verde esmeralda	alcanza la mitad del largo de los segmentos interiores del perianto, de color verde amarillento
FENOLOGIA	florece de abril a junio	florece de julio a agosto
MUNICIPIOS DEL VALLE DE MEXICO EN QUE SE HA COLECTADO	Zapotlán (Hidalgo) y Otumba(México)	Huehuetoca y Coacalco (México)

Ejemplares de herbario examinados:

HIDALGO: Mpio. Zapotlán, Cerro Sotula, Zapotlán, 2600 m, 1. VII. 1974, L. Scheinvar & C. Ramirez 1547 (MEXU, ENCB).

MEXICO: Mpio. Otumba, Cerro de La Cumbre, San Marcos, 2400 m, 18. VIII. 1973, L. Scheinvar, J. & G. Rzedowski 1162 (MEXU, ENCB).

Coryphantha bussleri (Mundt) Scheinvar comb. nov. A. Hábito (x1.1); B. Aréola (x1.7); C. Glándulas en la base del surco (x6.8); D. Flor, vista exterior (x0.6); E. Flor, vista interior, corte longitudinal (x0.6); F. Segmento interior del perianto (x1.4); G. Segmento exterior del perianto (x1.4); H. Fruto (x0.6). Dibujos de E. Esparza (Scheinvar 1162).

Heliocereus elegantissimus (Berg.) Br. & Rose var. helenae Scheinvar var. nov.

Planta rupestris vel epiphytica, caulis usque ad 4 cm latus; costae 4-6, apice recto vel undulato; areolae 1.3-2.5 cm inter se distantes, lanam albam vel flavidam ferentes; spinae 5 - 21, usque ad 1.5 cm longae, flavidae; flos coccineus nitidus, aetate vinosus vel cinnabarinus; fructus 4.5-7 cm longus, 3.5-4 cm latus; semen alam tegumentariam notabilem ferens.

HOLOTIPO: L. Scheinvar & C. León 2240, Estado de México, Municipio Amecameca, Agua Viva, Tocinco, faldas del Iztaccíhuatl, 13. VII. 1977 (MEXU).

Planta rupícola o epifítica; artículos de 0.3 a 4 cm de largo y hasta 4 cm de ancho; costillas 4 a 6, de 8 a 18 mm de altura y de 0.3 a 1 cm de espesor en la base; aréolas obovadas, de 1 a 3 mm en el diámetro mayor, distantes 1.3 a 2.5 cm entre sí; espinas 5- 21, todas distribuidas en la parte inferior de la aréola, de 2 a 15 mm de largo, no diferenciadas en radiales y centrales o con 1 espina central, amarillentas; flor de 10 a 16.5 cm de largo y de 12 a 15 cm de diámetro en la antesis; pericarpelo y tubo cilíndricos, de 4.1 a 6 cm de largo y de 1 a 1.8 cm de ancho, de color castaño rojizo violáceo o castaño verdoso rojizo, con podarios prominentes, oblongos, aréolas dispuestas en 5 a 7 series de espirales, con escama basal crasa, deltoide a angostamente oblonga, de color rosado con banda mediana de color vino o castaño rojizo con bordes blanquecinos y base rojiza, espinas 7 a 11, setosas; segmentos exteriores del perianto semejantes a las escamas del tubo en la forma y en el color; segmentos interiores del perianto oblongos con el ápice atenuado, margen ondulado en la parte inferior, bordes lisos o aserrados hacia el ápice, sedosos, de 5 a 11 cm de largo y de 1.1 a 2.3 cm de ancho en la base, de color rojo encarnado brillante pasando a color de vino y en las plantas umbrófilas de color rojo brillante con tintes anaranjados, internamente con tonos anaranjados y la base verdosa o amarillo verdosa; estambres encorvados en la base, declinados hacia un lado de la flor, blancos en la parte inferior y purpúreos o rosados en la parte superior, anteras hasta de 7 mm de largo y $\pm$ 0.8 mm de ancho, blancas, algunas con tintes purpúreos; estilo de 6 a 10.5 cm de largo y 1.5 a 2mm de ancho, lóbulos del estigma 6 a 9, emergentes, a veces del mismo largo de los estambres; fruto obovoide a elipsoide, de 4.5 a 7 cm de largo y de 3.5 a 4 cm en el diámetro mayor, con 8 a 10 costillas, bien o poco marcadas, aréolas con 7 a 11 espinas setosas, aciculares, con la base ensanchada en un bulbo, asociado a pelos amarillentos, espinas radiales

6 a 10, de 2 a 6 mm de largo, espina central 1, hasta de 7 mm de largo; pulpa blanca; semilla obovoide, con ala tegumentaria bien marcada, de 1.5 a 2.5 mm de largo, 1.2 a 2 mm de ancho y de 0.6 a 1 mm de espesor, de color castaño negruzco o castaño rojizo, brillante, taza del hilo lateral oblicua o subbasal, testa foveolada. "Junco", "nopalillo", "texcaxóchitl" (Náhuatl); el fruto: "pitahaya de roca", "tuna verde". Florece desde marzo hasta julio y fructifica desde septiembre.

Esta variedad se encuentra silvestre en los alrededores de Amecameca, en las faldas del volcán Iztaccíhuatl, en peñas expuestas al sol, cubriendo algunas extensiones de rocas volcánicas o en microclimas húmedos y sombríos; en ese caso, presenta el tallo más delgado, más largo, más blando, espinas a manera de pelos, flores y frutos más largos y semillas más angostas.

La autora la encontró cerca de Santiago Cuauhtenco, de El Salto y de Tocinco, Agua Viva. También fue colectada por Rzedowski(N°27180, ENCB) en el año de 1970, en una cañada al noreste de Chalma. Crece entre 2500 y 2750 m de altitud, en barrancas con bosque mesófilo de montaña con Abies, Pinus y Quercus.

El fruto es comestible, muy dulce y la flor es vendida en el mercado de Amecameca como medicina para afecciones del corazón.

Fue nombrada en honor a Helen O' Gorman, cactófila y coleccionista de Heliocereus mexicanos.

H. elegantissimus var. helenae se distingue de H. elegantissimus var. elegantissimus y de H. elegantissimus var. stenopetalus por las siguientes características que se aprecian en el cuadro:

	var. elegantissimus	var. helenae	var. stenopetalus
APICE DE LAS COSTILLAS	fuertemente ondulado	recto a ondulado	algo elevado y ondulado en las aréolas
COLOR DE LA LANA DEL TALLO	amarillo	blanco o amarillento	moreno amarillento
COLOR DE LAS ESPINAS RADIALES	blanco	amarillento o rosado	amarillo moreno

	var. elegantissimus	var. helenae	var. stenopetalus
COLOR DE LOS SEGMENTOS INTERIORES DEL PERIANTO	rojo purpúreo	planta expuesta al sol: rojo encarnado; planta umbrófila: rojo con tintes anaranjados	rojo purpúreo
LARGO DEL PERICARPELO Y TUBO	hasta de 4 cm	de 4.1 a 6 cm	hasta de 1.2 cm
TAMAÑO DEL FRUTO	hasta de 3 cm de largo	de 4.5 a 7 cm de largo x 3.5 a 4 cm de ancho	no se ha observado
SEMILLA	sin ala tegumentaria	con ala tegumentaria	no se ha observado

Ejemplares de herbario examinados:

MEXICO: Mpio. Amecameca, Cañon al E de Santiago Cuauhtenco, 2650 m, 1 III. 1969, J. Rzedowski 26707 (ENCB); Cañada al NE de Chalma, 2550 m, 9. IV. 1970, J. Rzedowski 27180 (ENCB); Santiago Cuauhtenco, faldas del Iztaccíhuatl, Amecameca, 3000 m, 4. XI. 1975, L. Scheinvar 2026 (ENCB); El Salto, faldas del Iztaccíhuatl, Acospan, 2500 - 2525 m, 24. I. 1976, L. Scheinvar & F. Sudzuki 2088, 2089 (MEXU, ENCB); Santiago Cuauhtenco, 2600 m, 24. I. 1976, L. Scheinvar & F. Sudzuki 2090 (MEXU, ENCB); Ibid., 2725-2750 m, 4. III. 1976, L. Scheinvar & H. Richter 2115, 2116, 2117, 2118 (MEXU, ENCB); Ibid., 2500 m, 28. III. 1976, L. Scheinvar & F. Hajek 2131, 2132 (MEXU, ENCB); Agua Viva, Tocinco, faldas del Iztaccíhuatl, 2600 m, 24. IV. 1977, L. Scheinvar, J. Rzedowski & L. Paray 2241 (MEXU, ENCB); Ibid., 2550 m, 13. VII. 1977, L. Scheinvar & C. León 2240 (MEXU-HOLOTIPO; ENCB).

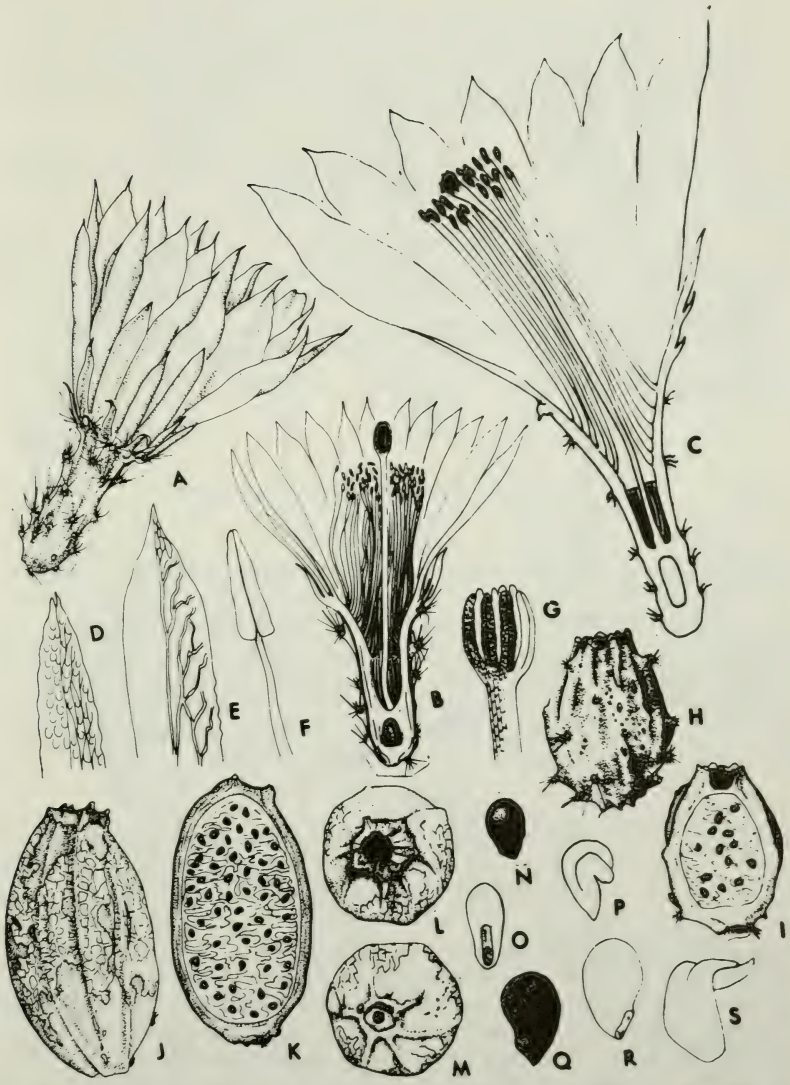
Heliocereus elegantissimus (Berg.) Br. & Rose var. helenae var. nov. A. Flor, vista exterior (x0.6); B. Flor, vista interior (x0.6); C. Flor más larga, vista interior (x0.6); D. Segmento exterior del perianto (x1.1); E. Segmento interior del perianto (x0.6); F. Estambre (x3.4); G. Parte superior del estilo y 8 lóbulos del estigma (x2.3); H. Fruto, vista exterior (x0.6); I. Fruto, vista interior (x0.6); J. Fruto, vista exterior (x0.6); K. Fruto, vista interior (x0.6); L. Cicatriz floral (x0.6); M. Fruto, cicatriz inferior (x0.6); N. Semilla (x4); O. Semilla, taza del hilo (x6); P. Embrión acumbente envolviendo reducido perisperma (x6); Q. Semilla (x6); R. Taza del hilo (x6); S. Embrión (x9). Dibujos de E. Esparza. Estructuras de planta expuesta al sol: A-B-D-E-F-G-H-I-Q-R-S (Scheinvar 2234)
Estructuras de planta umbrófila: C-J-K-L-M-N-O-P (Scheinvar 2240).

Opuntia lindheimeri Engelm. var. lucens (Griffiths) Schein var comb. nov.
Bas. Opuntia lucens Griffiths, Ann. Rep. Mo. Bot. Gard. 19 : 269, 1908.

Opuntia lindheimeri Engelm. es una especie sumamente variable. Según Britton & Rose (The Cactaceae v. 1 : 165, 1920), se compone de muchas razas que se entrecruzan en el campo originando intergradaciones en sus formas, y que difieren en la espinación, color de las flores, tamaño y forma de los artículos y frutos.

Según Bravo (Las Cactáceas de México, 2a. ed. v. 1 : 228, 1978), en México hay 3 variedades de esta especie: var. lindheimeri; var. tricolor y var. aciculata. L. Benson reconoce otra variedad más, var. cuija (= O. cantabrigiensis Lynch), todas del norte de la República Mexicana y la última se distribuye hasta San Luis Potosí e Hidalgo, sin alcanzar los límites del Valle de México.

O. lucens fué descrita por Griffiths con las siguientes características principales: planta arbustiva, de 60 a 100 cm de altura, erecta, sin tronco definido, artículos ascendentes, subcirculares a obovados, de 13 a 24 cm de largo, 16 a 19 cm de ancho y ± 8 mm de espesor; aréolas dispuestas en 7 a 9 series de espirales, prominentes, con lana castaño negruzca, glóquidas amarillas, desiguales, de ± 3 mm de largo, pero en los bordes de los artículos hasta de 1 cm de largo, amarillentas en la base castaño rojiza; espinas 0 a 4, la más larga es la mediana y las más cortas son las superiores, de 0.7 a 3.5 (4) cm de largo; flor amarilla con tintes verdosos y brillo metálico, de ± 5.5 cm de largo y



Heliocereus elegantissimus (Berg.) Br. & Rose var. helenae Scheinvar var. nov.

de 6 a 6.5 cm de diámetro en la antesis; fruto purpúreo, piriforme. "Cuija".

Griffiths (N° 7602, 7646, 8036, 8417, 9728, US) la colectó en San Luis Potosí y N° 8060 en el Estado de México.

La autora la observó fuera del Valle de México en el Valle del Mezquital, en Izmiquilpan, Hidalgo.

En el Valle de México la colectó en los Municipios de Pachuca, Hidalgo y Otumba, México.

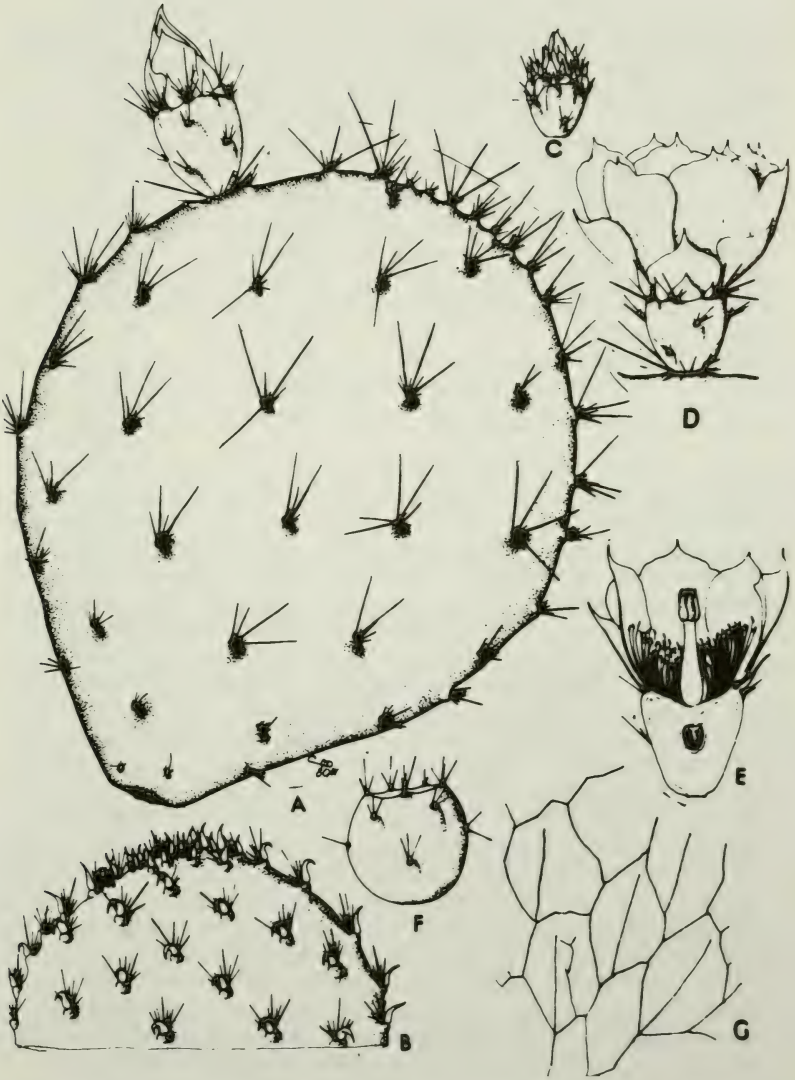
Se considera que O. lucens debe pasar a ser variedad de O. lindheimeri por poseer las siguientes características comunes con las demás variedades de esta especie: plantas arbustivas, erectas, artículos ascendentes, subcirculares a obovados con la base angostada, de 15 a 25 cm de largo, de color verde azuloso grisáceo; fruto purpúreo, obovoide a elipsoide.

Ejemplares de herbario examinados:

HIDALGO: Mpio. Pachuca, Cerro Gordo, Pachuca, 2550 m, 7.III.1974, L. Scheinvar, H. Shimizu & J. Robles 1350 (MEXU, ENCB); Ibid., 5.VIII.1975, L. Scheinvar & E. Velasco 2012, 2013, 2014 (MEXU, ENCB); Ibid., 17.III.1977, L. Scheinvar 2223 (MEXU); Mpio. Zempoala, Tepeyahualco, Cerro Tlacoyo, 2700 m, 28.II.1974, L. Scheinvar & E. Velasco 1332A (MEXU, ENCB).

MEXICO: Mpio. Otumba, Cerro La Cumbre, San Marcos, 2400 m, 18.VII.1973, L. Scheinvar & E. Velasco 1165 (MEXU, ENCB).

Opuntia lindheimeri Engelm. var. lucens (Griffiths) Scheinvar comb. nov. A. Artículo (x0.6); B. Parte superior de un artículo joven, aréolas provistas de hojas basales reflejas y glóquidas desiguales (x0.6); C. Yema floral (x0.6); D. Flor, vista exterior (x0.6); E. Flor, vista interior, corte longitudinal (x0.6); F. Fruto (x0.6); G. Disposición de las fibras de los haces vasculares más prominentes de un artículo (x0.6). Dibujos de C. Moisés (Scheinvar 2013).



Opuntia lindheimeri Engelm. var. lucens (Griffiths) Scheinvar comb. nov.

Opuntia matudae sp. nov.

Planta fruticosa, 1.5-4.5 m alta, truncus brevis, articuli obovati, azureo-virides aliquantum cinerascentes; spinae 1-8, plerumque in areolis omnibus, inaequales, 0.7-3.5 cm longae, valde tenues, flexiles, curvae, infernae reflexae, basi plicatae, mediana vel superna longissima, plerumque intertextae, superae divergentes; albo-cinerascentes vel flavidae, apice translucentes, glochides brunneo-roseae; flos ex rubro luteus, nitens, 5-7 cm longus; pericarpellum sine spinis; filamenta lutea, antherae albo-flavidae; stylus roseus, stigmatis lobi 7 vel 8, virides, brunnescentes; fructus ellipsoideus usque ad pyriformis, extus viridi-roseus, intus purpureus, 2.5-4 cm longus, 1.5-2.5 cm diametro, parietes usque ad 1.5 cm crassi, edulis ubi coctus, acidus; semina ± 4 mm longa, 3 mm lata, arillo laterali tenui, drusis in testa.

HOLOTIPO: L. Scheinvar, C. Alvarez & C. Ramírez 1563, Estado de Hidalgo, Municipio Tezontepec, Cerro entre Tezontepec y Santa María, 2. VIII. 1974 (MEXU).

Planta arbustiva, de 1.5 a 4.5 m de altura, con tronco definido, ancho; artículos angostamente obovados a obovados, de 20 a 25 cm de largo y de 10 a 15.5 cm de ancho, de color verde azuloso algo grisáceo, epidermis glabra, aréolas dispuestas en 13 a 14 series de espirales, generalmente con mancha purpúrea a su derredor, distantes ± 2 cm entre sí, con fieltro grisáceo negruzco, glóquidas de 2 a 3 mm de largo, de color castaño rosado; espinas 1 a 8, generalmente en todas las aréolas, desiguales, de 0.7 a 3.5 cm de largo, muy delgadas, flexibles, algunas torcidas, las inferiores reflejas, algunas con la base doblada, la mediana o la superior son las más largas, generalmente entrelazadas las unas con las otras, las superiores porrectas, divergentes, de color blanco grisáceo o amarillento con el ápice translúcido; flor de 5 a 7 cm de largo y hasta de 8 cm de diámetro en la antesis, de color amarillo brillante con manchas rojas, pasando con el tiempo a rosado y rojo; fruto elipsoide a piriforme, de 2.5 a 4 cm de largo y de 1.5 a 2.5 cm de ancho, con cicatriz umbilical profunda, epicarpo de color verde purpúreo y mesocarpo rosa rojizo, aréolas sin espinas, con lana grisácea y glóquidas de color castaño rosado, comestible, ácido; semillas discoides, con arilo lateral delgado, bien marcado, de ± 4 mm de largo, ± 3 mm de ancho y ± 2 mm de espesor, de color blanquecino con tonos rosados, funículos jugosos; testa con drusas. "Xoconostle colorado con espinas".

Esta especie se caracteriza por el color verde azuloso algo grisáceo de sus artículos que son glabros, y por sus espinas

blanco grisáceas, delgadas, entrelazadas las unas con las otras, flexibles, algo torcidas y aréolas cercanas. El fruto es internamente de color rosa rojizo, de paredes muy anchas.

Pertenece a la Serie Streptacanthae Br. & Rose. Por la forma de los artículos, espinas blancas, delgadas, flexibles, aplanadas en la base y algo torcidas, se acerca a O. crethochaeta Griff. Entre tanto O. matudae se distingue de O. crethochaeta por las siguientes características:

	O. crethochaeta	O. matudae
HABITAT	crece en habitats sombríos	crece expuesta al sol
COLOR DE LOS ARTICULOS	amarillo verdoso en artículos adultos y verde oscuro en artículos jóvenes	verde azuloso algo grisáceo en artículos adultos y artículos jóvenes del mismo color
NUMERO DE SERIES DE ESPIRALES DE AREOLAS EN LOS ARTICULOS	± 9	13 a 14
FORMA DE LAS AREOLAS	obovadas a transversalmente alargadas	subcirculares a elípticas
COLOR DE LAS GLOQUIDAS	amarillo claro	castaño rosado
LARGO DE LAS ESPINAS	de 4 a 5 (7) cm	de 0.7 a 3.5 cm
COLOR DE LA FLOR	anaranjado rojizo oscuro	amarillo oscuro brillante con manchas rojas
LARGO DEL PERICARPELO	de 2.8 a 5 cm	de 2 a 2.7 cm
DISTANCIA ENTRE LAS AREOLAS DEL PERICARPELO	de ± 8 mm	de ± 4 mm
COLOR DE LAS GLOQUIDAS DEL PERICARPELO	marrón	anaranjadas
COLOR DE LOS FILAMENTOS	verdosos en la base y blancos con tintes rojizos hacia el ápice	amarillos

	O. crethochaeta	O. matudae
FORMA DEL FRUTO	obovoide	elipsoide a piriforme
DIAMETRO DEL FRUTO	de 3.5 a 5.5 cm	de 1.5 a 2.5 cm
COLOR DE LA SEMILLA	amarillo cremoso	blanquecino con tonos rosados

O. matudae se encuentra silvestre en el Valle de México en los Municipios de Pachuca, Zempoala y Tezontepec, Estado de Hidalgo y en los Municipios de Tecamac y Tultepec, Estado de México, entre 2300 y 2680 m de altitud, en suelos derivados de rocas volcánicas con afloramientos de caliche, en vegetación de matorrales xerófilos.

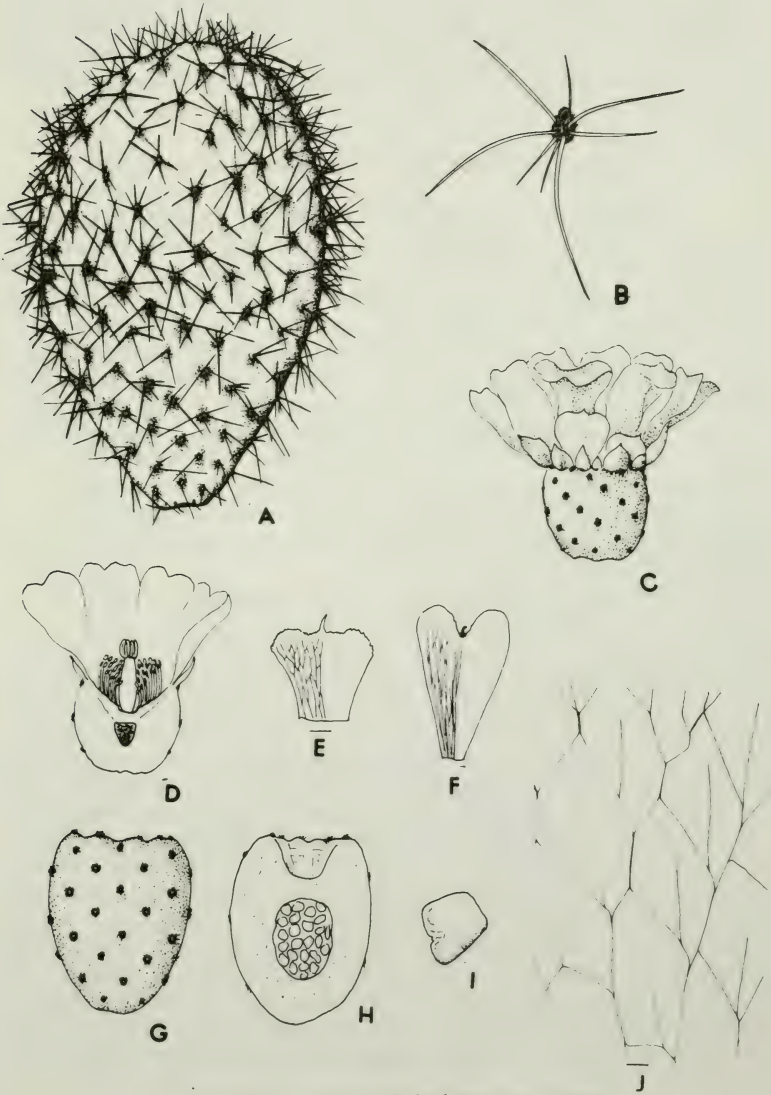
Fuera del Valle de México fue observada por la autora en el Valle del Mezquital, entre Izmiquilpan y el Cerro de La Pechuga, Estado de Hidalgo.

Fue nombrada en honor al distinguido botánico japonés-mexicano: Dr. Eizi Matuda, cactófilo y estudioso de la flora y vegetación de México, fallecido en el año de 1977, en Perú.

Ejemplares de herbario examinados:

HIDALGO: Mpio. Pachuca, Cerro Gordo, Pachuca, 2600 m, 7. III. 1974, L. Scheinvar, H. Shimizu & J. Robles 1348 (MEXU, ENCB); Mpio. Zempoala, Cerro de La Caja de Agua, 2680 m, 6. IX. 1974, L. Scheinvar, A. Castellanos & C. Ramírez 1581 (MEXU); Estación Tepa, 2300 m, 22. XI. 1973, L. Scheinvar 1239 (MEXU, ENCB); Mpio. Tezontepec, Cerro entre Tezontepec y Santa María, L. Scheinvar, C. Alvarez & C. Ramírez 1563 (MEXU-HOLOTIPO; ENCB).

MEXICO: Mpio. Tecamac, Tecamac, 2310 m, 11. VIII. 1976, L. Scheinvar & C. Orozco 2183 (MEXU, ENCB); Mpio. Acolman, Cerro Chiconautla, 2100 m, 18. VII. 1973, L. Scheinvar, J. & G. Rzedowski 1153A (MEXU, ENCB).



Opuntia matudae Scheinvar sp. nov.

Opuntia matudae sp. nov. A. Artículo (x0.28); B. Aréola con espinas (x1.1); C. Flor, vista exterior (x0.6); D. Flor, vista interior, corte longitudinal (x0.6); E. Segmento exterior del perianto (x1.1); F. Segmento interior del perianto (x1.1); G. Fruto, vista exterior (x0.6); H. Vista interior, paredes muy gruesas (x0.6); I. Semilla (x3.4); J. Disposición de las fibras de los haces vasculares más prominentes de un artículo (x0.6). Dibujos de C. Moisés (Scheinvar 1536).

Opuntia sarca Griffiths ex Scheinvar sp. nov.

Planta arborescens, pubescens, 3-4 m alta, irregulariter ramosa; articulo late obovati, 14-32 cm longi, usque ad 2.5 cm crassi, viridi-flavi; areolae suborbiculares usque ad late obovatae, ± 2 mm diametro, nigricantes, glochides luteae, usque ad 3 mm longae, ad areolae partem superam conniventes; spinae (0) (1) 3 vel 4, ad margines 5-6 (12) (20), porrectae, radiatae, complanatae, tortae, albae, apice translucentes, spina mediana longissima, 2.5-4.5 cm longa; flores aurantiaci maculis rubris; filamenta primaria viridula, secundaria superne rubra, stylus rubellus; stigmatis lobi 8-10, virides pallidi hebetati, stria ventrali rubra; fructus ruber-purpureus, subglobosus, 4-5 cm diametro, cicatrice umbillicata profunda, epicarpium glochides luteas inaequales et pilos setosos 8-10 mm longos ferens; semina discoidea, ± 3 mm diametro, ± 2 mm crassa.

HOLOTIPO: D. Griffiths 8120, Estado de Hidalgo, Jasso (antes Dublán), 1905 (US).

Planta arborescente, pubescente, de 3 a 4 m de altura, con tronco definido, de 60 a 150 cm de alto y ± 60 cm de diámetro, con aréolas provistas de hasta 12 (20) espinas, desiguales, de 1 a 3.5 cm de largo, diferenciadas en radiales y centrales, divergentes; artículo adulto anchamente obovado, de 14 a 32 cm de largo y 10.5 a 15 cm de ancho y hasta de 2.5 cm de espesor, de color verde amarillento, con tubérculos ligeramente elevados, oblongos; aréolas distantes 1.6 a 2.5 cm entre sí, dispuestas en 8 a 10 series de espirales, subcirculares a anchamente obovados, de ± 2 mm de diámetro, aumentando con la edad hasta 4 a 5 mm, negruzcas, lana inconspícua, negruzca, de 2 a 3 mm de largo, de color castaño amarillento; espinas ausentes en las aréolas inferiores, en las demás son 3 a 4 y en los bordes 5 a 6 (12) (20), no diferenciadas en radiales y centrales, la mediana es la más larga, refleja, de 2.5 a 4.5 cm de largo, radiadas, aplanadas, tor-

cidas, de color grisáceo con la parte superior amarillenta; tricomas falcados, sin lumen visible, no segmentado, con granulaciones en las paredes exteriores; flores amarillo anaranjadas con estrías o manchas rojas, de 5 a 7 cm de largo y 4 a 5 cm de ancho en la antesis; pericarpelo de 3 a 3.5 cm de largo y ± 2.5 cm de ancho, con ± 6 series de espirales de aréolas, éstas son elípticas, sin espinas, glóquidas amarillas, lana de color castaño; filamentos primarios verdosos y secundarios amarillentos con la parte superior roja, antera amarilla, dorsifija; estilo rojizo, lóbulos del estigma 8 a 10, ligeramente verdosos; fruto subgloboso a elipsoide, de ± 4.5 cm de largo y 3 (4) (4.5) cm de ancho, de color purpúreo, con cicatriz umbilical circular, hundida, epicarpo con 6 series de espirales de aréolas distantes 8 a 10 mm entre sí, éstas son obovadas, con lana negruzca, algunos pelos setosos de 8 a 10 mm de largo y glóquidas desiguales, amarillas, hasta de 3 mm de largo, sus paredes corresponden a ± 1/4 de su diámetro total, son de 3 a 4 mm de espesor, con funículos desarrollados, dulces y jugosos; semilla discoide, angulada, de ± 3 mm de diámetro y ± 2 mm de espesor, arilo lateral ancho, irregular. "Nopal chamacuerito".

Al revisar el herbario de David Griffiths en Pomona College, la autora encontró la descripción de Opuntia sarca, elaborada por el referido cactólogo y que sin embargo, no llegó a ser publicada.

Encontró también los ejemplares de herbario preparados por Griffiths. Por este motivo, decidió designar como tipo el número 8120 de David Griffiths (US), describir esta entidad, que se encuentra presente en el Valle de México, dándole el nombre por él seleccionado.

En relación al significado de la palabra zarca, en español se refiere a un color azul claro. Su aplicación a esta especie debe estar relacionada con el color del artículo que es algo azuloso o con el color del fruto que con el tiempo pasa a azuloso.

En el Valle de México se encuentra distribuida en los Municipios de Tezontepec, Estado de Hidalgo, en los Municipios de Chimalhuacán, Tepotzotlán y de Atizapán de Zaragoza, Estado de México y en las Delegaciones de Iztapalapa, Tlalpan y Coyoacán, en el Distrito Federal, entre 2320 y 2700 m de altitud, en suelos derivados de rocas volcánicas, generalmente basálticas, en vegetación de matorrales xerófilos.

Fuera del Valle de México fue colectada por Griffiths en Jasso (antes Dublán), cerca de Tula, Hidalgo y muy cerca del Va-

lle de México.

O. sarca pertenece a la Serie Tomentosae.

Se trata de una especie que hasta ahora no habia sido detalladamente estudiada y que estaba confundida con O. tomentosa SD., especie de la misma Serie, con tricomas, flores amarillas con manchas rojas (var. herrerae), fruto elipsoide, purpúreo y también distribuida en el Valle de México. Entre tanto, O. sarca se distingue de O. tomentosa por las características que se observan en el cuadro, a saber:

	O. sarca	O. tomentosa
FORMA DE LOS ARTICULOS	anchamente obovados	oblongos, 2 ó 3 veces más largos que anchos
COLOR DE LOS ARTICULOS	verde claro amarillento	verde oscuro grisáceo
FORMA DE LAS AREOLAS	subcirculares a anchamente obovadas	angostamente piriformes
ESPINAS	grisáceas con el ápice amarillento; 3 o 4, en los bordes 5 o 6 (12) (20);la mediana es la más larga; aréolas inferiores generalmente sin espinas	blancas o amarillentas; 1 a 2 (4), ausentes en las aréolas inferiores; la inferior es la más larga
ESTOMAS	orientados, paracíticos	no orientados, tetracíticos
COLOR DE LA FLOR	amarillo anaranjado con estrías o manchas rojas	rojo purpúreo o amarillo, a veces con manchas rojas
SEMILLAS	+ 3 mm de diámetro	4 a 8 mm de diámetro

En el Herbario de Smithsonian Institution (US), la autora encontró un ejemplar de O. sarca procedente de la Sierra de Guadalupe, Delegación V. G. A. Madero, Distrito Federal, que Rose & Painter (N°6649) habían identificado erroneamente como O. macdougaliana Rose, especie pubescente, que se encuentra en los alrededores de Tehuacán, Puebla y en Oaxaca, y que no se encuentra en el Valle de México.

O. macdougaliana se distingue de O. sarca por las siguientes características que se observan en el cuadro:

	O. sarca	O. macdougaliana
TRONCO	de 60 a 150 cm de largo; ramifica - ción a lo largo del tronco principal	hasta de 40 cm de largo; ramas salen cerca de la base
ARTICULOS	anchamente obova dos, de ± 17 cm de largo y ± 10. 5 cm de ancho	oblongos, de ± 30 cm de largo y ± 10 cm de ancho
ESPINAS	3 o 4 y en los bor- des 5 o 6 (12) (20); aréolas inferiores sin espinas	generalmente 4
COLOR DE LAS ESPINAS	grisáceas con la parte superior amarilla	amarillas
COLOR DE LAS GLOQUIDAS	castaño amarillen tas	amarillas
COLOR DE LA FLOR	amarillo anaranja da con estrías o manchas rojas	amarilla

Ejemplares de herbario examinados:

HIDALGO: Mpio. Tezontepec, Tezontepec, 26. III. 1971, S. Sánchez 1 (ENCB).

MEXICO: Mpio. Tepotzotlán, Presa de La Concepción, 5. V. 1967, L. Hilerio 2370 (ENCB); Cerro La Columna, Cápula, 2320 m, 6. IV. 1973, L. Schein - var, P. Ruiz & A. Castellanos 1054 (MEXU, ENCB); Mpio. Tultepec, Tultepec, Cerro La Nopalera, 2300 m, 9. VIII. 1973, L. Scheinvar & P. Ruiz 1172, 1172A, 1172B (MEXU, ENCB); Mpio. Atizapan de Zaragoza, Presa de Guadalupe, Lago de Guadalupe, 2400 m, 9. II. 1973, L. Scheinvar 960, 962, 964, 965, 974 (MEXU, ENCB); Ibid., 8. VI. 1973, L. Scheinvar 1133, 1134 (MEXU, ENCB); Mpio. Chimalhuacán, entre Los Reyes y Chapingo, 2700 m, 31. V. 1974, L. Scheinvar, O. Tirado & R. Dehesa 1474, 1474A (MEXU, ENCB).

DISTRITO FEDERAL: Deleg. Villa G. A. Madero, Cerro (Roches) de Guadaloupe près Mexico, 20. V. 1865, M. Bourgeau 46 (P); near Guadalupe, Valley of Mexico, 24. VIII. 1903, J. N. Rose & J. H. Painter 6549 (US); Guadalupe, 9. IX. 1909, D. Griffiths 9729 (US); Deleg. Iztapalapa, Sierra de Santa Catarina, cerca de Santa Catarina, 2700 m, 17. V. 1973, L. Scheinvar, P. Ruiz & A. Castellanos 1101A, 1107, 1108, 1108A (MEXU, ENCB); Santa Catarina, 2400 m, 15. III. 1951, E. Matuda 21316 (MEXU); Deleg. Coyoacán, Pedregal de San Angel, Ciudad Universitaria, 2320 m, 15. VI. 1969, M. Mitastein 285 (ENCB); Deleg. Tlalpan, Cerro Zacatepetl, 2400 m, 2. II. 1973, L. Scheinvar 954 (MEXU); Pedregal de Tlalpan, 2320 m, 15. III. 1974, L. Scheinvar 1356, 1357 (MEXU).

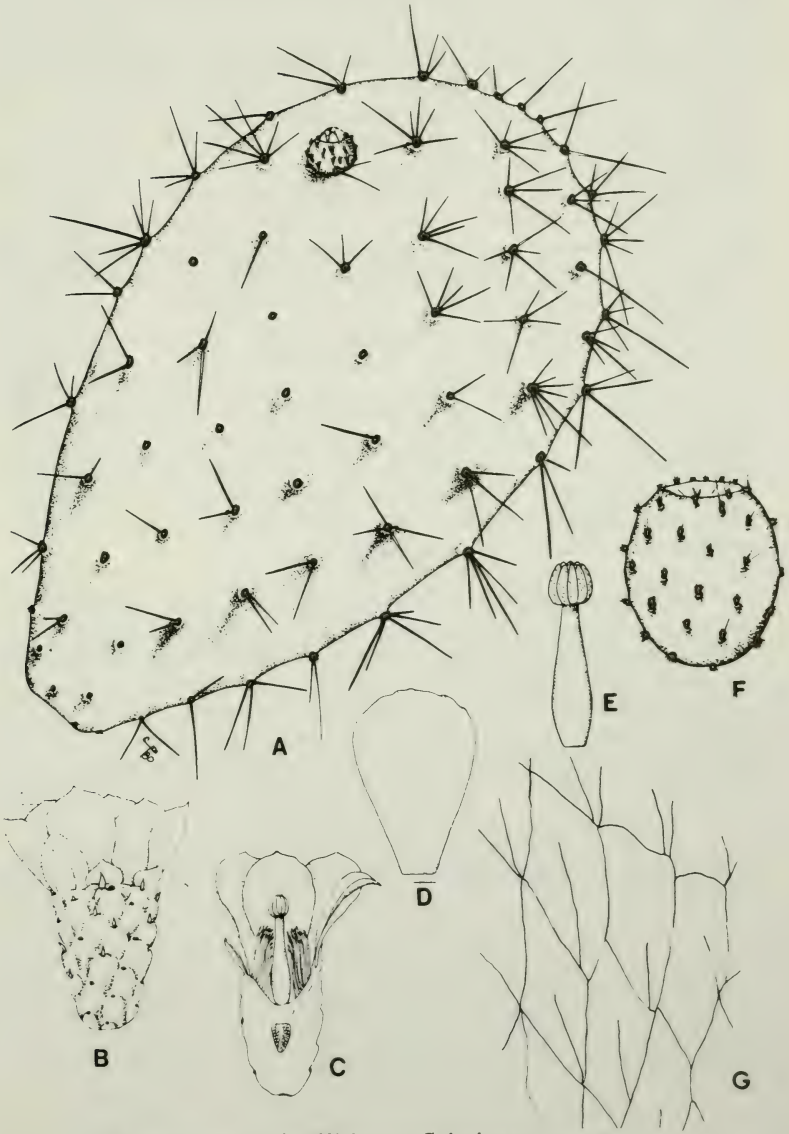
Opuntia sarca Griffiths ex Scheinvar sp. nov. A. Artículo (x0. 3); B. Flor, vista exterior (x0. 6); C. Flor, vista interior, corte longitudinal (x0. 6); D. Segmento interior del perianto (x1. 1); E. Estilo y 8 lóbulos del estigma (x1. 1); F. Fruto (x0. 6); G. Disposición de las fibras de los haces vasculares más prominentes de un artículo (x0. 6). Dibujos de C. Moisés (Scheinvar 1474).

Opuntia tomentosa SD. var. herrerae Scheinvar var. nov.

Planta fruticosa, pubescens, usque ad 2. 5 m alta; articuli oblongi, plus minusve duplo longiores quam latiores, spinae in areolis fere omnibus desunt, aliquis 1-3, usque ad 1 cm longae, flavidae; flores lutei; filamenta albo-viridula usque ad lutea; stylus ex roseo albus, stigmatis lobi 7, lutei leviter viriduli usque ad virides pallidi; fructus pyriformis, cicatrice ombillicata pauce profunda, 3. 2-3. 5 cm longus; semen ± 4 mm diametro.

HOLOTIPO: L. & I. Scheinvar 1496, Estado de México, Municipio Coacalco, entre Coacalco y Lechería, Cerro Mina, 2500 m, 30. VI. 1974 (MEXU).

Planta arbustiva, pubescente, hasta de 2. 5 m de altura, tronco de 14 a 24 cm de largo y de 18 a 28 cm de ancho, corteza casi lisa, con aréolas provistas hasta de 6 espinas; artículo adulto oblongo, ± 2 veces más largo que ancho, de 22 a 26 cm de largo y 11 a 12. 5 cm de ancho, de color verde oscuro grisáceo, aré-



Opuntia sarca Griffiths ex Scheinvar sp. nov.

olas dispuestas en ± 10 series de espirales, distantes 1.5 a 2 cm entre sí, piriformes, con lana castaño grisácea pasando a negruzca con el tiempo, glóquidas castaño amarillentas; espinas ausentes en casi todas las aréolas o bien presentes y entonces 1 a 3, hasta de 1 cm de largo, flexibles, generalmente en los bordes de los artículos, pero en artículos viejos puede alcanzar hasta 4.5 cm de largo, de color amarillento; flor amarilla, a veces con manchas rojas, rotácea en la antesis, de 3.5 a 5 cm de largo, pericarpelo con la mitad del largo del perianto; segmentos exteriores del perianto de color blanco con amplia banda mediana verde amarillenta en la base, arriba amarillo verdosa y en el ápice, castaño rojiza; segmentos interiores del perianto espatulados, con el ápice emarginado, bordes finamente dentados, hasta de 4 cm de largo, de color amarillo, a veces con manchas rojas; filamentos blanco verdosos los primarios y amarillos los secundarios, estilo de ± 1.1 cm de largo, de ± 0.5 cm de ancho en la base, blanco con tintes rosados, lóbulos del estigma 7, de ± 3 mm de largo, de color verde claro o amarillo ligeramente verdoso; fruto piriforme, con cicatriz floral poco profunda, de 3.2 a 3.5 cm de largo y de 2.2 a 2.5 cm de ancho, con ± 6 series de espirales de aréolas, distantes ± 1.5 cm entre sí, sin espinas, con glóquidas de color amarillo dorado; semillas de ± 4 mm de diámetro, arilo lateral ancho. "Nopal chamacuerito".

Esta variedad se encuentra silvestre en el Valle de México, en los Municipios de Huehuetoca, Tepotzotlán, Coacalco, Tultepec y Ecatepec de Morelos, en el Estado de México, y en las Delegaciones de Tlalpan y de Coyoacán, en el Distrito Federal, entre 2275 y 2800 m de altitud, en suelos derivados de rocas generalmente basálticas, con afloramientos de caliche, en vegetación de matorrales xerófilos, muy perturbados por actividades humanas.

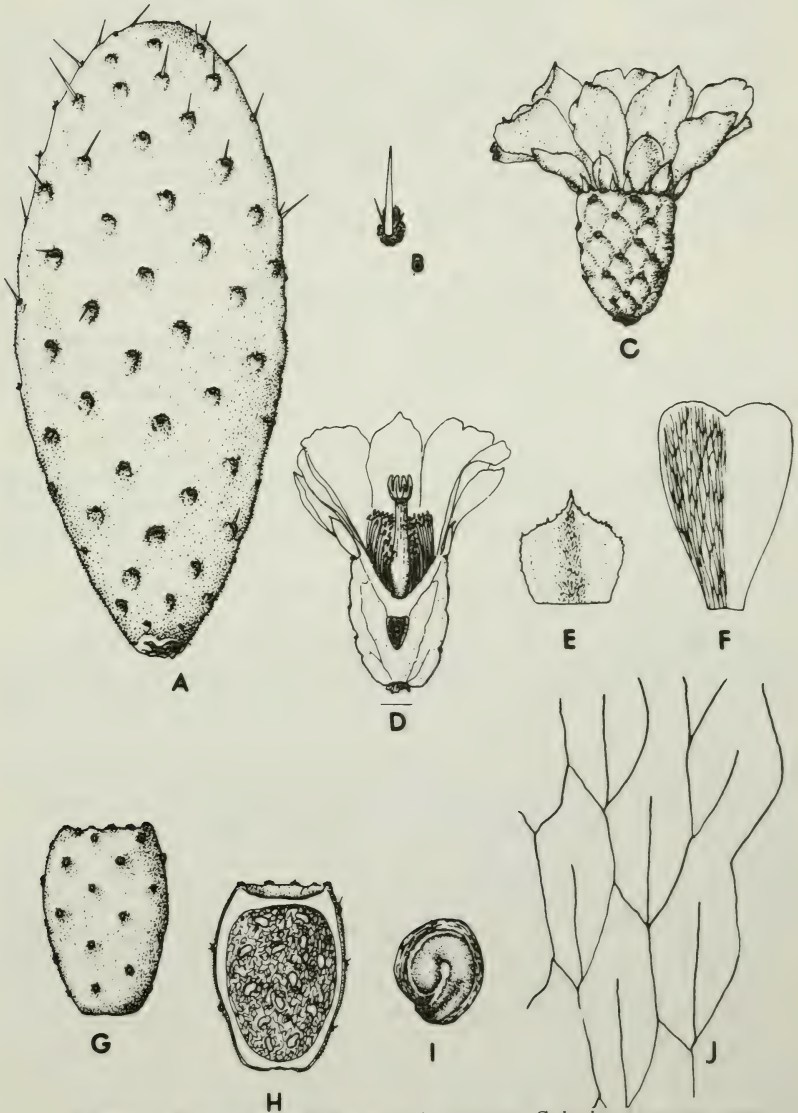
Las características distintivas entre O. tomentosa var. herrerae y O. tomentosa var. tomentosa pueden ser observadas en el cuadro:

	var. tomentosa	var. herrerae
HABITO	arborescente, de 3 a 6 m de altura	arbustivo, hasta de 2.5 m de altura
TRONCO	hasta de 2.2 m de largo y de 30 a 70 cm de ancho; corteza escamosa	de 14 a 24 cm de largo y de 18 a 28 cm de ancho; corteza casi lisa

	var. tomentosa	var. herrerae
AREOLAS DEL TRONCO	con 8 a 14 espinas	hasta con 6 espinas
DIMENSIONES DE LOS ARTICULOS	± 3 veces más largos que anchos; de 24 a 26 cm de largo y de 8.5 a 10 cm de ancho	± 2 veces más largos que anchos; de 22 a 26 cm de largo y 11 a 12.5 cm de ancho
DISTANCIA ENTRE AREOLAS	de 2 a 2.5 cm	de 1.5 a 2 cm
DIMENSION DE LAS AREOLAS	± 2.5 mm de largo y ± 1.5 mm de ancho	± 2 mm de largo y ± 1 mm de ancho
COLOR DE LA LANA	gris negruzco	castaño grisáceo pasando a negruzco
COLOR DE LAS GLOQUIDAS	amarillo oscuro	castaño amarillento
ESPINAS	ausentes en las aréolas inferiores o bien 1 a 2 en las inferiores y hasta 4 en las superiores	ausentes en casi todas las aréolas o bien 1 a 3
COLOR DE LAS ESPINAS	grisáceo variegado de amarillo	amarillento
TRICOMAS	densamente dispuestos, falsamente bífidos, lumen segmentado, paredes delgadas	aislados, cónicos, ápice falcado y la base ensanchada, lumen angosto, no segmentado
EPIDERMIS	células epidérmicas dispuestas en círculos alrededor del estoma que es circular	células epidérmicas no dispuestas en círculos alrededor del estoma que es oblongo
FIBRAS DE LOS HACES VASCULARES	rombos de ± 3.5 cm de largo y de ± 1.5cm de ancho	rombos de 6 a 6.3 cm de largo y de 2.2 a 2.4 cm de ancho
FLORES	perianto abre poco en la antesis; de color rojo purpúreo; de ± 6 cm de largo y ± 5.5cm de ancho	perianto ampliamente abierto en la antesis; de color amarillo con o sin manchas rojas; de 3.5 a 5 cm de largo y de ancho

	var. tomentosa	var. herrerae
SEGMENTOS EXTERIORES DEL PERIANTO	oblongos, pasando a espatulados; blancos con amplia banda mediana purpúrea	deltoides, blancos, con amplia banda mediana amarillo verdosa y ápice castaño rojizo
SEGMENTOS INTERIORES DEL PERIANTO	de ± 2.7 cm de largo, de color purpúreo	hasta de 4 cm de largo, de color amarillo, a veces con manchas rojas
FILAMENTOS	de color rosa rojizo	los inferiores blanco verdosos y los superiores amarillentos
GRANOS DE POLEN	con muros verrucosos	con muros lisos
ESTILO	de 2 a 2.2 cm de largo y ±0.4 cm de ancho en la base; de color púrpura	de ± 1.1 cm de largo y ± 0.5 cm de ancho en la base; de color blanco con tintes rosados
LOBULOS DEL ESTIGMA	6 a 9, de ± 0.5 cm de largo, de color blanco con estría dorsal mediana rosa rojiza	7, de ± 3 mm de largo, de color verde claro o amarillo ligeramente verdoso
FRUTO	elipsoide, con cicatriz umbilical profunda; de 3.3 a 5 cm de largo y de 2.7 a 3 cm de ancho, con aréolas distantes 0.6 a 0.8 cm entre sí; espinas setosas hasta 2 cm de largo castaño amarillentas; glóquidas de color castaño	piriforme, con cicatriz umbilical poco profunda; de 3.2 a 3.5 cm de largo y de 2.2 a 2.5 cm de ancho; aréolas distantes ± 1.5 cm entre sí, sin espinas, con glóquidas de color amarillo dorado

El nombre de esta variedad fue dado en honor del Dr. Téofilo Herrera Suárez, investigador del Instituto de Biología de la Universidad Nacional Autónoma de México, quien siempre animó la autora de esta variedad a realizar y proseguir en el estudio de las Cactáceas del Valle de México.



Opuntia tomentosa SD. var. herrerae Scheinvar var. nov.

Ejemplares de herbario examinados:

MEXICO: Mpio. Huehuetoca, Cerro San Juan, 2350 m, 26. IV. 1974, L. Scheinvar & E. Velasco 1408(MEXU); 7 km al N de Huehuetoca, 2450 m, 24. IV. 1966, A. Vargas s. n. (ENCB); 55 km de la Ciudad de México, carretera México-Querétaro, 2600 m, 12. V. 1969, M. Mitastein 303 (ENCB); Mpio. Tepotzotlán, Presa La Concepción, 2370 m, 5. V. 1967, L. Hilério s. n. (ENCB); Mpio. Coacalco, entre Coacalco y Lechería, Cerro Mina, 2496 m, 30. VI. 1974, L. & I. Scheinvar 1496 (MEXU-HOLOTIPO; ENCB); Mpio. Ecatepec de Morelos, 1. 5 km W de San Cristobal Ecatepec, 2350 m, 27. IV. 1967, E. Ruiz 118 (ENCB); Cerro San Cristobal, 2800m, 25. V. 1966, J. Espinosa 732 (ENCB); Ibid., 2800 m, 25. IV. 1951, E. Matuda 21152 (MEXU).

DISTRITO FEDERAL: Deleg. Coyoacán, Pedregal de San Angel, Ciudad Universitaria, Jardín Botánico Exterior, 2320 m, 5. II. 1977, L. Scheinvar 2217, 2218 (MEXU); Mpio. Tlalpan, Pedregal de Tlalpan, Cuicuilco, 2400 m, 13. IV. 1973, L. Scheinvar 1063A (MEXU).

Opuntia tomentosa SD. var. herrerae Scheinvar var. nov. A. Artículo (x0. 3); B. Aréola del artículo (x1. 1); C. Flor, vista exterior (x0. 6); D. Flor, vista interior, corte longitudinal (x0. 6); E. Segmento exterior del perianto (x1. 7); F. Segmento interior del perianto (x1. 1); G. Fruto, vista exterior (x0. 6); H. Fruto, vista interior del perianto (x0. 6); I. Semilla (x1. 7); J. Disposición de las fibras de los haces vasculares más prominentes de un artículo (x0. 6). Dibujos de C. Moisés (Scheinvar 1496).

AGRADECIMIENTOS

La autora desea expresar sus más cumplidos agradecimientos al Dr. Jerzy Rzedowski quien tradujo las descripciones originales al latín. Asimismo, desea agradecer al M. en C. Hermilo Quero por la revisión y sugerencias hechas al presente trabajo.

A NEW MESOAMERICAN QUILLWORT

by Luis D. Gómez P.
Museo Nacional, San José, C. R.

Four species of quillworts are known from Central America, all of them described from Costa Rica and Panamá. Although three taxa have been reported from central Mexico, there are no records from Guatemala, Honduras, El Salvador, Belize and Nicaragua, probably due to the paucity of fieldwork by specialists.

A new species is described from the grasslands of Guanacaste in Costa Rica but the species is also expected in the paludose, south western corner of Nicaragua, as the type locality is only 2-3 mi. from the border.

Isoëtes savannarum, sp. nov.

Herba aquatica immersa. Folia usque ad 550 mm longa, erecta, rigida, caespitosa, viridinitentes, trihedrica, 3-carinata, acuminatissima, Junciformes: fasce vasculari 1-centrali; alis hyalinis, 90-120 mm longis, 4-5 mm amplis, inmaculatis. Ligula deltoidea, 5-6 mm longa, hyalina, membranoso-carnosa. Velum parvum, in maturitate exsertum, ex labium foveam modum valvatum. Megasporae albae, 500-600 µm diametro, papillo-tuberculatae, tuberculis 0.015 mm long., rotundatis. Microsporae bilaterales, monoletae, 27(30.75)-34.5 µm, humidas tenue avellaneis, albis siccans. Cormus obscure trilobulatus, reductus.

I. panamense Max. & Morton primu adspectu maxime simile sed ab eo foliis longioribus, megasporis latioribus, sporangiis velatis differt.

Holotypus: In pratis innundatis et planietibus paludosis Provinciam Guanacaste inmediationem Crucis, propre loco Tanques dicto, ca. 200 m.s.m., L. D. Gómez 17350 CR. Isotypi: US, F, NY, MO, BM, K. Paratypus: ib. loc., J. Gómez-L. 7088, USJ.

Plants aquatic, submerged or with tips emergent. Corms small, obscurely trilobed. Leaves up to 55 cm long, trihedric, 3-carinate, junciform, vascular bundles 1, central. Diaphragms with large, stellate aerenchyma cells with spinulose walls, spines simple or bifid. Wing 9-12 cm long, 4-5 mm wide near the base, hyaline, tenuous. Ligule 5-6 mm long, deltoid, membranose, with fleshy glossopodium. Velum partial, covering less than one half of the sporangium, in maturity directed upwards and outwards as if hinged from labium of the fovea and thus

valvate in appearance. Megaspores white, 500-600 µm, tuberculate, the tubercles rounded at apex, 0.015 mm long, always free. Microspores monolete, subglobose, white when dry, finely rugose, 27-34.5 µm. Both mega and microsporangia with numerous filiform trabeculae.

The new species is closely related to Isoëtes panamensis Maxon & Morton but differs from it in having a partial velum, its longer leaves, much larger megaspores and the finely rugose microspores.

Isoëtes savannarum grows in the seasonal and semiseasonal ponds of the northern Guanacaste savannahs in the Curatella-Byrssonima-Gramineae association, together with several sedges, Eriocaulon and an aquatic species of Eryngium.

Other localities in Guanacaste: Laguna Finca Lolita, camino a Cuajiniquil, apx. 3.5 km de Interamericana, 300 m, L.D.Gómez 17944 CR;Laguna, apx. 1 km del cruce Interamericana-Cuajiniquil, 250-280 m,L.D. Gómez 17945 CR; Quebrada Yayal, Finca Pocosol, 4 km al N de la entrada al Parque Nal. Sta. Rosa, apx. 255 m, L.D.Gómez 17946; Charca estacional, 3-4 km al S. de La Cruz, 250-270 m, L.D.Gómez 17947 CR.

NEOTROPICAL MYRSINACEAE -- VI

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AURICULARDISIA Lundell, gen. nov. -- Frutices vel arbores foliis alternis, petiolatis vel raro sessilibus, integerrimis; furfuracei vel lepidoti; inflorescentiae terminales, paniculatae; flores hermaphroditi, 5-meri, sessiles vel pedicellati, glomerati, subcapitati, umbellati vel subcorymbosi, raro spicati, furfuracei vel lepidoti; sepala libera vel basi breviter coalita, coriacea, late rotundata, elliptica vel late ovata, asymmetrica, auriculata; petala basi connata; stamina 5, libera, prope basin corollae affixa; filamenta conspicua; antheris lanceolatis; ovarium ovoideum vel subglobosum stylo gracillimo perlongo, stigmate minuto, punctiformi; placenta pluriseriatim, multi-ovulata; fructus globosus, 1-spermus.

TYPE SPECIES: Auriculardisia glomerata (Lundell) Lundell (= Ardisia glomerata Lundell).

Species of the genus Auriculardisia range from robust with taxa having thick branchlets and large entire leaves usually coriaceous and with thick petioles to slender with small leaves. The indumentum is scaly, commonly furfuraceous with the scales sometimes stalked, stellate or dendroid. A few of the species are lepidote with small appressed scales. Notable is the nature of the inflorescence with the flowers sessile or pedicellate, either glomerate in small heads, spicate, umbellate or subcorymbose-racemose. After flowering the rachis sometimes elongates so that the fruits are racemose.

To recapitulate: the scaly indumentum, the asymmetric thick sepals, depressed-orbicular, elliptic or broadly ovate, usually wider than long, mostly rounded and often emarginate, with the overlapped edge auriculate or enlarged, together with the flowers either in heads, subcorymbose-racemose, rarely umbellate or spicate, are features which serve to distinguish the genus. The auricles may be appendage-like and very conspicuous, but often they are only scarious enlargements of the included margin. The auricles may be entire, erose, ciliolate, ciliate, fimbriate or lacerate.

The petals are united into a short tube in which the stamens are attached. The filaments usually are thick and short. The erect anthers, attached above the base, are sagittate-lanceolate; anthers at first usually have two rimose pores which split longitudinally with maturity of the flower, the dehiscence thus appearing to be longitudinal in most taxa. Like other genera

in the Ardisia Sw. complex, the imbedded ovules of the ovoid central placenta are in several series and usually numerous.

The genus Auriculardisia ranges from Nicaragua into northern South America with the highest concentration of species in Panama.

Auriculardisia is separable from Ardisia Sw. as follows:

> Plants glabrous or pubescent, not scaly; sepals symmetrical, ovate, longer than wide, usually thick; flowers strictly racemose or subspicate . . . . Ardisia.
>
> Plants conspicuously scaly, furfuraceous or rarely lepidote; sepals asymmetrical, depressed-orbicular, elliptic or broadly ovate, and mostly wider than long, auriculate; flowers in heads, subcorymbose, or rarely umbellate or spicate, the rachis sometimes accrescent with the fruits becoming racemose . . . . Auriculardisia.

AURICULARDISIA ACUTATA (Lundell) Lundell, comb. nov. Ardisia acutata Lundell, Wrightia 6: 60. 1979.

AURICULARDISIA ATRATA (Lundell) Lundell, comb. nov. Ardisia atrata Lundell, Wrightia 6: 60. pl. 133. 1979.

AURICULARDISIA ATROPURPUREA (Lundell) Lundell, comb. nov. Ardisia atropurpurea Lundell, Phytologia 48: 134. 1981. Additional collections of this taxon, as well as Auriculardisia pirreana (Lundell) Lundell, are needed to clarify the status of this small complex of paired species.

AURICULARDISIA BLEPHARODES (Lundell) Lundell, comb. nov. Ardisia blepharodes Lundell, Wrightia 4: 55. 1968.

AURICULARDISIA BOLTENII (Lundell) Lundell, comb. nov. Ardisia Boltenii Lundell, Wrightia 6: 63. 1979.

AURICULARDISIA BOQUETENSIS (Lundell) Lundell, comb. nov. Ardisia boquetensis Lundell, Wrightia 6: 64. 1979.

AURICULARDISIA BRENESII (Standl.) Lundell, comb. nov. Ardisia Brenesii Standl., Field Mus. Pub. Bot. 18: 885. 1938. The sepals are not typical, but some are enlarged on the overlapped edge. The coarse stellate-furfuraceous pubescence is unique.

AURICULARDISIA CAPITELLATA (Lundell) Lundell, comb. nov. Ardisia capitellata Lundell, Wrightia 6: 67, pl. 135. 1979.

AURICULARDISIA CARCHIANA (Lundell) Lundell, comb. nov. Ardisia carchiana Lundell, Wrightia 7: 23. 1981. The calyx is

atypical, but the species appears to be referable here on the basis of incomplete material available.

AURICULARDISIA CARTAGOANA (Lundell) Lundell, comb. nov. Ardisia cartagoana Lundell, Wrightia 6: 68. 1979.

AURICULARDISIA COCLENSIS (Lundell) Lundell, comb. nov. Ardisia coclensis Lundell, Ann. Missouri Bot. Gard. 28: 453. 1941.

AURICULARDISIA COLORADOANA (Lundell) Lundell, comb. nov. Ardisia coloradoana Lundell, Wrightia 6: 69. 1979.

AURICULARDISIA CONGLOBATA (Lundell) Lundell, comb. nov. Ardisia conglobata Lundell, Wrightia 6: 70, pl. 138. 1979.

AURICULARDISIA CONGLOMERATA (Lundell) Lundell, comb. nov. Ardisia conglomerata Lundell, Wrightia 6: 71. 1979.

AURICULARDISIA CORREAE (Lundell) Lundell, comb. nov. Ardisia Correae Lundell, Wrightia 6: 72. 1979.

AURICULARDISIA CRASSIPEDICELLATA (Lundell) Lundell, comb. nov. Ardisia crassipedicellata Lundell, Wrightia 6: 73, pl. 140. 1979.

AURICULARDISIA CRASSIPES (Lundell) Lundell, comb. nov. Ardisia crassipes Lundell, Wrightia 4: 57. 1968.

AURICULARDISIA CRASSIRAMEA (Standl.) Lundell, comb. nov. Ardisia crassiramea Standl., Field Mus. Pub. Bot. 18: 887. 1938. The asymmetric auriculate sepals are small, lanceolate and acute in the flower buds.

AURICULARDISIA CROATII (Lundell) Lundell, comb. nov. Ardisia Croatii Lundell, Wrightia 5: 281. 1976.

AURICULARDISIA DARIENENSIS (Lundell) Lundell, comb. nov. Ardisia darienensis Lundell, Wrightia 4: 58. 1968.

AURICULARDISIA DODGEI (Standl.) Lundell, comb. nov. Ardisia Dodgei Standl., Field Mus. Pub. Bot. 18: 888. 1938. The species is noteworthy for its persistent large involucrate bracts and bractlets.

AURICULARDISIA DODSONII (Lundell) Lundell, comb. nov. Ardisia Dodsonii Lundell, Wrightia 6: 102. 1980.

AURICULARDISIA DUNLAPIANA (P. H. Allen) Lundell, comb. nov. Ardisia Dunlapiana P. H. Allen, Rain Forests of Golfo Dulce 409. 1956.

AURICULARDISIA DURIUSCULA (Lundell) Lundell, comb. nov. Ardisia duriuscula Lundell, Wrightia 7: 24. 1981.

AURICULARDISIA DWYERI (Lundell) Lundell, comb. nov. Ardisia Dwyeri Lundell, Wrightia 4: 145. 1970; Ann. Missouri Bot. Gard. 58: 333, fig. 14. 1971.

AURICULARDISIA FIMBRILLIFERA (Lundell) Lundell, comb. nov. Ardisia fimbrillifera Lundell, Wrightia 4: 180. 1971.

AURICULARDISIA FLORULENTA (Lundell) Lundell, comb. nov. Ardisia florulenta Lundell, Wrightia 6: 75. 1979.

AURICULARDISIA FOLSOMII (Lundell) Lundell, comb. nov. Ardisia Folsomii Lundell, Wrightia 6: 76. 1979.

AURICULARDISIA FURFURACEA (Standl.) Lundell, comb. nov. Ardisia furfuracea Standl., Journ. Wash. Acad. Sci. 17: 525. 1927.

AURICULARDISIA GENTRYI (Lundell) Lundell, comb. nov. Ardisia Gentryi Lundell, Wrightia 6: 77, pl. 146. 1979.

AURICULARDISIA GLOMERATA (Lundell) Lundell, comb. nov. Ardisia glomerata Lundell, Am. Mid. Nat. 29: 486. 1943; Ann. Missouri Bot. Gard. 58: 325, fig. 15, 1971. Type of the genus Auriculardisia Lundell (MO, holotype; A, LL, US, isotypes).

AURICULARDISIA HAGENII (Lundell) Lundell, comb. nov. Ardisia Hagenii Lundell, Wrightia 4: 59, 1968; Wrightia 6: 78, pl. 147. 1979; Ann. Missouri Bot. Gard. 58: 326, fig. 16, 1971.

AURICULARDISIA HAMMELII (Lundell) Lundell, comb. nov. Ardisia Hammelii Lundell, Wrightia 6: 78, pl. 148. 1979.

AURICULARDISIA HORQUETENSIS (Lundell) Lundell, comb. nov. Ardisia horquetensis Lundell, Wrightia 4: 181. 1971.

AURICULARDISIA LIESNERI (Lundell) Lundell, comb. nov. Ardisia Liesneri Lundell, Wrightia 6: 106. 1980.

AURICULARDISIA LIMONENSIS (Lundell) Lundell, comb. nov. Ardisia limonensis Lundell, Wrightia 6: 79. 1979.

AURICULARDISIA MACROSTACHYA (Lundell) Lundell, comb. nov. Ardisia macrostachya Lundell, Wrightia 6: 81. 1979.

AURICULARDISIA MEGISTOPHYLLA (Lundell) Lundell, comb. nov. Ardisia megistophylla Lundell, Wrightia 4: 147. 1970; Wrightia 6: 83, pl. 157. 1979.

AURICULARDISIA NERVOSISSIMA (Lundell) Lundell, comb. nov. Ardisia nervosissima Lundell, Wrightia 4: 62. 1968.

AURICULARDISIA OMETEPENSIS (Lundell) Lundell, comb. nov. Ardisia ometepensis Lundell, Wrightia 6: 85. 1979.

AURICULARDISIA PALMANA (Donn. Sm.) Lundell, comb. nov. Ardisia palmana Donn. Sm., Bot. Gaz. 27: 434. 1899.

AURICULARDISIA PANAMENSIS (Lundell) Lundell, comb. nov. Ardisia panamensis Lundell, Wrightia 3: 198. 1966. Ardisia pallidiflora Standl., 1927, non Ridley, 1912.

AURICULARDISIA PILONENSIS (Lundell) Lundell, comb. nov. Ardisia pilonensis Lundell, Wrightia 6: 86. 1979.

AURICULARDISIA PIRREANA (Lundell) Lundell, comb. nov. Ardisia pirreana Lundell, Phytologia 48: 134. 1981. Paired with Auriculardisia atropurpurea (Lundell) Lundell, the complex needs further collecting and study.

AURICULARDISIA PITTIERI (Mez) Lundell, comb. nov. Ardisia Pittieri Mez, Bull. Herb. Boissier, Ser. 2. 3: 236. 1903. Ardisia Cutteri Standl., Journ. Washington Acad. Sci. 17: 521. 1927.

AURICULARDISIA PLEUROBOTRYA (Donn. Sm.) Lundell, comb. nov. Ardisia pleurobotrya Donn. Sm., Bot. Gaz. 25: 148. 1898.

AURICULARDISIA RETUSA (Lundell) Lundell, comb. nov. Ardisia retusa Lundell, Wrightia 6: 88, pl. 163. 1979.

AURICULARDISIA RUFA (Lundell) Lundell, comb. nov. Ardisia rufa Lundell, Wrightia 4: 182. 1971; Wrightia 6: 91, pl. 166. 1979.

AURICULARDISIA TILARANENSIS (Standl.) Lundell, comb. nov. Ardisia tilaranensis Standl., Journ. Wash. Acad. Sci. 17: 524. 1927.

AURICULARDISIA TYSONII (Lundell) Lundell, comb. nov. Ardisia Tysonii Lundell, Wrightia 4: 165. 1971; Wrightia 6: 92, pl. 169. 1979.

AURICULARDISIA UNGUIENSIS (Lundell) Lundell, comb. nov. Ardisia unguiensis Lundell, Wrightia 6: 112. 1980.

AURICULARDISIA VESCA (Lundell) Lundell, comb. nov. Ardisia vesca Lundell, Wrightia 6: 93, pl. 170. 1979.

ICACOREA Aubl., Pl. Guian. 2: Suppl. 1. 1775.

Icacorea guyanensis Aubl. together with Icacorea compressa (H.B.K.) Standl. combine the characteristic features of this difficult complex of taxa. Icacorea is a genus which can be easily recognized, and it is not to be confused with Ardisia Sw. in spite of historical precedent.

The genus was misinterpreted by Mez in his 1902 monograph for he reduced Icacorea to a subgeneric status and referred a number of taxa to it which are not referable here. One of the largest genera in the Neotropics, its numerous species, like so many in the Myrsinaceae, are not well-marked.

Icacorea is a diverse genus of shrubs and trees. It grows from sea level to mountain tops, where it abounds in cloud forests at elevations up to 3000 m. It ranges from tropical Mexico and Central America as far south as Peru, Bolivia, and Brazil.

Characteristics which serve to distinguish it are: lepidote or furfuraceous-lepidote indumentum; terminal or sometimes axillary inflorescences; corymbose or subcorymbose pedicellate flowers, with 5- but often 4-parted calyx and corolla; sepals nearly free, always symmetric, mostly lanceolate or ovate-elliptic and longer than wide, usually thin and orange or orange-black punctate; corolla with petals united at base and mostly lanceolate with apex either symmetric or asymmetric; stamens with filaments sometimes equalling anthers but mostly shorter and borne usually above base of the short corolla tube; anthers epunctate and often drying blackish, mostly linear-lanceolate with rimose apical pores which usually split longitudinally at maturity; and, placenta mostly ovoid, with small imbedded ovules in several series. The ovules are few to numerous but in a species the number rarely ranges more than three from the mean.

An important diagnostic feature, aside from the distinctive calyx, is the presence in most taxa of Icacorea of a dense lepidote covering of the peduncle, the branches of the inflorescence having only scattered small scales and often appearing glabrous.

ICACOREA ACUMINIFOLIA (Lundell) Lundell, comb. nov. Ardisia acuminifolia Lundell, Wrightia 6: 101. 1980.

ICACOREA AEQUILONGA (Lundell) Lundell, comb. nov. Ardisia aequilonga Lundell, Wrightia 5: 277. 1976.

ICACOREA ALSTONII (Lundell) Lundell, comb. nov. Ardisia Alstonii Lundell, Wrightia 4: 159. 1971.

ICACOREA AMANUENSIS (Lundell) Lundell, comb. nov. Ardisia amanuensis Lundell, Am. Midland Nat. 29: 485. 1943.

ICACOREA ANTONENSIS (Lundell) Lundell, comb. nov. Ardisia antonensis Lundell, Wrightia 4: 44. 1968.

ICACOREA APODA (Standl. & Steyerm.) Lundell, comb. nov. Ardisia apoda Standl. & Steyerm., Field Mus. Bot. 23: 219. 1947. The fragmentary calyx appears to be typical of Icacorea.

ICACOREA AURANTIACA (Lundell) Lundell, comb. nov. Ardisia aurantiaca Lundell, Wrightia 5: 59. 1974.

ICACOREA BARUANA (Lundell) Lundell, comb. nov. Ardisia baruana Lundell, Wrightia 6: 61. 1979.

ICACOREA BAWAE (Lundell) Lundell, comb. nov. Ardisia Bawae Lundell, Wrightia 6: 62. 1979.

ICACOREA BELIZENSIS (Lundell) Lundell, comb. nov. Ardisia belizensis Lundell, Contr. Univ. Michigan Herb. 7: 38. 1942.

ICACOREA BREVIS (Lundell) Lundell, comb. nov. Ardisia brevis Lundell, Wrightia 5: 277. 1976.

ICACOREA BURGERI (Lundell) Lundell, comb. nov. Ardisia Burgeri Lundell, Wrightia 7: 23. 1981.

ICACOREA CALVARIOANA (Lundell) Lundell, comb. nov. Ardisia calvarioana Lundell, Wrightia 6: 66. 1978. Resembling Icacorea stenophylla (Donn. Sm.) Lundell, flowers are needed to determine its affinities.

ICACOREA CAMPANENSIS (Lundell) Lundell, comb. nov. Ardisia campanensis Lundell, Wrightia 6: 66. 1979.

ICACOREA CATHARINENSIS (Mez) Lundell, comb. nov. Ardisia catharinensis Mez, Pflanzenreich IV. Fam. 236: 96. 1902.

ICACOREA CAUDATIFOLIA (Lundell) Lundell, comb. nov. Ardisia caudatifolia Lundell, Wrightia 5: 278. 1976.

ICACOREA CHAHALANA (Lundell) Lundell, comb. nov. Ardisia chahalana Lundell, Wrightia 4: 55. 1968.

ICACOREA CHIRIQUIENSIS (Lundell) Lundell, comb. nov. Ardisia chiriquiensis Lundell, Wrightia 5: 279. 1976.

ICACOREA CHOCOANA (Lundell) Lundell, comb. nov. Ardisia chocoana Lundell, Wrightia 6: 68. 1979.

ICACOREA CLAVELLIGERA (Lundell) Lundell, comb. nov. Ardisia clavelligera Lundell, Wrightia 5: 280. 1976.

ICACOREA COOKII (Lundell) Lundell, comb. nov. Ardisia Cookii Lundell, Wrightia 4: 56. 1968.

ICACOREA COPEYANA (Standl.) Lundell, comb. nov. Ardisia copeyana Standl., Field Mus. Pub. Bot. 18: 886. 1938.

ICACOREA COSTARICENSIS (Lundell) Lundell, comb. nov. Ardisia costaricensis Lundell, Contrib. Univ. Michigan Herb. 7: 39. 1942.

ICACOREA CROSBYI (Lundell) Lundell, comb. nov. Ardisia Crosbyi Lundell, Wrightia 6: 73. 1979.

ICACOREA CUSPIDATA (Benth.) Lundell, comb. nov. Ardisia cuspidata Benth., Bot. Sulph. 123. 1844.

ICACOREA DEMINUTA (Lundell) Lundell, comb. nov. Ardisia deminuta Lundell, Wrightia 6: 74. 1979.

ICACOREA DIGITATA (Lundell) Lundell, comb. nov. Ardisia digitata Lundell, Wrightia 5: 60. 1974.

ICACOREA DUKEI (Lundell) Lundell, comb. nov. Ardisia Dukei Lundell, Wrightia 4: 45. 1968.

ICACOREA EDWARDSII (Lundell) Lundell, comb. nov. Ardisia Edwardsii Lundell, Wrightia 4: 58. 1968.

ICACOREA EUGENIOIDES (Lundell) Lundell, comb. nov. Ardisia eugenioides Lundell, Wrightia 5: 283. 1976.

ICACOREA FENDLERI (Lundell) Lundell, comb. nov. Ardisia Fendleri Lundell, Wrightia 4: 45. 1968.

ICACOREA FLUMINENSIS (Mez) Lundell, comb. nov. Ardisia fluminensis Mez, Pflanzenreich IV. Fam. 236: 95. 1902.

ICACOREA FOREROI (Lundell) Lundell, comb. nov. Ardisia Foreroi Lundell, Wrightia 6: 103. 1980.

ICACOREA FOVEOLATA (Lundell) Lundell, comb. nov. Ardisia foveolata Lundell, Wrightia 6: 77. 1979.

ICACOREA FRUTICOSA (Lundell) Lundell, comb. nov. Ardisia fruticosa Lundell, Wrightia 5: 284. 1976.

ICACOREA FURFURACELLA (Standl.) Lundell, comb. nov. Ardisia furfuracella Standl., Ann. Mo. Bot. Gard. 25: 832. 1938.

ICACOREA GENICULATA (Lundell) Lundell, comb. nov. Ardisia geniculata Lundell, Ann. Mo. Bot. Gard. 28: 454. 1941.

ICACOREA GORGONAE (Cuatr.) Lundell, comb. nov. Ardisia gorgonae Cuatr., Brittonia 14: 53, figs. 3, 4. 1962.

ICACOREA GUANCHEANA (Lundell) Lundell, comb. nov. Ardisia guancheana Lundell, Wrightia 5: 284. 1976.

ICACOREA HINTONII (Lundell) Lundell, comb. nov. Ardisia Hintonii Lundell, Wrightia 5: 61. 1974.

ICACOREA HUALLAGAE (Mez) Lundell, comb. nov. Ardisia huallagae Mez, Pflanzenreich IV. Fam. 236: 95. 1902.

ICACOREA IBAGUENSIS (Lundell) Lundell, comb. nov. Ardisia ibaguensis Lundell, Wrightia 3: 197. 1966.

ICACOREA IRAZUENSIS (Oerst.) Lundell, comb. nov. Ardisia irazuensis Oerst., Kjoeb. Vidensk. Meddel. 124. 1861.

ICACOREA JAMAICENSIS (Lundell) Lundell, comb. nov. Ardisia jamaicensis Lundell, Wrightia 4: 120. 1969.

ICACOREA JEFEANA (Lundell) Lundell, comb. nov. Ardisia jefeana Lundell, Wrightia 5: 285. 1976. Ardisia obovalifolia Lundell (1971), non Merrill (1928).

ICACOREA KALLUNKII (Lundell) Lundell, comb. nov. Ardisia Kallunkii Lundell, Wrightia 5: 285. 1976.

ICACOREA LASSERI (Lundell) Lundell, comb. nov. Ardisia Lasseri Lundell, Wrightia 4: 59. 1968.

ICACOREA LONGICAUDATA (Lundell) Lundell, comb. nov. Ardisia longicaudata Lundell, Wrightia 4: 60. 1968.

ICACOREA LORETENSIS (Lundell) Lundell, comb. nov. Ardisia loretensis Lundell, Wrightia 6: 80. 1979. The indumentum of loose scales and stalked stellate or dendroid trichomes makes doubtful, in the absence of flowers, the reference of this taxon to Icacorea.

ICACOREA MAASOLAE (Lundell) Lundell, comb. nov. Ardisia Maasolae Lundell, Wrightia 6: 81. 1979.

ICACOREA MANGLILLO (Cuatr.) Lundell, comb. nov. Ardisia Manglillo Cuatr., Rev. Acad. Colomb. Cienc. 8: 318. 1951.

ICACOREA MARTINENSIS (Lundell) Lundell, comb. nov. Ardisia martinensis Lundell, Wrightia 6: 82. 1979.

ICACOREA MATAGALPANA (Lundell) Lundell, comb. nov. Ardisia matagalpana Lundell, Wrightia 4: 61. 1968.

ICACOREA MAXONII (Standl.) Lundell, comb. nov. Ardisia Maxonii Standl., Journ. Wash. Acad. Sci. 17: 522. 1927.

ICACOREA METENSIS (Lundell) Lundell, comb. nov. Ardisia metensis Lundell, Wrightia 6: 107. 1980.

ICACOREA MICROCALYX (Lundell) Lundell, comb. nov. Ardisia microcalyx Lundell, Wrightia 4: 46. 1968.

ICACOREA MINIMA (Lundell) Lundell, comb. nov. Ardisia minima Lundell, Wrightia 6: 83. 1979.

ICACOREA MINUTIFLORA (Lundell) Lundell, comb. nov. Ardisia minutiflora Lundell, Wrightia 4: 62. 1968.

ICACOREA MOMBACHOANA (Lundell) Lundell, comb. nov. Ardisia mombachoana Lundell, Wrightia 6: 108. 1980.

ICACOREA MORII (Lundell) Lundell, comb. nov. Ardisia Morii Lundell, Wrightia 5: 286. 1976.

ICACOREA NEEI (Lundell) Lundell, comb. nov. Ardisia Neei Lundell, Wrightia 5: 287. 1976. The post-anthesis anthers are atypical, being oblong and dehiscent longitudinally, but this may be due to age!

ICACOREA NICARAGUENSIS (Oerst.) Lundell, comb. nov. Ardisia nicaraguensis Oerst., Kjoeb. Vidensk. Meddel. 123. 1861.

ICACOREA NOVITENSIS (Lundell) Lundell, comb. nov. Ardisia novitensis Lundell, Wrightia 6: 109. 1980. Closely resembling Icacorea loretensis (Lundell) Lundell, the status of this taxon remains doubtful in the absence of flowering material.

ICACOREA OERSTEDIANA (Lundell) Lundell, comb. nov. Ardisia Oerstediana Lundell, Wrightia 6: 84. 1979.

ICACOREA OPACA (Lundell) Lundell, comb. nov. Ardisia opaca Lundell, Wrightia 4: 47. 1968.

ICACOREA PANURENSIS (Mez) Lundell, comb. nov. Ardisia panurensis Mez, Pflanzenreich IV. Fam. 236: 95. 1902.

ICACOREA PERGRACILIS (Lundell) Lundell, comb. nov. Ardisia pergracilis Lundell, Wrightia 5: 288. 1976.

ICACOREA PINCHINCHANA (Lundell) Lundell, comb. nov. Ardisia pinchinchana Lundell, Wrightia 6: 86. 1979.

ICACOREA PLATYPHYLLA (Lundell) Lundell, comb. nov. Ardisia platyphylla Lundell, Wrightia 4: 62. 1968.

ICACOREA PLURIFLORA (Lundell) Lundell, comb. nov. Ardisia pluriflora Lundell, Wrightia 6: 87. 1979.

ICACOREA POLYANTHA (Lundell) Lundell, comb. nov. Ardisia polyantha Lundell, Wrightia 4: 63. 1968.

ICACOREA POLYDACTYLA (Lundell) Lundell, comb. nov. Ardisia polydactyla Lundell, Wrightia 4: 63. 1968.

ICACOREA POPAYANENSIS (Mez) Lundell, comb. nov. Ardisia popayanensis Mez, Pflanzenreich IV. Fam. 236: 89. 1902.

ICACOREA PROCTORI (Lundell) Lundell, comb. nov. Ardisia Proctori Lundell, Wrightia 4: 64. 1968.

ICACOREA RAVENIANA (Lundell) Lundell, comb. nov. Ardisia Raveniana Lundell, Wrightia 5: 61. 1974.

ICACOREA REFLEXIFLORA (Lundell) Lundell, comb. nov. Ardisia reflexiflora Lundell, Wrightia 4: 164. 1971.

ICACOREA RIGIDIFOLIA (Lundell) Lundell, comb. nov. Ardisia rigidifolia Lundell, Ann. Missouri Bot. Gard. 28: 455. 1941.

ICACOREA RIMIFORMIS (Lundell) Lundell, comb. nov. Ardisia rimiformis Lundell, Wrightia 6: 89. 1979.

ICACOREA RIVASENSIS (Lundell) Lundell, comb. nov. Ardisia rivasensis Lundell, Wrightia 6: 90. 1979.

ICACOREA RUSBYANA (Standl.) Lundell, comb. nov. Ardisia Rusbyana Standl., Field Mus. Pub. Bot. 4: 250. 1929.

ICACOREA SALVADORENSIS (Lundell) Lundell, comb. nov. Ardisia salvadorensis Lundell, Wrightia 4: 148. 1970.

ICACOREA SANTAFEANA (Lundell) Lundell, comb. nov. Ardisia santafeana Lundell, Wrightia 5: 288. 1976.

ICACOREA SCHERYI (Lundell) Lundell, comb. nov. Ardisia Scheryi Lundell, Ann. Mo. Bot. Gard. 28: 456. 1941.

ICACOREA SILTEPECANA (Lundell) Lundell, comb. nov. Ardisia siltepecana Lundell, Wrightia 4: 66. 1968.

ICACOREA STANDLEYANA (Allen) Lundell, comb. nov. Ardisia Standleyana Allen, Rain Forests of Golfo Dulce, 409. 1956.

ICACOREA STENOPHYLLA (Donn. Sm.) Lundell, comb. nov. Ardisia stenophylla Donn. Sm., Bot. Gaz. 24: 395. 1897. Ardisia oblanceolata Standl., Field Mus. Pub. Bot. 4: 249. 1929.

ICACOREA STORKII (Lundell) Lundell, comb. nov. Ardisia Storkii Lundell, Wrightia 4: 47. 1968.

ICACOREA SUBCRENULATA (Lundell) Lundell, comb. nov. Ardisia subcrenulata Lundell, Contrib. Univ. Michigan Herb. 7: 40. 1942.

ICACOREA SUBSESSILIFOLIA (Lundell) Lundell, comb. nov. Ardisia subsessilifolia Lundell, Wrightia 4: 48. 1968.

ICACOREA TACARCUNANA (Lundell) Lundell, comb. nov. Ardisia tacarcunana Lundell, Wrightia 5: 252. 1976.

ICACOREA TENUICAULIS (Lundell) Lundell, comb. nov. Ardisia tenuicaulis Lundell, Wrightia 6: 110. 1980.

ICACOREA TENUIS (Lundell) Lundell, comb. nov. Ardisia tenuis Lundell, Wrightia 4: 149. 1970. The species is atypical and may not be referable to Icacorea. Additional collections are needed in flower to clarify its relationship.

ICACOREA TERRABANA (Lundell) Lundell, comb. nov. Ardisia terrabana Lundell, Wrightia 4: 66. 1968.

ICACOREA VERAGUASENSIS (Lundell) Lundell, comb. nov. Ardisia veraguasensis Lundell, Wrightia 5: 64. 1974.

ICACOREA WHITEI (Lundell) Lundell, comb. nov. Ardisia Whitei Lundell, Wrightia 4: 67. 1968.

ICACOREA WOODSONII (Lundell) Lundell, comb. nov. Ardisia Woodsonii Lundell, Ann. Mo. Bot. Gard. 28: 457. 1941.

ZUNILIA Lundell, gen. nov. -- Frutices vel arbores foliis alternis, petiolatis, integerrimis vel obscure crenulatis; inflorescentiae glabrae, paniculatae, terminales; flores hermaphroditi, 5- vel raro 6-meri, subumbellato-corymbosi vel subracemoso-corymbosi; pedicelli ad 3 cm. longi, saepe verticillati; sepala fere libera, ovata vel ovato-elliptica, symmetrica, intus saepe papillosa, ciliolata vel ciliata; corolla ad 11 mm. longa; petala basi connata, intus glandulifera; filamenta glandulifera; antherae lanceolatae; ovarium glabrum.

TYPE SPECIES: Zunilia sexpartita (Lundell) Lundell (= Ardisia sexpartita Lundell).

Glabrous shrubs or small trees, mostly growing on slopes of volcanoes in Guatemala and Chiapas, but with one isolated anomalous species in the mountains of San Luis Potosi. The rather large leaves on thickish branchlets are subentire or obscurely crenulate. The large terminal paniculate glabrous inflorescences are unique for the flowers on a single branch of an inflorescence are corymbose at apex with pedicels below which are either whorled, opposite or alternate. From corymbs in bud, the heteromorphous development of the inflorescence takes place as the rachis elongates and the flowers mature. The pedicels are accrescent, exceeding 3 cm. in length in fruit in several of the taxa. Except in Z. hyalina, which has thin hyaline sepals and petals, the perianth is thick. Sepals are symmetrical and mostly ovate-elliptic and conspicuously punctate with large blackish glands. The corolla is large with a well developed tube which is glandular within. The large stamens have long filaments pubescent with gland-tipped hairs. The large anthers are lanceolate, epunctate, and dehiscent by apical pores which split longitudinally as the flower matures. As in other genera related to Ardisia Sw., the central placenta is mostly ovoid with numerous imbedded ovules in several series.

Zunilia may be distinguished from Ardisia Sw. as follows:

> Panicles of flowers in corymbs, the mature inflorescences heteromorphic with strongly accrescent elongated pedicels arranged either in whorls or opposite or alternate below the apical corymbs . . . . . Zunilia.
>
> Panicles of flowers consisting of simple racemes or spikes, the inflorescences with flowers uniformly distributed, either pedicellate or sessile . . . Ardisia.

Found mostly on volcanic slopes at middle altitudes in Guatemala and Chiapas, collections of Zunilia sexpartita have been made on Volcan Zunil by both A. F. Skutch and Julian A. Steyermark, whence the name of the genus.

ZUNILIA ALBA (Lundell) Lundell, comb. nov. Ardisia alba Lundell, Wrightia 3: 195. 1966.

ZUNILIA CUCULLATA (Lundell) Lundell, comb. nov. Ardisia cucullata Lundell, Wrightia 3: 26. 1962.

ZUNILIA HYALINA (Lundell) Lundell, comb. nov. Ardisia hyalina Lundell, Wrightia 3: 99. 1964.

ZUNILIA SEXPARTITA (Lundell) Lundell, comb. nov. Ardisia sexpartita Lundell, Wrightia 3: 29. 1962. Type of the genus Zunilia Lundell (LL, holotype; F, isotype).

ZUNILIA VERAPAZENSIS (Lundell) Lundell, comb. nov. Ardisia verapazensis Donn. Sm., Bot. Gaz. 46: 113. 1908.

Contribution to the Lichen Flora of Venezuela, III.

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During the months of April and May of this year I had the privilege to study at the Smithsonian Institution sufficient material collected in Venezuela.

As result of this study a new list of registered lichens for Venezuela is presented.

*Arthonia rubella (Fée) Nyl.

Estado Lara: Serranía de Baragua, entre Altagracia y Pedernales, en el camino de la cumbre de la Serranía, López-Figueiras & R. Smith 20880.

*Arthonia tumidula (Ach.) Ach.

Estado Mérida: Sierra Nevada de Mérida, páramo de Gavidia, cercanías de Mucuchíes, López-Figueiras 20603.

Estado Lara: Serranía de Matatere, entre el caserío Los Caimitos hacia Matatere y Aguada Grande, López-Figueiras & R. Smith 20973.

Bulbothrix apophysata (Hale & Kurok.) Hale

Estado Mérida: Sierra Nevada de Mérida, quebrada de Fafoy, cercanías de El Carrisal, López-Figueiras & Hale 20075.

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*Numbers determined by Dr. R. Harris, New York Botanical Garden.

Bulbothrix fungicola (Lynge) Hale

Estado Lara: En el camino entre el fundo "Buenos Aires" y Humocaro Alto, López-Figueiras & Hale 19669.

Bulbothrix hypocraea (Vainio) Hale

Estado Lara: Sierra de Barbacoas, entre Barbacoas y San Pedro, López-Figueiras 19123.

Bulbothrix imshaugii (Hale) Hale

Estado Mérida: Sierra Nevada de Mérida, alrededores del páramo de Gavidia, cercanías de Mucuchíes, López-Figueiras 20643.

*Cryptothecia megalocarpum (Müll. Arg.) Sant.

Estado Falcón: Península de Paraguaná, a lo largo del arroyo Santa Ana, Cerro Santa Ana, López-Figueiras & R. Wingfield 21344.

Cerro Turipiita, en la vía San Francisco-Perú (entronque con la carretera Coro-Morón), López-Figueiras & R. Wingfield 22433.

Heterodermia leucomela (L.) forma verrucifera Kurok

Estado Lara: Serranía de Bobare, en Pico-Pico, López-Figueiras & R. Smith 20789.

Estado Mérida: El Paramito, un sector de La Carbonera, cercanías de Mérida, López-Figueiras 17511.

Heterodermia subcomosa (Nyl.)

Distrito Federal: En la vía El Junquito-Colonia Tovar, López-Figueiras 22010, 22013, 22014.

Hypotrachyna rhabdiformis (Kurok.) Hale

Distrito Federal: En la vía El Junquito-Colonia Tovar,

López-Figueiras 22007A.

Hypotrachyna subaffinis (Zahlbr.) Hale

Estado Mérida: En Morro Negro, cerca de Pico de Horma, al sureste de Mesa Quintero, López-Figueiras & H. Rodríguez 22940.

*Myriotrema compunctum (Ach.) Hale

Estado Lara: Serranía de Matatere, entre el caserío Los Caimitos hacia Matatere y Aguada Grande, López-Figueiras & R. Smith 20974.

*Myriotrema occultum (Eschw.) Hale

Estado Lara: Serranía de Matatere, entre el caserío Los Caimitos hacia Matatere y Aguada Grande, López-Figueiras & R. Smith 20975.

*Parathelium indutum Nyl.

Estado Táchira: Betania, parte alta del valle de Tamá, bosque andino primitivo, López-Figueiras & Ruiz-Terán 10131.

Parmelia perreticulata (Räs.) Hale

Estado Lara: Sierra de Barbacoas, entre Barbacoas y San Pedro, López-Figueiras 19096.

Parmelina Cfr. damaziana (Zahlbr.) Hale

Estado Mérida: Entre Tovar y el páramo de Guaraque, López-Figueiras 22656.

Parmelina phlyctina (Hale) Hale

Estado Falcón: Sierra de San Luis, Montaña de Paraguariba, López-Figueiras & van der Werff 21492.

Parmelina pilosa (Stizenb.) Hale

Estado Lara: Sierra de Barbacoas, entre Barbacoas y San Pedro, López-Figueiras 19100A.

Estado Mérida: Arriba de Tovar, entre esta población y la carretera hacia el páramo de Mariño, López-Figueiras 24699.

Parmotrema madagascariacea (Hue) Hale

Estado Falcón: Serranía Ziruma o Empalado, alrededores de Sinamaica, proximidades de Cerro Azul, López-Figueiras & R. Wingfield 21552.

Estado Mérida: En Morro Negro, cerca de Pico de Horma, al sureste de Mesa Quintero, López-Figueiras & H. Rodríguez 23033, 23036.

La Sabana, área de Pico de Horma, al sureste de Mesa Quintero, López-Figueiras & H. Rodríguez 23365, 23382, 23383.

*Pertusaria copiosa Erichs.

Estado Falcón: Sierra Empalado o Ziruma, Cerro Socopo, López-Figueiras & R. Wingfield 22544.

*Pertusaria hypothamnolica Dibb.

Estado Mérida: El Paramito, un sector de la Carbonera, cercanías de Mérida, López-Figueiras 17332.

Estado Falcón: Serranía Empalado o Ziruma, Los Cogollales, cercanías de Cerro Azul, López-Figueiras & R. Wingfield 21527.

*Pertusaria tetrathalmia (Fée) Nyl.

Estado Falcón: Sierra Empalado o Ziruma, Cerro Socopo, López-Figueiras & R. Wingfield 22591.

*Pertusaria texana Müll. Arg.

Estado Falcón: Sierra de San Luis, Piedra de Agua, cercanías de San Luis, López-Figueiras & R. Wingfield 22416.

*Pertusaria xanthodes Müll. Arg.

Estado Lara: En Canape, 18 km de Barquisimeto, en la vía a Quíbor, zona árida (cardonales) López-Figueiras & R. Smith 20719.

Pseudoparmelia cinerascens (Lynge) Hale

Estado Lara: El Manzano, vía Barquisimeto-El Altar-Yaritagua (Edo. Yaracuy), López-Figueiras 16147.

Sabanas El Altar-Yaritagua (Edo. Yaracuy), López-Figueiras & R. Smith 16483, 16489.

Pseudoparmelia cyphellata Lynge

Estado Mérida: El Moral, vía Guaraque-Mesa Quintero, López-Figueiras & H. Rodríguez 22850.

Pseudoparmelia leucoxantha (Müll. Arg.) Hale

Estado Lara: Sierra de Barbacoas entre Barbacoas y San Pedro, López-Figueiras 19112.

Sierra Portuguesa, Loma El León, proximidades de Barquisimeto, López-Figueiras & R. Smith 21222.

Sierra de Barbacoas entre Barbacoas y La Panamericana, López-Figueiras 22072.

Pseudoparmelia rutidota (Hooker & Taylor) Hale

Estado Lara: Sierra de Barbacoas, en Nepe pequeño, un sector del páramo de Los Nepes, López-Figueiras 17062.

Pseudoparmelia soredians (Nylander) Hale

Estado Mérida: Páramo de Gavidia, cercanías de Mucuchíes, López-Figueiras 20541.

Xanthoria candelaria (L.) Th.Fr.

Estado Lara: Sierra Portuguesa, Loma El León, proximidades de Barquisimeto, López-Figueiras & R. Smith 21170.

Estado Falcón: Sierra de San Luis, en el camino situado al oeste de Carrizalito, hacia los farallones, vía Coro-Churuguara, López-Figueiras & R. Wingfield 21788.

Sierra de San Luis, Piedra de Agua, cercanías de San Luis, López-Figueiras & R. Wingfield 22408.

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ADDITIONAL NOTES ON THE GENUS *VITEX*. XXI

Harold N. Moldenke

VITEX OBANENSIS Wernham

Additional bibliography: Fedde & Schust., Justs Bot. Jahresber. 42: 252. 1920; Mold., Phytologia 15: 312. 1967; Mold., Fifth Summ. 1: 223 (1971) and 2: 927. 1971; Mold., Phytol. Mem. 2: 213 & 592. 1980.

VITEX OBOVATA E. Mey.

Additional bibliography: Harv., Gen. S. Afr. Pl., ed. 1, 270. 1838; D. Dietr., Syn. Pl. 3: 612. 1843; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; T. R. Sims, Sketch Check-list Fl. Kaffr. 63. 1894; Stapf, Ind. Lond. 6: 479. 1931; Mold., Phytologia 15: 312. 1967; Mold., Fifth Summ. 1: 258 (1971) and 2: 927. 1971; Palmer & Pitman, Trees South. Afr., ed. 2, 3: 1951 & 1961. 1972; Mold., Phytol. Mem. 2: 246 & 592. 1980.

Palmer & Pitman (1972) refer to this species as the "Cape vitex" and describe it as "a species of the eastern Cape -- and possibly of Natal -- a small tree with angled, hairy young twigs much marked with leaf scars. The 3--5 almost stalkless leaflets that make up the leaves are smallish, 2.5--5 cm. long and less than 2.5 cm. broad, typically egg-shaped or oblong, the tips often with a short jutting point, the bases narrowed, velvety when young, especially along the midrib and margins, becoming less hairy or smooth, with about 6--10 inconspicuous pairs of veins, the margins untoothed. The leaves are borne on shortish stalks less than 2.5 cm. long. The white flowers are in branching heads on long stalks in the axils of the leaves. They bloom about November. The small round fruit, ripe about April, is encircled by a pronounced lobed calyx."

VITEX ODORATA Huber

Additional bibliography: Mold., Phytologia 15: 312. 1967; Mold., Fifth Summ. 1: 180 (1971) and 2: 927. 1971; Mold., Phytol. Mem. 2: 172 & 592. 1980.

VITEX ORINOCENSIS H.B.K.

Additional & emended synonymy: *Vitex orinocensis* Kunth apud Spreng. in L., Syst. Veg., ed. 16, 2: 757. 1825. *Vitex orinocensis* Humb. & Kunth apud D. Dietr., Syn. Pl. 3: 612. 1843.

Additional bibliography: Spreng. in L., Syst. Veg., ed. 16, 2: 757. 1825; D. Dietr., Syn. Pl. 3: 612. 1843; Schau. in A. DC., Prodr. 11: 688. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; Pittier, Contrib. U. S. Nat. Herb. 20: 484. 1922; Knuth, Feddes Repert. Spec. Nov. Beih. 43: [Init. Fl. Venez.] 607. 1927; Stapf, Ind. Lond. 6: 479. 1931; Macbr., Field Mus. Publ. Bot. 13 (5): 692 & 696. 1960; Mold., Phytologia 17: 20--21. 1968; Mold., Résumé Suppl. 16: 29. 1968; Lasser, Act. Bot. Venez. 4: 48. 1970;

Mold., Fifth Summ. 1: 121, 128, 131, 133, 134, 144, 179, 180, & 374 (1971) and 2: 723, 725, 927, & 928. 1971; López-Palacios, Pittiera 5: 47. 1973; López-Palacios, Revist. Fac. Farm. Univ. Andes 9 (13): 56. 1973; Mold., Phytologia 27: 368. 1973; Lasser, Braun, & Steyerm., Act. Bot. Venez. 9: 36. 1974; Mold., Phytologia 28: 435 & 452. 1974; Finol U., Act. Bot. Venez. 11: 25, 46, 48, 53, & 55. 1975; López-Palacios, Revist. Fac. Farm. Univ. Andes 15: 98--102, fig. [20]. 1975; Mold., Phytologia 34: 256 & 257. 1976; Ortega U., Cienc. Naturaleza 17: 23. 1976; Soukup, Biota 11: 20. 1976; López-Palacios, Fl. Venez. Verb. 581, 582, 609, 614--623, & 654. 1977; Mold., Phytologia 36: 32. 1977; Steyerm. & Huber, Fl. Avila 861 & 868. 1978; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 33. 1979; Mold., Phytologia 44: 387. 1979; Mold., Phytol. Mem. 2: 112, 121, 123, 125, 126, 130, 136, 171, 172, 367, 459, & 592. 1980.

Additional illustrations: López-Palacios, Fl. Venez. Verb. [615], fig. 143. 1977.

Recent collectors describe this plant as a tree, 8--20 m. tall, the trunk to 40 cm. in diameter, "casca fissurada, descascande em placas verticais, o certe de casca éxida de creme a uma coloração ferruginosa", the leaves mostly 3-foliolate, sometimes 1- or 5-foliolate, calyx truncate, stamens rather dark lilac in color, and have found it in flower in April and October at 400 m. altitude. The corollas are said to have been "violet" in color on *López-Palacios 3912* and "light-lilac" on *Mori & Benton 12868*. López-Palacios, in a personal communication to me, lists the vernacular name, "tassajo", for this species. In his 1975 work he says: "Parece que su área de dispersión es muy restringida. Para Venezuela sólo he examinado e inventariado 4 registros: la colección típica en el Herbario Willdenow, *Pittier 12356* y *12489*, y *Tamayo 4048*. Este último ejemplar bien puede ser *V. orinocensis* var. *multiflora*, pues es de 3 folíolos y estos muy obtusos. Ha sido citado para el Guárico, aunque en su rótulo no se señala el lugar de recolección; sólo trae esta indicación: 'Crece en las orillas del Río Orinoco y en la llamada montaña de Carapa, Parmana, Edo. Guárico....Comision borrachera'." In his 1977 work he cites the latter collection as "*Tamayo 4088*". He cites the type, *Bonpland 832*, from Amazonas, but Knuth (1927) cites it from Bolívar. Macbride (1960) incorrectly cites the original publication by Humboldt, Bonpland, and Kunth as "1818". Lasser and his associates (1974) record the species as cultivated in Venezuela.

The *Aristeguieta & Zabala 7025*, distributed in some herbaria as *V. orinocensis*, seems better regarded as *V. appuni* Mold., while *Gentry & Puig-Ross 14292* is *V. orinocensis* var. *multiflora* (Mi) Huber and *Schunke Vigo 1768* & *2913* are not verbenaceous.

Additional citations: COLOMBIA: Meta: *López-Palacios 3912* (Z). BRAZIL: Bahia: *Mori & Benton 12868* (Z).

VITEX ORINOCENSIS var. *GLABRA* Mold.

Additional bibliography: Mold., Phytologia 15: 513. 1967; Mold., Fifth Summ. 1: 121 (1971) and 2: 927. 1971; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 33. 1979; Mold., Phytol. Mem. 2: 112 & 592. 1980.

VITEX ORINOCENSIS var. *MULTIFLORA* (Miq.) Huber

Additional synonymy: *Vitex orinocoensis* Huber ex Mold., Résumé 387, in syn. 1959. *Vitex orinocensis* var. *multiflora* Miq. ex Mold., Phytol. Mem. 2: 459, in syn. 1980

Additional bibliography: Schau. in A. DC., Prodr. 11: 690. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; Stapf, Ind. Lond. 6: 479. 1931; Macbr., Field Mus. Publ. Bot. 13 (5): 696. 1960; Mold., Phytologia 17: 20--21. 1968; Mold., Résumé Suppl. 16: 29. 1968; Lasser, Act. Bot. Venez. 4: 48. 1970; Mold., Fifth Summ. 1: 121, 128, 131, 133, 134, 144, 179, & 180 (1971) and 2: 723, 725, & 928. 1971; López-Palacios, Pittiera 5: 47. 1973; López-Palacios, Revist. Fac. Farm. Univ. Andes 9 (13): 56. 1973; Mold., Phytologia 27: 368 (1973) and 28: 435. 1974; López-Palacios, Revist. Fac. Farm. Univ. Andes 15: 98--102, fig. [20]. 1975; Mold., Phytologia 34: 256 & 257. 1976; Ortega U., Cienc. Naturaleza 17: 23. 1976; Soukup, Biota 11: 20. 1976; López-Palacios, Fl. Venez. Verb. 581, 582, 609, 616--623, & 654, fig. 144. 1977; Mold., Phytologia 36: 32. 1977; Steyerm. & Huber, Fl. Avila 861, [865], & 868, fig. 301B. 1978; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 33. 1979; Mold., Phytologia 44: 415. 1979; Mold., Phytol. Mem. 2: 112, 121, 123, 125, 126, 130, 136, 171, 172, 367, 459, & 592. 1980.

Additional illustrations: López-Palacios, Revist. Fac. Farm. Univ. Andes 15: fig. [20]. 1975; López-Palacios, Fl. Venez. Verb. [618], fig. 144. 1977; Steyerm. & Huber, Fl. Avila [865], fig. 301B. 1978.

Recent collectors describe this plant as a tree, 6--25 m.tall, low-branched, the trunk to 1.15 m. in circumference and 50 cm. in diameter at breast height, the bark shallowly and finely fissured, brownish-gray, the leaves 3--5-foliolate, of 2 sizes, the central leaflet larger, all papery, pale-green, slightly glossy above, the cymes divaricate, the anthers dark-blue, and the fruit often sparse, at first green, turning black. They have found it growing along riversides and in adjacent forests, among roadside vegetation, in forests and swampy depressions on level terrain, and in old capoeira with *Orbignya* palms, at 30--1500 m. altitude, in anthesis from March to June and September to November, and in fruit in January, May to August, and October.

The corollas are said to have been "blue" on *Aristeguieta & Zabala 7025, Gentry & Puig-Ross 14313,* and *Prance & al. 7892,* "blue-violet" on *Irwin & al. 55608,* "lilac" on *Romero C. 8305,* "purple" on *Steyermark & al. 120471,* "pale-purple" on *Breteler 3662,* and "pale-blue with a small pubescent yellow patch on the lower petal" on *Daly & al. D.631.*

Recent collectors report the following vernacular names for this plant: "aceitillo", "aceituna", "aceituno", "aceituno negal", "aquariquari branca", "chitinim", "guarataro", "guarataro negro", "palo de arco", "pao-kera", "pechiche", and "rac-kara".

Ruiz-Terán and his associates describe the plant as an "árbol erecto, inerme, 4--15 m.; tronco irregularmente cilíndrico, heuce, 8 cm.--1,2 m. de diámetro basal, hojas oposití-decusadas, predominantemente 3-foliolado-digitadas, folíolos desiguales,

cartaceas, verde intensos, lucientes por la haz, más claras por el envés. Ejes inflorescentiales y pedicelos y cáliz pardo rejizos a pardo purpúreos; corola blanca en la base del tubo, el resto, morado subintenso, con zonas más claras; filamentos morado claros: anteras pardo negruzcas; drupas maduras atropurpúreas". López-Palacios (1973) reports that the leaves are either opposite or ternate. Breteler refers to the plant as a lowland "species", while Gentry & Puig-Ross report it "common" in Táchira, Venezuela.

López-Palacios (1977) cites the following collections from Venezuela: Amazonas: *Holt & Blake 679, Maguire & Wurdack 34759, Medina E.387, Spruce 3653, Ll. Williams 15177.* Apure: *Chardon 142, Foldats 3515, Geay s.n., Ruiz-Terán 1841, Trujillo 2159, Vélez 2258 & 2699.* Aragua: *Pittier 14095.* Barinas: *Aragüe 8 21, Bernardi 1205 & 6849, Breteler 3663 & 3907, Gutiérrez 20 & 83, Little 15028, López-Palacios 2750, 2805, & 3147, Marcano-Berti & Torres-Lezama 192, Ramia 1690 & 1692, Rodriguez 1541, Ruiz-Terán 1769, Steyermark & al. 102008.* Bolívar: *Bernardi 2915, Marcano-Berti 2519, Ruiz-Terán 2582, Ruiz-Terán, Carabot, & Morales 10804, Ruiz-Terán & López-Palacios 11679, Steyermark 90773, Ll. Williams 13295.* Carabobo: *Saer 802.* Cojedes: *Pittier 11682, Vivas 102.* Distrito Federal: *Dillewijn s.n., Labbiente 33, Moritz 1148 & 1726.* Falcón: *Ruiz-Terán & López-Palacios 10353.* Guárico: *Aristeguieta 4574, Christ 3, Pittier 11797.* Lara: *Saer 422.* Mérida: *López-Palacios & Bautista 3311.* Miranda: *Aristeguieta 2801, Delgado 331, Tamayo 1505.* Monagas: *Aristeguieta 1727.* Portuguesa: *Aristeguieta & Zabala 6918.* Tachira: *Ijjasz & Madriz 378, López-Palacios 3593.* State undetermined: *Chardon 57.*

Material of this variety has been misidentified and distributed in some herbaria as *V. appuni* Mold., typical *V. orinocensis* H.B.K., and *V. stahelii* Mold. [which has the peduncles shorter than the petioles, while in *V. orinocensis* var. *multiflora* the peduncles are notably longer than the petioles].

Additional citations: COLOMBIA: Antioquia: *Gentry, Soejarto, Zarucchi, & Fallen 17938* (N). Arauca: *López-Palacios 1991* (N), *2960* (N). Córdoba: *López-Palacios 3858* (Ac, N). Cundinamarca: *Uribe Uribe 6036* (E--1988368). Santander: *Romero C. 8305* (N). VENEZUELA: Amazonas: *Foldats 100a* (W--2705441); *Medina 387* (Ld). Barinas: *Breteler 3662* (Mu, N, S), *3907* (N); *López-Palacios 3147* (Ld, N); *Steyermark, Bunting, & Blanco 102008* (Ld). Bolívar: *Ruiz-Terán, Carabot, & Morales 10804* (Ld); *Ruiz-Terán & López-Palacios 11679* (Mi). Distrito Federal: *Manara s.n.* [21-5-77] (N). Guárico: *Aristeguieta & Zabala 7025* (N). Táchira: *Gentry & Puig-Ross 14292* (N), *14313* (N); *López-Palacios 3593* (N, N); *Steyermark & Liesner 119349* (Ld); *Steyermark, Liesner, & González 120471* (Ld). Raton Island: *Bossio 12* (N). State undetermined: *Cuatrecasas 4150* (W--2780389). SURINAM: *Florschütz & Maas 2787* (Ld, W--2857197); *Irwin, Prance, Soderstrom, & Holmgren 55608* (N, W--2737054). FRENCH GUIANA: *Sagot 1013* (Pd). ECUADOR: Morena Santiago: *Little, Ortega, & Vivar 732* (Ld). PERU: Loreto: *Gentry, Diaz, Aronson, & Jaramillo 25834* (Ld); *Gentry, diaz, & Jaramillo 21818* (Ld, N); *Revilla 2145* (N). BRAZIL: Acre: *Prance, Coelho, Ramos, & Farias 7892* (Ld, N). Maranhão: *Daly,*

Campbell, Silva, Bahia, & Santos D.631 (Ld), *D.742* (Ld); *Ribeiro & Pinheiro 1176* [Herb. IPEAN. 151835] (Ld); *Rosa & Vilar 2956* (N).

VITEX OSCITANS Mold.

Additional bibliography: Mold., Phytologia 15: 313--314. 1967; Mold., Fifth Summ. 1: 263 (1971) and 2: 724 & 928. 1971; Mold., Phytol. Mem. 2: 252 & 592. 1980.

VITEX OXYCUSPIS J. G. Baker

Additional & emended bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 316 & 326--327. 1900; Hutchins. & Dalz., Fl. W. Trop. Afr., ed. 1, 2: 276 & 277. 1931; Gledhill, Check List Flow. Pl. Sierra Leone 30. 1962; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1967: 62. 1968; Mold., Phytologia 17: 21 & 42. 1968; Mold., Fifth Summ. 1: 218--221, 223, 232, 239, 245, & 253 (1971) and 2: 928. 1971; Jaeger & Mold., Phytologia 30: 403. 1975; Mold., Phytologia 34: 261. 1976; Odebiyi & Sofowora, Lloydia 41: 245. 1978; Mold., Phytologia 44: 480. 1979; Mold., Phytol. Mem. 2: 209--211, 213, 221, 228, 235, 242, & 592. 1980.

Adebiyi & Sofowora (1978) report finding saponins and tannins in the leaves and stems (but not in the roots) of this plant. Cooper describes it as a tree, 30--35 feet tall, the trunk 7--8 inches in diameter at breast height, and found it "common" in Liberia, where it is called "kpar-seh". Jaeger & Moldenke (1975) report it from a low forest "sur palier à *Gaertnera paniculata*" in Sierra Leone, commenting that the "Espèce proche de *V. micrantha* dont elle se distingue par ses feuilles plus grandes, grossièrement dentées et longuement acuminées", and giving its overall distribution as Sierra Leone, Liberia, Ivory Coast, Southern Nigeria, and Angola. Baker (1900) cites only *Mann 2243* from Nigeria; Hutchinson & Dalziel (1931) cite *Mann 2243, Cooper 321, Chevalier 17371, Kitson 1001,* and *Unwin & Smythe 37,* adding Gold Coast to the distribution area. In their 1963 work they cite *Small 613* and *Unwin & Smythe 37* from Sierra Leone, *Cooper 321* from Liberia, *Boughey GC.14858* from Ivory Coast, and *Jones & Keay FHI.14236, Mann 2243, Onochie FHI.36163, Ross 234,* and *Talbot 2061 bis* from Southern Nigeria.

Additional citations: LIBERIA: *Adam 27397* (E--2129040); *G. P. Cooper 321* [Herb. Mus. Yale Sch. Forest. 15228] (W--1378491); *Mayer 19* (W--2630358).

VITEX OXYCUSPIS var. *MOSSAMBICENSIS* Mold.

Additional bibliography: Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1967: 62. 1968; Mold., Phytologia 17: 21 & 42. 1968; Mold., Fifth Summ. 1: 253 (1971) and 2: 928. 1971; Mold., Phytologia 34: 261 (1976) and 44: 480. 1979; Mold., Phytol. Mem. 2: 228 & 592. 1980.

Recent collectors refer to this plant as a shrub with a woody base, 30 cm. tall, with opposite long-petiolate leaves with pink veins, and have encountered it in grassland with coconut forest patches.

Additional citations: TANZANIA: Tanganyika: *Harris, Tadros, & Macaulay BJH.5298* (Z).

VITEX PACHYCLADA J. G. Baker

Additional bibliography: Mold., Phytologia 15: 315. 1967; Mold., Fifth Summ. 1: 263 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 252 & 592. 1980.

VITEX PACHYPHYLLA J. G. Baker

Additional & emended bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 317 & 328. 1900; A. Chev., Vég. Util. Afr. Trop. Franç. 9: 281 & 344--345, pl. 25. 1917; Janssonius, Mikrogr. Holz. 812. 1926; Good & Exell, Journ. Bot. 68: Suppl. 144. 1930; Kribs, Comm. For. Woods, ed. 2, 162, fig. 475. 1959; Saint Aubin, Forêt Gabon [194] & 206. 1963; Bouquet, Invent. Pl. Méd. Tox. Cong. Braz. 33. 1967; Mold., Phytologia 15: 315. 1967; Kribs, Comm. For. Woods, ed. 3, 162, fig. 475. 1968; Mold., Fifth Summ. 1: 226 & 227 (1971) and 2: 928. 1971; Hegnauer, Chemotax. Pfl. 6 [Chem. Reihe 21]: 679. 1973; Mold., Phytologia 44: 390. 1979; Mold., Phytol. Mem. 2: 216, 217, 235, & 592. 1980.

Additional illustrations: Kribs, Comm. For. Woods, ed. 2, fig. 475 (1959) and ed. 3, fig. 475. 1968.

Gossweiler refers to this plant as a hydrophyte, 15 m. tall, and encountered it at sealevel, fruiting in August. Vernacular names reported for it are "angona", "evino", and "nto", names all also applied to *V. ciliata* Pierre, as well as "koudou", "evou", and "ewu". Kirk describes the wood as follows: "Color uniform light yellowish or grayish brown. Luster slightly golden. Odor and taste not distinct. Rather light and soft, sp. gr. 0.53 (air dry); weight 33 lbs. per cu. ft. Grain straight to slightly interlocked. Texture medium fine." He also describes it in anatomical detail, commenting that it is used for furniture and cabinet work, interior finish, millwork, veneer, and plywood in Gabon, French Guinea, and Cameroons.

Baker (1900) cites only the type collection, *Mann 994*, from the Gabonese Republic. Good & Exell (1930) cite only *Gossweiler 9199* from Kongo, noting that the species also occurs in "Gaboon and Congo [Zaire]".

The *Krukoff 119*, distributed as *V. pachyphylla*, actually is *V. barbata* Planch.

VITEX PADANGENSIS H. Hallier

Additional bibliography: Mold., Phytologia 15: 315. 1967; Mold., Fifth Summ. 1: 328 (1971) and 2: 928. 1971; Mold., Phytologia 46: 466. 1980; Mold., Phytol. Mem. 2: 319 & 593. 1980.

It seems very possible that this taxon may actually prove to be a species of *Teijsmanniodendron*.

VITEX PANSHINIANA Mold.

Additional synonymy: *Vitex paushiniana* Mold., Phytol. Mem. 2: 459, in syn. 1980.

Additional bibliography: Braga, Fl. Nordest., ed. 2, 338. 1960; Mold., Phytologia 15: 315. 1967; Mold., Résumé Suppl. 17: 12. 1968; Mold., Fifth Summ. 1: 144 & 179 (1971) and 2: 725 & 928. 1971; Mold., Phytologia 23: 418 (1972), 28: 437 (1974), and

34: 280. 1976; Soukup, Biota 11: 20. 1976; Mold., Phytologia 44: 482 & 485. 1979; Mold., Phytol. Mem. 2: 125, 136, 171, 459, & 593. 1980.

Recent collectors describe this plant as a tree, 7.7--20 m. tall, the trunk 30--68 cm. in diameter at breast height, with no buttresses, the bark about 1.3 cm. thick, flaking longitudinally, rather evenly fissured, the wood blaze light-yellowish, darkening rapidly on exposure to air, the flowers visited by many bees, the filaments pale-purple or blue-purple, the anthers dark-gray or dark-brown, the style and stigma pale-purple, and have found it growing in wet tropical forests, in low forests in the transition from cerrado to Amazonian forest, frequent in gallery forests, on open savannas near forest margins, in the transition zone to "seashore forest" islands, and "with treelets between great groups of rocks", at 4--500 m. altitude, in anthesis in August and October. Oldenburger and his associates describe the corollas as "blue purplish or bluish-purple, inner side with clear or dark purple stripes, petals dirty-white or bluish-white, the upper side purplish, the lower side pale yellow-green, inner side of lip blue-purple". The corollas are described by other collectors as: "pale-blue" on *Richards & al. R.501,* "violet" on *Herb. Fr. Guian. Forest Serv. s.n.,*"purple outside, white within" on *Maguire 56153,* and "upper lobe deep-blue, others pale-blue, eye yellow with dark-blue lines" on *Prance & Silva 58615.*

Vernacular names reported for the species are "malocopeici", "quinilla colorada", and "tarumao", the last-mentioned applied to most species of the genus in Brazil. *Arostegui V. 104-I* serves as herbarium voucher for a wood sample collected for the Forest Products Laboratory at Madison, Wisconsin.

Interestingly, Braga (1960) regards the species as a synonym of *V. flavens* H.B.K. Material has been misidentified and distributed in some herbaria as *V. polygama* var. *bakeri* Mold., *Boraginaceae,* and *Sapotaceae!*

Additional citations: SURINAM: *Oldenburger, Norde, & Schulz ON. 323* (N), *ON.360* (N, W--2673788). FRENCH GUIANA: *Herb. Fr. Guian. Forest Serv. s.n.* [4 fevrier 1955] (N). PERU: Loreto: *Arostegui V. 104-I* [muestra 123-AAV & 75-AAV] (Ws, Ws, Ws). BRAZIL: Maranhão: *Prance & Silva 58615* (Ac, N). Mato Grosso: *Maguire, Murça Pires, Maguire, & Silva 56153* (N, N); *Richards, Ratter, Ramos, & Argent R.501* (N). Pará: *Coradin 101* (Ld).

VITEX PANSHINIANA var. *PULCHRA* Mold.

Additional bibliography: Mold., Phytologia 15: 315. 1967; Mold., Fifth Summ. 1: 179 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 171 & 593. 1980.

VITEX PARVIFLORA A. L. Juss.

Additional synonymy: *Cofassus mas* Rumpf, Herb. Amboin. 3: 28, pl. 14, fig. A. 1743. *Cofassus mas seu rubra* Rumpf, Herb. Amboin. 3: 28, pl. 14, fig. A. 1743. *Vitex paraflora* Lamb. & Bruns. ex Mold., Fifth Summ. 1: 725, in syn. 1971. *Vitax parviflora* Juss. ex Mold., Phytol. Mem. 2: 456, in syn. 1980. *Vitex timoriana* Walp., in herb.

Additional & emended bibliography: Rumpf, Herb. Amboin. 3: 28--30, pl. 14, fig. A. 1743; D. Dietr., Syn. Pl. 3: 611. 1843; Walp., Repert. Bot. Syst. 4: 84--85. 1844; Schau. in A. DC., Prodr. 11: 686, 695, & 696. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 501 & 502. 1858; Naves & Fern.-Villar in Blanco, Fl. Filip., ed. 3, 6: pl. 227 (1878) and ed. 3, 4: 160. 1880; Vidal, Sin. Fam. Gen. Pl. Leñ. Filip. [Introd. Fl. For. Filip.] 2: 35--36 & 201, pl. 75C. 1883; Vidal y Soler, Phan. Cuming. Philip. 37, 48, 71, & 134. 1885; E. D. Merr., Fl. Manila, imp. 1, 403 & 404. 1912; Sydow, Ann. Mycol. 12: 551. 1914; W. H. Br., Merr., & Yates, Philip. Journ. Sci. Bot. 12: 240. 1917; Heyne, Nutt. Plant. Ned. Ind., ed. 1, 113--114. 1917; E. D. Merr., Philip. Journ. Sci. Bot. 12: 391. 1917; H. J. Lam in Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 49 & 50. 1921; Kalaw & Sacay, Philip. Agriculturist 14: 427. 1925; Fedde & Schust., Justs Bot. Jahresber. 47 (2): 246. 1927; Peteri, Journ. Chem. Soc. 1939: 1635--1637. 1939; Peteri, Chem. Abstr. 34: 764. 1940; Fedde & Schust., Justs Bot. Jahresber. 60 (2): 576. 1941; Bor & Raizada, Some Beaut. Indian Climb. [136]. 1954; Pételot, Pl. Méd. Camb. Laos Vietn. 2: 250 (1954) and 4: 171. 1954; Natarajan, Phyton 8: 24 & 35. 1957; Estores Anzaldo, Marañon, & Ancheta, Philip. Journ. Sci. Bot. 86: 236. 1958; Hansford, Sydowia Ann. Myc., ser. 2, Beih. 2: 695. 1961; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2277, 2278, & 2280. 1966; Hyland, U. S. Dept. Agr. Pl. Invent. 168: 196. 1967; Tingle, Check List Hong Kong Pl. 38. 1967; Brugues [ed. P. Fernandez], Act. Manil. 4: 73 & 80. 1968; E. D. Merr., Fl. Manila, imp. 2, 403 & 404. 1968; Mold., Phytologia 17: 8, 12, 13, & 21. 1968; Mold., Résumé Suppl. 16: 13. 1968; Uphof, Dict. Econ. Pl., ed. 2, 122, 338, & 545. 1968; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 828 & xix. 1970; B. C. Stone, Micronesica 6: [Fl. Guam] 508 & 509. 1970; Farnsworth, Pharmacog. Titles 5, Cumul. Gen. Ind. 1971; Mold., Fifth Summ. 1: 106, 318, 319, 328, 331, 333, 339, 351, & 374 (1971) and 2: 713, 715--718, 720, 721, 725, 728, 791, & 928. 1971; Mold. in Woodson, Schery, & al., Ann. Mo. Bot. Gard. 60: 131--132 & 148. 1973; Gibbs, Chemotax. Flow. Pl. 3: 1752. 1974; León & Alain, Fl. Cuba, imp. 2, 2: 318. 1974; Mold., Phytologia 31: 412. 1975; Molina R, Ceiba 19: 96. 1975; Zimmerm. & Ziegler in Zimmerm. & Milburn, Transp. Pl. 1 [Pirson & Zimmerm., Encycl. Pl. Physiol., ser. 2, 1]: 503. 1975; Mold., Phytologia 34: 270. 1976; L. H. & E. Z. Bailey, Hortus Third 1162. 1976; Clay & Hubbard, Haw. Gard. Trop. Shrubs 185 & 294. 1977; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40 & 52. 1978; Fosberg, Sachet, & Oliver, Micronesica 15: 239. 1979; López-Palacios, Revist Fac. Farm. Univ. Andes 20: 34. 1979; Mold., Phytologia 44: 348, 404, & 485 (1979) and 46: 26 & 466. 1980; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield, Vasc. Pl. Palau 38. 1980;Mold., Phytol. Mem. 2: 98, 112, 288, 309, 310, 319, 321, 323, 329, 341, 367, 394, 456, 457, & 593. 1980; Mold., Phytologia 48: 456. 1981.

Emended illustrations: Vidal, Sin. Fam. Gen. Pl. Leñ. Filip. [Introd. Fl. For. Filip.] 2: pl. 75C. 1883.

Recent collectors describe this plant as a small or medium-

sized tree, 6--25 m. tall, spreading, the clear bole to 10 m. high, girth to 2 m., the wood strong and hard [or "soft" according to Falanruw], light-brown to straw-yellow, easy to work, the bark papery or scaly, the outer bark greenish or brownish to gray or white, the inner bark yellowish or yellow to greenish-white, reddish or brownish-yellow, the sapwood pale-yellow or yellowish-white, the flower panicles large, the flowers small, delicate, "borne at twig tips", mildly fragrant, and the fruit at first dark-green or greenish, then reddish-yellow, finally blue-black, "a small berry [actually a drupe!] the size of a blueberry". They have found it growing in brownish, sandy black, or coralline soil, in open places near the seashore, open forests, and both primary and secondary forests on hillsides and on ridgetops, from sealevel to 650 m. altitude, in anthesis from July to September and November, in fruit in August, September, and November.

The corollas are described as "blue to purplish" by the Baileys (1976) and are said to have been "light-blue" on *Seibert 1535,* "pale-blue" on *Lambert & Brunson 116* and *Pancho 98,* "lilac-blue" on *Gillis 10996,* "deep-blue" on *Gillis 8389,* "violet" on *Rbalo 257* and *Falanruw 954,* and "blue-purple, the central petal darker" on *López-Palacios 4313.* The Herb. Philip. Lumber Develop. Co. collection, cited below, represents a juvenile form with the leaflets elongate-elliptic and coarsely and antrorsely serrate from the middle to the apex. *Loher 4428* is a mixture with f. *sterilis* H. J. Lam.

Fosberg & al. (1979) list this species from Guam in the Marianas Islands and from "Tor uil" in the Palau Islands. Clay & Hubbard (1977) list it as cultivated in Hawaii, Tingle (1967) as cultivated in Hong Kong, and Molina (1975) as cultivated in Honduras. Stone (1970) refers to it as a Philippine species "evidently introduced lately to Guam". Brown (1917) and Merrill (1917) list it from Volcano island; Gillis found it cultivated in Florida from material brought from the Philippines. Backer & Bakhuizen (1965) say of it: "Native to the Philippines and the eastern part of Malesia; stated to have once been collected near Cheribon [Java]". Rundi asserts that it is "not very common" in Sabah. López-Palacios says that it was "possibly introduced" in Colombia.

Hansford (1961) records the parasitic fungus, *Meliola cookeana* Speg., on this species in the Philippines, based on *Philip. Bur. Sci. 294,* and *M. rizalensis* Syd. based on *Sydow 379, Philip. Bur. Sci. 23971* & *24629.*

Vernacular names recently reported for *Vitex parviflora* are "amugauan", "chaste-tree", "daon kajuh, kulah", "hamolauon", "kajoe koela", "kajuh kulah", "kula", "molabe", "molauin", "molave", "molave chaste-tree", "mulawin", "small-flowered vitex", and "Timor chaste tree".

The Baileys (1976) say that the species is from the "Malay Archipelago, Philippine Islands, and Hawaii" and that its wood is utilitarian. Ebalo notes that it "makes firstclass lumber". Lambert & Brunson refer to it as "one of the most important Philippine woods"; Fernandez (1968) says of it: "a universally ap-

preciated wood because of its unsurpassable qualities for all kinds of solid construction". Uphof (1968) adds "suitable for turnery and household goods". Seibert tells us that it was "introduced into Panama because the wood was used to make railroad ties". Teijsmann (1874) says: "een aftreksel van den bast op Timor wordt gedronken tegen geelen waterzucht". Kalaw & Sacay (1925) report hydrocyanic acid and saponin present in the leaves, bark, roots, and fruit, adding that because of this the bark is used as a fish-poison. Gibbs (1974) reports cyanogenesis present in "probably all parts" of the plant.

Fernandez-Villar (1880) avers that he observed living plants of this species on both Luzon and Panay islands in the Philippines and that it is common around Manila. He regarded "*V. altissima* Naves (non Blanco)" as a synonym of what he called *V. timoriensis* Walp., but both *V. timoriensis* Walp. and *V. altissima* Blanco, as well as *V. altissima* Naves, are now regarded as conspecific with and synonyms of *V. parviflora*, as is also the *V. geniculata* Blanco which he maintains as distinct. It should be noted that Walpers' binomial, *V. timoriensis*, is merely a new name for the *V. littoralis* of Decaisne, which Walpers rightly recognized as being a later and therefore invalid homonym of Cunningham's earlier *V. littoralis* (now known as *V. lucens* T. Kirk). The *Herb. Mus. Paris s.n.* [Timor] specimen in the Torrey Herbarium, cited below, is probably an isotype of *V. littoralis* Decne. and therefore also of *V. timoriensis* Walp.

In regard to the Rumpf pre-Linnean names listed in the synonymy (above) it is worth noting again Rumpf's original statement (1743): "Post Metrosideri species hoc celebre tignum suum obtinet locum, cujus tres nobis obvenere species: Primo mas seu rubra; Secundo alba, seu pallida: Tertio mollis, quae femina esse putatur, quae omnes parum forma, modoque crescendi differunt, excepto lignorum colore". On his plate 14 figs. A and B are drawn as attached to each other! Of these "A" is trifoliolate (probably representing *V. parviflora* A. L. Juss.) while "B" is unifoliolate (probably representing *V. cofassus* Reinw.); "A" is in flower. "B" is in fruit. "A" probably represents *Cofassus mas* Rumpf and *Cofassus mas seu rubra* Rumpf; "B" probably represents *Cofassus alba* Rumpf and *Cofassus femina* Rumpf. "A" is inscribed on the plate as "folia maris" and "B" as "femina".

Decaisne's (1834) original description of his *V. littoralis* is long and detailed, ending with the observation that "Cette espèce voisine du *Vitex Leucoxylon* Linn. fil. s'en éloigne par plusieurs caractères tels que celui des feuilles qui sont toujours au nombre de trois, très glabres, opaques sur les deux faces, noircissant par la dessication, et par des panicules plus étalées. Ces caractères observés sur les échantillons recueillés à Timor, se sont retrouvés exactement les mêmes sur la plante rapportée de de Manille par les naturalistes de l'expédition de la Favorite, qui commandait M. le capitaine Laplace."

Blanco's original description (1837) of his three species, difficult to find in most libraries, is worth repeating in full here: "*Vitex Latifolia*. *Vitex* de hojas anchas. Hojas ternadas. Hoju-

elas oblicuamente aovadas anchas tiesas, alargadas y aguzadas. Peciolos propios cortes. Flores terminales en panoja dicotoma. Cal. pequeñisimo, con cinco diemtecillos. Cor. con el extremo del tubo de figura de campana, bilabiada. El labio superior escotado: el inferior hendido con tres lacinias: la del medio mayor, con lana en la garganta y paladar. Estigma en dos partes. Lo demas, como en las otras especies. = Arbol comun en los montes de S. Mateo. Las hojas son mas anchas que en los otros molabres; y no son blanquecinas por debajo. El uso de esta arbol conocido en las cercanias de Manila, es el mismo que el de sus congeneros, de que hablaré adelante. Flor. en Abr. * T, Molauin, Hamuraon, Bulaon.

"*Vitex Geniculata*. *Vitex* con nudos. Hojas de tres en tres, ó de cinco sobre un peciolo comun. Hojuelas lanceoladas, algo vellosas en las orillas, y vena del medio. Peciolo comun con un nudo acia el medio, desde donde se dobla un poco en otro sentido. Peciolo propio corto. Flores en panoja verticilada. Cal. mui pequeño, derecho, de figura de campana, con tres ó cuatro dientes. Cor bilabiada de figura de campana; el tubo encorvado y ensanchado por arriba. El labio superior escotado: el inferior con tres lacinias: la del medio mayor, con lana en la garganta, y paladadar. Estam. didinamos, vellosos por la parte inferior. Ant. de figura de media luna. Estilo del largo de los estambres. Estigma bifido. Drupa pequeña globosa, con una nuez como en las otras especies. = Este arbol se eleva mas de cincuenta pies, y muchas veces es torcido. Su madera tiene la primacia entre todas las que se conocen en Filipinas, y es de un uso immenso. Se aprecia para todo genero de obras; pero las habitaciones de molabre igualmente que las de ipil ó balayon son mui frias. Su color tira en poco a pagizo, y cuando se le trabaja, despide olor de miel. Es durisima, y vidriosa: y asi se asierra y labra facilmente; pero suele tener nudos, y agugeros: y esta es la mas dura: porque la que es mui limpia, no lo es tanto. Metida en tierra, en el agua, ó en la cal, dura muchismo tiempo. Por lo dicho se ve que el molabe, esa madera tan preciosa, y tan buscada, se da en cualesquierta parte: pues no es otra cosa que lo que conocen todos en al Pais con el nombre de Lagundi, el cual en los bosques se hace mui grande, hasta perder el nombre, y llamarse Molabe. Esta especie que tiene nudo en el peciolo, no es mui comun. Yo la vi en los bosques de S. Jose de Batangas. Las aserraduras finas del molabe, son usadas con exito feliz en las heridas por grandes que sean: y se dejan pegadas á la sangre hasta que se caigan: bien que para estos casos tienen los Indios una lista mui numerosa de remedios, de modo que se puede decir que curan las heridas con cualesquiera cosa, como lo he visto muchas veces. La infusion del leño da un color pagizo bastante bello; pero mui fugaz. * T, Molavin.

Vitex altissima. *Vitex* mui alto. Hojas de tres en tres ó de cinco en cinco, sobre un peciolo comun. Hojuelas lanceoladas enteras, y lampiñas por arriba, y por abajo blanquecinas. Peciolos propios cortos. Flores en panoja verticilada. Fruto como en el *Vitex geniculata*. = Esta especie llamada tambien Molabe, se

hace de primer orden como la anterior. Es comun en casi todos los bosques de las Islas, y las propiedes y usos son los mismos. * T, Molavin, Lagundi".

As Dr. Merrill has pointed out, Blanco's specimens with five leaflets probably represent *Viticipremna philippinensis* (Turcz.) H. J. Lam; only those with three leaflets are the true *Vitex parviflora* A. L. Juss.

Hyland (1967) cites *U. S. Dept. Agr. Pl. Invent. 267710* from Hong Kong, while Hallier (1918) cites *Cunningham 526, DeVriese & Teijsmann s.n., Heyne 1, Spanoghe s.n., Teijsmann 8941 & 8944,* and *Zippelius s.n.* from Timor, *Teijsmann s.n.* from Amboina, *Rosenbluth 12165* from Marinduque, and *Cuming 1365, Hallier 4305b,* and *Vidal 488* from Luzon.

Material of *Vitex parviflora* has been misidentified and distributed in some herbaria as *V. divaricata* Sw., *V. floridula* Duchass. & Walp., *V. peduncularis* Wall., *V. pubescens* Vahl, *V. quinata* (Lour.) F. N. Will., and *Teijsmanniodendron* sp. On the other hand, the *Pancho 28,* distributed as typical *V. parviflora,* is f. *sterilis* H. J. Lam, while *Hu 7870* & *8857* and *Pitty & Ogata SAN.63263* are *V. quinata* (Lour.) F. N. Will., *Fox 99* [Philip. Nat. Herb. 4706] is *V. quinata* var. *puberula* (H. J. Lam) Mold., and *Strandtmann H.156* is *Stachytarpheta dichotoma* (Ruiz & Pav.) Vahl.

Additional citations: COLOMBIA: Antioquia: *López-Palacios 4313* (Ld). THAILAND: *Bunnak 76* [Herb. Roy. Forest. Dept. 9770] (Z). PHILIPPINE ISLANDS: Biliran: *R. C. McGregor s.n.* [Herb. Philip. Bur. Sci. 18860] (W--1238780). Camotes: *Ahern s.n.* [1901] (W--446122, W--446136). Cuyo: *Escritor s.n.* [Herb. Philip. Bur. Sci. 21367] (W--800877). Guimaras: *Gammill s.n.* [Herb. Philip. Forest. Bur. 95] (W--852308). Leyte: *Rosenbluth s.n.* [Herb. Philip. Forest. Bur. 12730] (W--711555). Luzon: *Adduru 90* (W--898695); *Ahern's Collector s.n.* [Herb. Philip. Forest. Bur. 1445] (W--851281); *Banos s.n.* [Herb. Philip. Forest. Bur. 18869] (W--900096); *H. H. Bartlett 14940* (Mi, N); *Borden s.n.* [Herb. Philip. Forest. Bur. 771] (W--625376), *s.n.* [Herb. Philip. Forest. Bur. 2022] (W--625545); *Cuming 1365* (M, Mu--1352); *H. M. Curran s.n.* [Herb. Philip. Forest. Bur. 6887] (W--706071); *Elmer 17286* (W--897399); *Escritor s.n.* [Herb. Philip. Bur. Sci. 21078] (W--900811); *Fénix s.n.* [Herb. Philip. Bur. Sci. 12970] (W--714270); *Hagger 255* (W--1584070); *Herb. Philip. Lumber Develop. Co. s.n.* [Nov. 2, 1902] (W--1584100); *Loher 4427* (Mu--3959, Mu--3960, W--446874), *4428 in part* (Mu), *4429* (Mu--3962, W--446876), *6591* (Mu--4211), *6592* (Mu--4272), *12490* (Mu--4332); *F. Manuel s.n.* [Herb. Philip. Forest. Bur. 23187] (W--1376033); *E. D. Merrill 2084* (W--437033), *2327* (W--437275), *2960* (W--437932); *Otanes s.n.* [Herb. Philip. Bur. Sci. 17984] (W--1238580); *J. V. Pancho 98* (Ba); *C. Reyes s.n.* [Herb. Philip. Forest. Bur. 7476] (Bz--24552, W--595600); *Velasco s.n.* [Herb. Philip. Forest. Bur. 24860] (W--1293785); *H. N. Whitford 886* (W--851823), *906* (W--852753), *1243* (W--852017). Masbate: *W. W. Clark s.n.* [Herb. Philip. Forest. Bur. 2526] (W--852301), *s.n.*[Herb. Philip. Forest. Bur. 2540] (W--852305); *E. D. Merrill 3072* (W--438042), *3079*

(W--438050). Mindanao: *Ahern 504* (W--445365), *s.n.* [1901] (W-- . 445911); *Elmer 11031* (W--779451), *13440* (W--1172252); *E. D. Merrill 5454*(W--710737); *D. P. Miranda s.n.* [Herb. Philip. Forest. Bur. 20545] (W--902692), *s.n.* [Herb. Philip. Forest. Bur. 20561] (W--901620), *s.n.* [Herb. Philip. Forest. Bur. 20565] (W--901523), *s.n.* [Herb. Philip. Forest. Bur. 20573] (W--901630); *Miras, Soriano, & Mariano s.n.* [Herb. Philip. Forest. Bur. 24419] (W--1293390); *Ponce s.n.* [Herb. Philip. Forest. Bur. 22832] (W--1293391); *Wenzel 2759* (Mu). Mindoro: *Bermejos s.n.* [Herb. Philip. Bur. Sci. 1522] (W--439462); *Conklin s.n.* [Philip. Nat. Herb. 18685] (W--2214833); *Ebalo 257* (Mi); *Lambert & Brunson 116* (W--1862426); *E. D. Merrill 2448* (W--437405). Negros: *Cardona s.n.* [Herb. Philip. Forest. Bur. 24220] (W--1376031). Sibuyan: *Elmer 10995* (W--873091). GREATER SUNDA ISLANDS: Sabah: *Binideh 63159* (Ld); *Lajanagah 44560* (Ld); *Pitty & Ogata 63240* (Sn--40927); *Rundi 43001* (Ld); *Tarmiji & Dewal SAN.84157* (Sn--52345). LESSER SUNDA ISLANDS: Timor: *Herb. Mus. Paris s.n.* [Timor] (T); *Smith & Wiles s.n.* [Voyage of the Providence] (W--2887736). MARIANAS ISLANDS: Guam: *Falanruw 954* (W--2676329). HAWAIIAN ISLANDS: Oahu: *L. H. Bailey s.n.* [Sept. 7, 1944] (Ba); *Judd s.n.* [Dec. 10, 1938] (N). CULTIVATED: Florida: *A. Gentry 222* (Ws); *Gillis 8389* (Ac), *8423* (Ft, Ft, Ft, Z), *8553*(Ft, Ft, Dt, Ft, Ft, Ld), *10996* [U. S. Dept. Agr. Pl. Introd. 101451, M.6501] (Ac, Ba); *Landingham 320* (Ne--38669); *H. N. Moldenke 21455* (Ac); *Tomlinson s.n.* [22 Sept. 1968] (Ac, Ft). Guam: *Null & Scully 130* (W--2920644, W--2920645). Hawaiian Islands: *Degener & Degener 30092* (N). Panama: *Seibert 1535* (E--1570768).

VITEX PARVIFLORA var. *PUBERULENTA* Mold.

Synonymy: *Vitex cofassus* var. *timorensis* subvar. *pubescens* H. Hallier, Meded. Rijks Herb. Leid. 37: 48. 1918. *Vitex cofassus* var. *pubescens* H. Hallier ex Mold., Prelim. Alph. List Inv. Names 50, in syn. 1940.

Bibliography: H. Hallier, Meded. Rijks Herb. Leid. 37: 48. 1918; Mold., Prelim. Alph. List Inv. Names 50. 1940; Mold., Phytologia 15: 317. 1967; Mold., Fifth Summ. 1: 318 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 309 & 593. 1980.

It seems most probable that Hallier's plant is the same as the present taxon and since he proposed it as a "Subvariety" his name does not take precedence over mine which was proposed as a variety. His original (1918) description is "Paniculae et plerumque etiam calyces plusminus cinereo-pubescentes". He cites *Hallier 4305, Merritt & Curran 12398,* and *Vidal 489* & *849* from Luzon, *Elmer 10995* from Sibuyan, *Curran 17452* from Negros, *Cenabre 15251* from Cebu, and *Ahern 389, Elmer 11031, 13440,* & *14218, Hallier 4305a,* and *Reillo 16463* from Mindanao. He reports finding it with aborted flowers in January as "mehrere kleine Bäume mit *Oroxylum indicum, Lagerstroemia speciosa* usw. im Busch" and in February as "megrere kleine Bäume mit Früchten und Blüthensrandshexenbesen in Sekundärbusch".

Material has been misidentified and distributed in some herbaria as *V. littoralis* Decne.

Additional citations: PHILIPPINE ISLANDS: Luzon: *Mangubat s.n.*

[Herb. Philip. Bur. Sci. 1361] (W--439813--isotype).

VITEX PARVIFLORA f. *STERILIS* H. J. Lam

Additional bibliography: Mold., Phytologia 15: 317. 1967; Mold., Fifth Summ. 1: 318 & 374 (1971) and 2: 791 & 928. 1971; Mold., Phytol. Mem. 2: 309, 367, & 593. 1980.

This teratologic form of the species obviously has no taxonomic significance whatever, but is so very widely represented in herbaria that the name proposed by Dr. Lam is continued to be used by me purely for convenience. The collections cited below are some of the *Vitex parviflora* collections on which this form has been observed.

Additional citations: PHILIPPINE ISLANDS: Basilan: *W. I. Hutchinson s.n.* [Herb. Philip. Forest. Bur. 6125 in part] (W--595598). Bohol: *R. C. McGregor s.n.* [Herb. Philip. Bur. Sci. 1218] (W--439589). Luzon: *Ahern 37* in part (W--445035, W--445588), *752* (W--445460); *Ahern's Collector s.n.* [Herb. Philip. Forest. Bur. 2158] (W--625988); *Elmer 18089* (W--1237556); *Klemme s.n.* [Herb. Philip. Forest. Bur. 5243 in part] (W--709437); *Loher 4428* in part (Mu--3961, W--446875), *4430* (W--446877), *7289* (Mu--4213); *Mariano s.n.* [Herb. Philip. Forest. Bur. 27153 in part] (W--1294729); *E. D. Merrill 2593* in part (W--437557), *Sp. Blanc. 340* (W--904022); *M. Ramos 16* (Mu--4274); *Rothdauscher s.n.* [Manilla 1879] (Mu--1525). Mindanao: *Ahern 389* [89] in part (W--445289), *s.n.* [Tetuan, 1901] (W--446007), *s.n.* [Sungao 1902] (W--445912); *DeVore & Hoover 272* in part (W--449541); *Elmer 14218* in part (W--1051223); *D. P. Miranda s.n.* [Herb. Philip. Forest. Bur. 17942] (W--568525), *s.n.* [Herb. Philip. Forest. Bur. 18760 in part] (W--900143); *Quadras 344* (W--1584684). Samar: *Lasquety s.n.* [Herb. Philip. Forest. Bur. 23590] (W--1375171). CULTIVATED: Philippine Islands: *J. V. Pancho 28* (Ba).

VITEX PATULA E. A. Bruce

Additional bibliography: Mold., Phytologia 15: 317. 1967; Van der Schijff, Check List Vasc. Pl. Kruger Natl. Park 81. 1969; Palmer & Pitman, Trees South Afr., ed. 2, 3: 1951, 1960, & 1962. 1972; Mold., Fifth Summ. 1: 253 & 258 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 242, 247, & 593. 1980.

Illustrations: Palmer & Pitman, Trees South. Afr., ed. 2, 1960. 1972.

Palmer & Pitman (1972) state that "*Vitex patula*, literally 'the spreading vitex', grows in the northern Transvaal where it is common on the slopes of the Soutpansberg, in the eastern Transvaal, and in northern Zululand, in mixed bushveld, on wooded rocky slopes, and sometimes on sandy flats. It is a fairly common species in the Mkuze and Ndumu Game Reserves in Zululand. It also occurs in Mozambique. It is usually a small, bushy tree with spreading branches, up to about 6 m tall, although one collector describes it as a 'tall, thin little tree with a rough stem up to 6 inches diameter'. The foliage is light green -- the young growth red-gold -- the twigs hairy and knobbly....The fruit...is ..a shiny green with white spots, becoming black, with a shallow,

5-toothed calyx. It ripens in the late autumn and is eaten by birds and monkeys. This species is closely allied to *Vitex amboniensis* which, however, most often has 5 and not 3 leaflets which are stalked, narrower and usually more pointed and more densely hairy."

Van der Schijff (1969) cites from Kruger National Park his *nos. 761, 3668, 3690,* & *3732, Codd 4227* & *5319,* and *"Lam." 27* & *45.*

VITEX PAUCIDENTICULATA Kutuzkina, Paleont. Journ. Akad. Nauk USSR 3: 156--158, fig. 1. 1970.

Bibliography: Kutuzkina, Paleont. Journ. Akad. Nauk USSR 3: 156--158, fig. 1 & 2. 1970; Tsagareli, Bull. Acad. Sci. Georgian SSR 78:383--384. 1975; Anon., Biol. Abstr. 61: Acl.733. 1976; "H. R.", Biol. Abstr. 61: 2221. 1976; Mold., Phytologia 45: 485. 1980; Mold., Phytol. Mem. 2: 369 & 593. 1980.

Illustrations: Kutuzkina, Paleont. Journ. Akad. Nauk USSR 3: 157, fig. 1. 1970.

This fossil species is known thus far only from the original collections in the Upper Sarmat Formation, of Upper Miocene age, in Russia.

VITEX PAYOS (Lour.) Merr.

Additional synonymy: *Vitex guerkeana* "Engl. ex Eyles." apud Palmer & Pitman, Trees South. Afr. 3: 1962, in syn. 1972. *Vitex payo* Good, Biol. Abstr. 55: 6069, sphalm. 1973.

Additional & emended bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 316 & 326. 1900; E. D. Merr., Trans. Am. Phil. Soc., ser. 2, 24 (2): 334 & 444. 1935; Wild & Gelfans, Cent. Afr. Journ. Med. 5: 292--305. 1959; Dale & Greenway, Kenya Trees Shrubs 593 & 597. 1961; Amico, Webbia 22: 489, 498, 500, & 501, pl. 35. 1967; Mold., Phytologia 15: 317--319. 1967; Hyland, U. S. Dept. Agr. Pl. Invent. 172: 303. 1968; Mold., Résumé Suppl. 16: 29 (1968) and 17: 8. 1968; Greenway, Journ. East Afr. Nat. Hist. Soc. 27: 176 & 196. 1969; Gillett, Numb. Check-list Trees Kenya 47. 1970; Mold., Fifth Summ. 1: 232, 239, 240, 245, 247, 249, 250, 253, 254, 374, & 386 (1971) and 2: 531, 717--719, 725, 727, 728, 731, 769, 928, & 969. 1971; Lopes & Oliveira, Agron. Moçamb. 6: 73, 75, & 79--81. 1972; Palmer & Pitman, Trees South. Afr. 3: 1951 & 1962--1963. 1972; Anon., Biol. Abstr. 55 (11): B.A.S.I.C. S.275. 1973; Farnsworth, Pharmacog. Titles 8 (8): xxiii. 1973; Good, Biol. Abstr. 55: 6069. 1973; Jacobsen, Kirkia 9: 172. 1973; Mold., Phytologia 25: 235 (1972), 28: 465 (1974), 44: 390 (1979), and 45: 494. 1980; Mold., Phytol. Mem. 2: 221, 228, 230, 231, 235, 236, 238, 239, 242, 243, 367, 459, & 593. 1980; Mold., Phytologia 48: 465. 1981.

Additional illustrations: Amico, Webbia 22: 489, pl. 35. 1967.

Recent collectors describe this species as a stiffly branched shrub, 2 m. tall, or a small tree, 3--8 m. tall, growing in groups, the trunk single, the bark brown, smooth or rough, striated or corrugated, the sap colorless, the petioles hairy, the leaf-blades leathery, soft to touch, dull-green beneath and hairy on the prominent veins, the upper surface "darker and veins subcurrent",

the flowers slightly aromatic, "in clusters at ends of long stems", and have encountered it in open or thick dry hillside forests on black or red sandy-loam soil, among granite rocks at the tops of kopjes, and along roadsides, from sealevel to 1250 m. altitude, in anthesis from December to February, and in fruit in January and April. The corollas are described as "white with a violet-bluish lower lip" by Gürke (1895) and are said to have been "white and very pale mauve" on *Tanner 2554,* "white and blue" on *Tanner 2605,* "mauve" on *Tanner 2523*, "white with one mauve petal" on *Johnstone 91,* and "yellow" on *Tanner 3877a*.

Lovemore reports that "typically the trunk has the appearance of having been cleaned of all bark by termites" in Zimbabwe. Hornby reports the species occasional with *Pseudolachnostylis naprouneaefolia* and *Diospyros kirkii* in *Brachystegia-Isoberlinia* woodlands. Amico (1967) records it from Zambezia in Mozambique, while Jacobsen refers to it as rare on graphitic slates and termitaria in thickets in Zimbabwe. Hyland (1968) reports it cultivated in Maryland as *U. S. Dept. Agr. Pl. Introd. 302762,* grown from seed imported from Zimbabwe. Greenway (1969) asserts that it is a rare tree in Tsavo East National Park, citing *Greenway & Kabwie 12630*. Dale & Greenway (1961) describe the fruit as edible and assert that the tree is an inhabitant of coastal savannas in Kenya, citing *Elliot 1680, Graham 1731,* and *Kirk 149*. My wife and I observed it in cultivation at the Karen home of Mr. & Mrs. Sidney Downey in Kenya in August, 1972 -- they stated that it had been on the grounds there when they purchased the estate and had never known its name.

Vernacular names reported for *Vitex payos* include "chikubai", "mfu", "mfudu". "mfufu", "mfuu", "mgobe", "mkoko", "mpulu", "m'purre", "muhubva", "mukubvu", "mutsubvu", "mwengere", "umbalebale", "umbindolo", "umchangwela", and "umtshwankela".

Watt & Breyer-Brandwijk (1962) assert that the flesh of the fruit has a distinctive flavor and is much eaten by the natives in Zimbabwe, saying also that "it contains no ascorbic acid". Tanner reports that the roots and bark are boiled and the resulting liquid is drunk to alleviate pain "in the lower stomach" connected with constipation. Lopes & Oliveira (1972) report on the chemical composition of the plant and its food value, finding that the "high energy value and high niacin content are comparable to those of tropical fruits of the same type".

The species is easily confused with *V. mombassae* Vatke, but that species has a brownish-appearing inflorescence and larger flowers, while in *V. payos* the inflorescence has a decided canescent appearance and the flowers are smaller.

Palmer & Pitman (1972) remark that "Until recently *Vitex payos* was held to be distinct from *Vitex hildebrandtii*. White, however, in his Flora of Northern Rhodesia considers them as inseparable.... the distribution and ecology of the species are imperfectly known. It is a tropical east African species and there are records -- whether authentic or not is not clear -- of the tree in the Caprivi and in Botswana.....The specific name *payos* was given by J. de Loureiro, a Portuguese Jesuit priest, who visited Mozambique in

the 1780's on his way from China to Europe. He collected botanical specimens there, and it is probable that he found the tree near the river Payosi, a small tributary of the Zambesi, and that the specific name is based on the name of the river."

The *Eyles 1201,* cited below, is the type collection of *Vitex eylesii* S. Moore. *Swynnerton 34* is cited by Pieper (1928) as one of the several cotypes of his var. *glabrescens,* but the leaves on at least the U. S. National Herbarium specimen of this collection are extremely densely hairy with long ochraceous hair and so it would seem that this collection (in part, at least) should not be regarded as typical of the variety.

Material of *V. payos* has been misidentified and distributed in some herbaria as *V. isotjensis* Gibbs and even as *Torenia mannii* Skan, but the latter surely as the result of the mixing of labels during mounting since this name applies to *Tanner 2533,* not to *Tanner 2523.*

Additional citations: TANZANIA: Tanganyika: *Holst 2101* (Mu--1794); *Tanner 2523* (Ba), *2554* (Ba, N), *2605* (Ba, N), *3877* (Ba), *3877a* (N), *3957* (Ba, N); *Wingfield 3361* (Ld). KENYA: *B. C. Stone 7936* (Kl--10570, W--2584494A). ZIMBABWE: *Dehn 509* (Mu--painting); *Eyles 1201* [Mo. Bot. Gard. photos A.853] (Go--photo, N--photo, W--photo, Z--photo); *Fries, Norlindh, & Weimarck 3205* (Mu); *Hornby 3222* [Govt. Herb. Salisb. 32894] (N); *Johnstone 91* (Mu); *Leach 9693* (Mu); *Lovemore 38* [Govt. Herb. Salisb. 33175] (N); *Mullin 62/51* [Govt. Herb. Salisb. 32666] (N); *Whellan 473* [Govt. Herb. Salisb. 31206] (N); *Wuiwood-Smith 21359* (Mu). MOZAMBIQUE: Gazaland: *Swynnerton 34* in part (W--945790).

VITEX PAYOS var. *GLABRESCENS* (Pieper) Mold.

Additional bibliography: Fedde & Schust., Justs Bot. Jahresber. 57 (2): 403. 1938; Mold., Phytologia 15: 318--319. 1967; Mold., Fifth Summ. 1: 232, 239, 249, 250, 253, & 254 (1971) and 2: 719, 731, & 928. 1971; Mold., Phytol. Mem. 2: 221, 228, 238, 239, 242, 243, & 593. 1980; Mold., Phytologia 48: 465. 1981.

Recent collectors describe this plant as a small savanna tree, 1--6.5 m. tall, with densely pubescent branchlets, coriaceous, 3--5-foliolate leaves, plum-sized drupes, 2.5 cm. in diameter, shiny and green with many lighter spots [when immature?], and have encountered it on savanna grasslands with thickets, at 80 m. altitude, in fruit in March and April.

Material of this taxon has been misidentified and distributed in some herbaria as *V. mombassae* Vatke. The *Swynnerton 34,* cited by Pieper (1928) seems in part, at least, to represent typical *V. payos* (Lour.) Merr.

Additional citations: TANZANIA: Tanganyika: *B. J. Harris 2827* (Ac); *Lemboko 26* (Ld).

VITEX PAYOS var. *STIPITATA* Mold.

Additional bibliography: Mold., Phytologia 15: 1967.

VITEX PAYOS var. *ZAMBESIACA* (J. G. Baker) Mold.

Additional bibliography: Fedde & Schust., Justs Bot. Jahresber.

57 (2): 403. 1938; Mold., Phytologia 15: 319. 1967; Mold., Fifth Summ. 1: 253 (1971) and 2: 719, 731, & 928. 1971; Mold., Phytol. Mem. 2: 242 & 593. 1980.

VITEX PEARSONII Pieper

Additional bibliography: Fedde & Schust., Justs Bot. Jahresber. 57 (2): 404. 1938; Mold., Phytologia 15: 319. 1967; Mold., Fifth Summ. 1: 253 (1971) and 2: 718 & 928. 1971; Mold., Phytol. Mem. 2: 242 & 593. 1980.

VITEX PEDUNCULARIS Wall.

Additional synonymy: *Vitex morana* Hamilt. ex D. Dietr., Syn. Pl. 3: 611, in syn. 1843. *Vitex peduneularis* Das, Indian Forest. 101: 556, sphalm. 1975.

Additional & emended bibliography: D. Dietr., Syn. Pl. 3: 611. 1843; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; Prain, Bengal Pl., imp. 1, 832 & 833. 1903; Brandis, Indian Trees, imp. 1, 505. 1906; Kirtikar & Basu, Indian Med. Pl., ed. 1, 3, 1936, & 1941, pl. 741. 1918; Troup, Silvicult. Indian Trees 2: 776 & 777. 1921; Haines, Bot. Bihar Orissa, ed. 1, 4: 711 & 712. 1922; Hubert, Rév. Bot. Appl. 2: 282. 1922; Bodding, Mem. Asiat. Soc. Beng.10: 12, 40, 68, & 88 (1925) anf 10: 187 & 245. 1927; Stapf, Ind. Lond. 6: 479. 1931; Fletcher, Kew Bull. Misc. Inf. 1938: 405, 432, & 436. 1938; Kanjilal, Das, & al., Fl. Assam 3: 480, 484--485, & 561. 1939; Biswas, Indian Forest Rec., ser. 2, Bot. 3: 42. 1941; H. N. & A. L. Mold., Pl. Life 2: 79. 1948; Sharma, Journ. Sci. Ind. Res. 14B: 267--270. 1956; Puri, Indian Forest Ecol. 189. 1960; Brooker & Cooper, N. Zeal. Med. Pl. 36. 1961; Haines, Bot. Bihar Orissa, ed. 2, 2: 745--747. 1961; Mold., Phytologia 8: 72. 1961; Gaussen, Legris, & Viart, Ind. Counc. Agr. Res. Map Ser. 2: 33. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2277. 1966; Yamazaki in Hara, Fl. East. Himal. 270. 1966; Kariyone, Ann. Ind. Rep. Pl. Chem. 1962: 136. 1967; R. E. Alston in Mabry, Recent Adv. Phytochem. 1: 311. 1968; Badhwar & Fernandez, Edible Wild Pl. Himal. 284. 1968; Das, Pakist. Journ. Forest. 18: 308 & 311. 1968; Deb, Indian Forest. 94: 756 & 765. 1968; Mold., Phytologia 17: 9 & 21--22. 1968; Mold., Résumé Suppl. 16: 10 & 29. (1968) and 17: 5. 1968; Uphof, Dict. Econ. Pl., ed. 2, 545. 1968; Sawyer & Chermsir., Nat. Hist. Bull. Siam Soc. 23: 126. 1969; Agarwal, Woodyield. Pl. India 67. 1970; Farnsworth, Pharmacog. Titles 5 (9): vii & item 9509. 1970; Jain & Tarafder, Econ. Bot. 24: 266. 1970; Brandis, Indian Trees, imp. 2, 505. 1971; Farnsworth, Pharmacog. Titles 5: Cum. Gen. Ind. (1971) and 6 (1): xvii & title 1370. 1971; Mold., Fifth Summ. 1: 269, 271, 279, 284, 285, 298, 303, & 374 (1971) and 2: 712, 722, 725, 726, 928, & 970. 1971; Mold., Phytologia 23: 423. 1972; Rollet, Bois For. Trop. 145: 33 & 34. 1972; Farnsworth, Pharmacog. Titles 6: Cum. Gen. Ind. [122]. 1973; Hegnauer, Chemotax. Pfl. 6 [Chem. Reihe 21]: 663. 1973; Mold., Phytologia 28: 445, 452, & 465. 1974; Das, Indian Forest. 101: 556. 1975; Mold., Phytologia 35: 275. 1977; Khosla & Sareen, Indian Journ. Forest. 1: 174. 1978; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 52. 1978; Sharma, Shetty, Vivekan., & Rathak., Journ. Bomb. Nat. Hist. Soc. 75: 33. 1978; Mold., Phytologia 44:

355, 356, & 358 (1979) and 46: 17 & 27. 1980; Mold., Phytol. Mem. 2: 256, 266, 271, 274, 275, 288, 289, 294, 367, 457, 459, 460, & 593. 1980; Mold., Phytologia 49: 373. 1981.

Recent collectors describe this plant as a "small" tree, 4--32 m. tall, the trunk 30--35 cm. in diameter at breast height and 140 cm. in circumference, the inflorescence axes light- or yellow-green, the flowers not odorous or with a slight sweetish odor, the calyx yellow-green, the lobes brown or white, the corolla-buds light-yellow, and the fruit at first green, then black. Young plants and those from watersprouts have the petioles winged and the leaflets serrate. Maxwell refers on the labels of some of his collections to "inflorescence axes, corolla, and fruit light-green" -- on his *no. 76-293* the corollas are said to have been "white with a yellow spot", while on *Larsen & Larsen* they were "purplish", on *Judd s.n.* "light-blue". on *Squires 777* "light-pink to white", on *Squires 861* "white", and on *Majumder & Islam 24493* "yellow". Judd mistakenly refers to the fruits as "berries" -- actually they are drupes.

Collectors have encountered this tree in deciduous, open or dry evergreen, semidense or deciduous dipterocarp (*Dipterocarpus obtusifolius* & *D. tuberculatus*), rocky deciduous, and mixed forests, often growing in red-brown gravelly-sandy clay soil or even in the open sunlight, at 100--1000 m. altitude, in anthesis from March to June, and in fruit from May to September and December.

The type of the species was collected at or near Moulmein, Burma. Sharma and his associates (1978) refer to the tree as a common one, with white "flowers" [corollas] in Tamil Nadu, citing *Vivekananthan 40805*. Das (1975) asserts that it comprises 6.4--16 percent of the individuals of all tree species in the mixed deciduous forests was "sal" (*Shorea robusta*) in the South Kamrup area of India. Puri (1960) found it associated with *Clerodendrum* and *Gmelina* in moist tropical deciduous "sal" forests of Assam. Sawyer & Chermsirivathan (1969) report it infrequent to common in Thailand. Yamazaki (1966) gives its natural distribution as the eastern Himalayas, Burma, Indochina, and Malaya. Kanjilal and his associates (1939) aver that it occurs throughout Assam and assert that "petioles winged in coppice shoots; wood very hard, used for posts, oil-mill pestles, yokes, etc." Prain (1903) records it from Orissa, Chota Nagpur, Bihar, and Chittagong. Clarke (1885) cites unnumbered Roxburgh and Wallich collections and gives its distribution as "Assam and Bengal to Tenasserim, frequent".

Fletcher (1938) cites from Thailand: *Haniff & Nur 4242, Kerr 34, 34a, 572, & 5275, Put 2788, Vanpruk 300,* and *Winit 255,* listing the species also from Burma and Indochina. Troup (1921) describes it as "A moderate-sized to large tree with trifoliate leaves, the petioles being winged in young plants and coppice-shoots. Wood hard, close-grained, used for posts and beams, yokes, &c. A tree of the eastern sub-Himalayan tract, Assam, Chota Nagpur, Orissa, and the Circars; common in upper mixed and tropical forests in many parts of Burma. Haines says that in Chota Nagpur it occurs in Singbhum and Gangpur, especially along streams, but also on rocky northern slopes, and that in Manbhum and Hazaribagh it is very common and

attains large size on the northern slopes of Parasnath; also in Koderma, Palamau, and the Santal Parganas (frequent). Flowers, March--June; fruits, August--September. The fruit is a small drupe with a 3- or 4-celled stone. Growth, according to Gamble, 6 to 8 rings per inch of radius, giving a mean annual girth increment of 0.78 to 1.05 in."

Agarwal (1970) asserts that it "Grows in Bengal, Assam, Bihar, Orissa, extending South up to Godavari & in West Pakistan & Burma. Wood reddish grey to light brown, very heavy, even textured, can be seasoned slowly, susceptible to insects, not very durable, polishes well; Wt. 27.40 kgms/cft. Used generally for agricultural implements, in Burma for harrows, wells, sugarcane crushers, rice pounders, mortars, oars & carving, and in Assam for beams in buildings."

Vernacular names recorded for the species include: "ahul", "ashol", "ashot", "asiltol", "awal", "boruna", "goda", "ing-het-lunghin", "jadhgach", "khelreng-thing", "khoidol", "kyetyo", "osai", "pazin-nyo", "rang-ngi", "rangri", "shelong-phang", "shilangri", "sila", and "sila-tita".

Khosla & Sareen (1978) report the chromosome number as 4x = 32, 34. The chemical structure of the vitexin in this species is discussed by Kariyone (1967).

As to medicinal uses, Jain & Tarafder (1970) report its use in treating whitlow, spleen complaints, muscular pains, stab wounds, dysentery, and bone fractures. Uphof (1968) tells us that it is recommended as a febrifuge in India and Burma. Deb (1968) asserts that the bark and leaves are used medicinally in Tripura (Pakistan), where Das (1968) claims that it grows in association with *Stereospermum personatum, Duabanga sonneratioides, Sterculia villosa,* and *Salmalia* spp. Badhwar & Fernandez (1968) aver that in the Himalaya Mountains it is used locally in cases of blackwater fever. Brooker & Cooper (1961) record its use in India in the treatment of various fevers and for antihaemolytic activity against cobra venom.

Material of *Vitex peduncularis* has been misidentified and distributed in some herbaria as *V. leucoxylon* L. f., *V. littoralis* A. Cunn., *V. lucens* T. Kirk, and *V. pierriana* Dop. On the other hand, the *Bunnak 76* [Herb. Rpy. Forest. Dept. 9779], distributed as *V. peduncularis* and so cited by me in 1957, actually is *V. parviflora* A. L. Juss.

Additional citations: INDIA: Assam: *Hooker & Thomson s.n.* [Khasia] (Pd); *Jenkins s.n.* [Assam] (Mu--671). Chota Nagpur: *Haines 321* (Mu--3990). State undetermined: *Brandis s.n.* [Pesa] (Pd). BANGLADESH: *Griffith 6061* (Mu--669); *Majumder & Islam 24493* [44] (Ws, Ws). BURMA: Upper Burma: *Herb. Burma Forest School 9* (E--1276707, E--1284615); *Mokim s.n.* [Kachin Hills, 1897] (Mu--3743). Lower Burma: *Wallich 1753* (Pd). Tenasserim: *Falconer 501* (Mu--670, Z), *509* (Mu--651). THAILAND: *R. M. King 5461* (W--2435877); *Larsen & Larsen 33677* (Ac), *33951* (Ac, Ld); *Larsen, Santisuk, & Warncke 2770* (Ac, Ld); *Maxwell 75-342* (Ac), *76-293* (Ac); *Van Beusekom & Phengkhlai 1307* (Ac). INDOCHINA: Annam: *Squires 777* (Mu), *861* (Mu). Cambodia: *Pierre 549* (W--

2602860). CULTIVATED: Hawaiian Islands: *Judd s.n.* [Dec. 1, 1930] (Mu). India: *Wallich 1752/3* (Pd). LOCALITY OF COLLECTION UNDETERMINED: *Herb. Zuccarini s.n.* (Mu--3901).

VITEX PEDUNCULARIS f. juv. *ROXBURGHIANA* (C. B. Clarke) Mold., Phytologia 37: 275. 1977.

Synonymy: *Vitex alata* Roxb. ex Willd. in Rottl., Gesell. Naturforsch. Freunde Berl., ser. 2, 4: 203. 1803 [not *V. alata* Heyne, 1821, nor Royen, 1940, nor Schau., 1885, nor Wall., 1947, nor Willd., 1803]. *Vitex roxburghiana* Kanjilal in Kanjilal & al., Pl. Assam 485. 1939.

Bibliography: Rheede, Hort. Ind. Malab. 5: pl. 1. 1685; Willd. in Rottl., Gesell. Naturforsch. Freunde Berl., ser. 2, 4: 203. 1803; Roth, Nov. Pl. Sp. 316. 1821; Wall., Numer. List [48], no. 1752 (1829) and 86. 1831; Roxb., Fl. Ind., ed. 2, imp. 1, 3: 72. 1832; Schau. in A. DC., Prodr. 11: 685. 1847; Voigt, Hort. Suburb. Calc. 469. 1845; Buek, Gen. Spec. Syn. Candoll. 3: 501. 1858; Dalz. & Gibs., Bombay Fl. 201. 1861; Roxb., Fl. Ind., ed. 2, imp. 2, 482. 1874; Kurz, Forest Fl. Brit. Burma 2: 272. 1877; Campbell & Watt, Descrip. Cat. Econ. Prod. Chutia Nagpur No. 9281. 1881; Gamble, Man, Indian Timb., ed. 1, 298 & 522. 1881; Watt, Econ. Prod. India 7: 254. 1883; C. B. Clarke in Hook. f., Fl. Brit. India 4: 587. 1885; Lisboa, Useful Pl. Bombay 201. 1886; Watt, Dict. Econ. Prod. India 6 (4): 250. 1893; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 1213. 1895; Gamble, Man. Indian Timb., ed. 2, 541. 1902; Prain, Bengal Pl., imp. 1, 2: 832. 1903; Troup, Silvicult. Indian Trees 2: 777. 1921; Haines, Bot. Bihar Orissa 4: 711 & 712 (1922) and 6: 712. 1924; Bodding, Mem. Asiat. Soc. Beng. 10: 285. 1927; Kanjilal & al., Fl. Assam 3: 485 & 561. 1939; Mold., Suppl. List Comm. Names 3, 4, 8, 9, 12, 14--16, & 20. 1940; Mold., Prelim. Alph. List Inv. Names 49. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 55 & 104. 1942; Mold., Alph. List Inv. Names 52. 1942; Mold., Phytologia 2: 121. 1944; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 2, 2: 1213. 1946; H. N. & A. L. Mold., Pl. Life 2: 79. 1948; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 125, 128, 129, & 202. 1949; Metcalfe & Chalk, Anat. Dicot. 1036. 1950; Mold., Phytologia 6: 51--52. 1957; Seshagiri Rao, Journ. Bombay Nat. Hist. Soc. 55: 438 & 439. 1958; Mold., Résumé 159, 165, 166, 380, & 477. 1959; Jacks.in Hook. f. & Jacks., Ind. Kew., imp. 3, 2: 1213. 1960; Prain, Bengal Pl., imp. 2, 2: 621 & 622. 1963; Mold., Phytologia 15: 320 (1967) and 17: 22. 1968; Jain & Tarafder, Econ. Bot. 24: 266. 1970; Farnsworth, Pharmacog. Titles 6 (1): xvii & title 1370. 1971; Mold., Fifth Summ. 1: 269, 279, & 284 (1971) and 2: 712, 928, & 970. 1971; Roxb., Fl. Ind., ed. 2, imp. 3, 482. 1971; Mold., Phytologia 28: 465 (1974), 37: 275 (1977), and 44: 355, 356, & 358. 1979; Mold., Phytol. Mem. 2: 266, 271, 274, 367, 457, 459, 460, & 593. 1980.

This is a juvenile form of the species, with no taxonomic significance, found also on watersprouts or "coppice-shoots" from older stumps, with the petioles conspicuously and often broadly winged. Roxburgh (1832) describes it as a separate species, *V. alata* "native of Chittagong, where it grows to be a large tree. From thence it

was introduced by Dr. Buchanan into the Botanic garden at Calcutta, where it blossoms in the month of April.....Leaves ternate; leaflets lanceolate . Petiole winged. Panicles axillary...Trunk straight, decorated with numerous, spreading and ascending branches, whole height of tree ten years old, about thirty feet. Bark smooth, of a dark, brownish, ash-colour. Leaves opposite, ternate. Leaflets lanceolate, smooth, entire, about six inches long. Petioles winged, particularly while the trees are young, about three or four inches long. Panicles axillary, solitary, erect, brachiate, with ramifications dichotomous, and a sessile flower in each division. Flowers numerous, pale yellow, tinged with very little blue. Calyx campanulate. Border unequally five-toothed. Corol, the middle lobe of the upper lip large, in proportion to its lateral lobes; the under lip two-parted, and small. Anthers thin, and of a bluish colour. Berry round, smooth, pulpy, when ripe purple, and the size of a marrow-fat pea. Nut turbinate, furrowed, four-celled, with a single seed in each." The fruit, of course, is a drupe, not a berry. Numerous other, even quite recent, authors maintain this taxon as a species.

Prain (1903), reporting it from Chota Nagpur, as well as Bihar and Chittagong, refers to its as "A considerable tree". Jain & Tarafder (1970) also list it from Bihar. Clarke (1885) describes the plant as a variety "less grey-pubescent, petioles winged, panicles lax few-fld.", citing unnumbered collections of Edgeworth [Behar, at Parasnath], Hooker f. & Thomson [E. Bengal and Khasia Terai], and Kurz [Pegu], noting that "Roxburgh quotes (for his Chittagong *V. alata*) Rheede Hort. Mal. c. t. 1, which has leaves that might do, but a totally different inflorescence, and is Heyne's *V. alata*."

Voigt (1845) also reports the plant in cultivation in Calcutta. Prain (1902) lists the vernacular names, "badu marak", "boruna", "goda", "kamrup", "krawru", and "nowgong". Jain & Tarafder (1970) assert that it is used in local medicine in treating the bite of a rabid dog or jackal. Kanjilal and his associates (1939) report an infusion of the leaves ("for this and/or its varieties") used as a specific for blackwater fever in Assam. It seems quite obvious that most, if not all, of the above information applies to typical *Vitex peduncularis* Wall. as well as to this form.

The Silva specimen, cited below, exhibits not only alate petioles but also serrate leaflet-blades.

Additional citations: CULTIVATED: Sri Lanka: *Silva 1002* (Pd).

VITEX PENTADACTYLA Velenovsky

Additional bibliography: Stopes, Cat. Mesoz. Pl. 225. 1913; Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 376 (1971) and 2: 928. 1971; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 44. 1978; Mold., Phytol. Mem. 2: 369 & 593. 1980.

VITEX PENTAMERA Engelhardt

Additional bibliography: Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 376 (1971) and 2: 928. 1971; Tsagarela, Bull. Acad. Sci. Georgian SSR 78: 383. 1975; Anon., Biol. Abstr. 61: ACL.733.

1976; Mold., Phytologia 45: 485. 1980; Mold., Phytol. Mem. 2: 369 & 593. 1980.

VITEX PERRIERI Danguy

Additional bibliography: Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 263 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 248, 252, & 593. 1980.

VITEX PERVILLEI J. G. Baker

Additional bibliography: Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 259 & 263 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 248, 252, & 593. 1980.

Gentry refers to this plant as a shrub, 3 m. tall, in green [immature] fruit in May, and found it growing at 200 m. altitude.

Additional citations: MADAGASCAR: *A. Gentry 11457* (E--2740064).

VITEX PERVILLEI var. *PUBESCENS* Mold.

Additional bibliography: Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 263 (1971) and 2: 928. 1971; Mold., Phytol. Mem. 2: 252 & 593. 1980.

VITEX PETERSIANA Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 264. 1861.

Additional & emended bibliography: Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 256 & 264. 1861; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 316 & 320--321. 1900; Fedde & Schust., Justs Bot. Jahresber. 57 (2): 402. 1938; Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 247, 249, & 253 (1971) and 2: 719, 728, & 928. 1971; Mold., Phytol. Mem. 2: 236, 238, 242, & 593. 1980.

Gürke (1895) records this plant from Tette (Mozambique), where it grows on sandy and rocky land and where bows and arrows are made from its wood. Gilges describes it as a small tree, growing in the bush, in flower in December.

Additional citations: ZAMBIA: *Gilges 691* (Mu). ZIMBABWE: *Lovemore 179* [Govt. Herb. Salisb. 35109] (N).

VITEX PETERSIANA var. *TETTENSIS* (Klotzsch) Pieper

Emended synonymy: *Vitex tettensis* Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 264--265. 1861.

Additional & emended bibliography: Klotzsch in Peters, Naturwiss. Reise Mossamb. 6 [Bot.] 1: 264--265. 1861; Fedde & Schust., Justs Bot. Jahresber. 57 (2): 402. 1938; Mold., Phytologia 15: 321. 1967; Mold., Fifth Summ. 1: 249 & 253 (1971) and 2: 728 & 928. 1971; Mold., Phytol. Mem. 2: 242 & 593. 1980.

Pieper (1928) classifies this taxon in his Subgenus *Euvitex,* Section *Axillares,* Subsection *Cymosae*.

VITEX PHAEOTRICHA Mildbr.

Additional synonymy: *Vitex phaeotricha* "Mildbr. ex Pieper" ex Mold., Phytol. Mem. 2: 459, in syn. 1980.

Additional bibliography: Fedde & Schust., Justs Bot. Jahresber. 57 (2): 402. 1938; Mold., Phytologia 17: 22. 1968. [to be continued]

NOTES ON NEW AND NOTEWORTHY PLANTS. CLI

Harold N. Moldenke

PAEPALANTHUS DICHOTOMUS var. *PUMILUS* Mold., var. nov.

Planta perpumila ca. 1 cm. alta, foliis linearibus 2--3 mm. longis 0.5 mm. latis apicaliter obtusis ubique glabris vel sparsissime pilosis, pedunculis 0.5--0.9 cm. longis subglabratis.

An extremely depauperate plant, reaching a total height of only about 1 cm., the leaves abundant, linear-oblong, 2--3 mm. long, apically very obtuse or rounded, bright shiny-green, glabrous or very sparsely and obscurely pilose toward the base, peduncles 5--9 mm. long, very slightly surpassing the sheath, glabrate or microscopically puberulous.

The type of this variety was collected by H. E. Moore, Jr., J. D. Ambrose, R. E. Dietz IV, and D. H. Pfister (*no. 9632*) in a wet savanna with thin soil over white sand, at about 1200 m. altitude. northwest of Misión de Santa Teresita de Kavanayén on the jeep trail to Haito, Bolívar, Venezuela, on August 9, 1970, and is deposited in my personal herbarium.

PAEPALANTHUS FRATERNUS var. *MARAHUACENSIS* Mold., var. nov.

Haec varietas a forma typica speciei recedit inter aliis bracteis involucrantibus anguste lanceolatis stramineis gradatim apicaliter angustatis.

This variety differs, among other things, in having its involucral bracts narrowly lanceolate, pale-stramineous or light greenish-brown throughout, not margined, narrowed very gradually and regularly from the base to the very elongate apex.

The type of this variety was collected by Bassett Maguire, Julian A. Steyermark, Charles Brewer-Carías, Celia K. Maguire, and Victoriano Carreno Espinosa (*no. 65609*) at 2685 m. altitude on the cumbre, "vecindades del zanjón", Section Southeast, Cerro Marahuaca, Department Atabapo, Amazonas, Venezuela, at lat. 3° 37' N., long. 65°21' West, on February 15, 1981, and is deposited in the Britton Herbarium at the New York Botanical Garden.

PAEPALANTHUS FRATERNUS var. *RADIATUS* Mold., var. nov.

Haec varietas a forma typica speciei recedit inter aliis bracteis involucrantibus lanceolatis ubique atrobrunneis apicaliter subabrupte acutis discam capitis excedentibus.

This variety differs from the typical form of the species, among other things, in having its involucral bracts lanceolate, dark-brown throughout, rather abruptly subacute apically, and surpassing the central disk of florets like a crown or halo when it is pressed dorso-ventrally.

The type of the variety was collected by Julian A. Steyermark, Charles Brewer-Carías, and Ron Liesner (*no. 124407*) on the cumbre, at 2500 m. altitude, Northwest Section of Cerro Marahuaca, Dept. Atabapo, Amazonas, Venezuela, on February 16, 1981, and is de-

posited in the Britton Herbarium at the New York Botanical Garden. The collectors note that the heads are "somewhat flattened, depressed, gray-white, bracts spreading, leaves rich green". Actually the inner involucral bracts form a very characteristic crown- or halo-like effect around the flower-head when this happens to be pressed and flattened out in a dorso-ventral, rather than a lateral, fashion during the preparation of herbarium material for mounting. The inner bracts are very conspicuously attenuate apically and dry to a very dark-brown or almost black color, forming a decided contrast to the white disk of florets.

PAEPALANTHUS FRATERNUS var. *SPATHULATUS* Mold., var. nov.

Haec varietas a forma typica recedit inter aliis bracyeis involucrantibus spathulato-obovatis, apicaliter rotundatis, marginaliter nigris.

This variety differs from the typical form of the species, among other things, in its involucral bracts being conspicuously spatulate-obovate, black-margined with a brown central section, apically broadly rounded.

The type of the variety was collected by Julian A. Steyermark and John J. Wurdack (*no. 490*) on an island in the Río Tirica above Middle Falls and below Summit Camp, at an altitude of 1925 m., in the Central Section, Chimanta Massif, Bolívar, Venezuela, on February 5, 1955, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collectors note that the plant was "Locally frequent, in dense masses, leaves shining, deep green, but not bluish-purple and *Stegolepis*-like as in *no. 491*, scapes pale green, involucre blackish below, heads dusky-white".

The three varieties described above are remarkably similar in habit and in foliage characters, but differ strikingly in the characters of the involucre. It is very possible that further detailed study will reveal that they each deserve specific rank status.

The high-alpine species of this and related genera form a very complex group whose members may very well eventually be found to exhibit far more local endemism than is indicated by their present rather tentative nomenclature.

NOTES ON THE FLORA OF COSTA RICA, 5:

A NEW SPECIES OF COCCOLOBA AND

NEW RECORDS OF POLYGONACEAE.

William C. Burger

Field Museum of Natural History, Chicago, IL, 60605

More intensive field work in the seasonally very dry and deciduous woodlands of Guanacaste Province has resulted in finding a number of plants not previously recorded for Costa Rica. Among these are a new species of *Coccoloba* closely related to *Coccoloba padiformis* and a species of *Podopteris*. Another polygonaceous genus not previously known in Costa Rica has been found as an ornamental climber in the city of San Jose; it is *Bilderdykia*, a segregate of the genus *Polygonum*.

COCCOLOBA GUANACASTENSIS W. Burger, sp. nov.

Arbor, usque 10 m alta, ramulis glabris; ocreis 4-8 mm longis, chartaceis; petioles supra basem ocreis gerentibus, teretibus, 15-30 mm longis, glabris; laminis oblongis vel oblongi-ellipticis, 7-18 cm longis, 3-9.5 cm latis, ad apicem obtusis vel rotundatis, basi obtusis vel rotundatis, glabris. Inflorescentiae racemosae, 10-15 cm longae, bracteis minutis; floribus plerumque solitariis, 4-6 mm longis, ca. 7 mm latis, pedicellis 2-4 mm longis, glabris, hypanthiis accrescentibus. HOLOTYPUS: *Opler 555* in F (1711161); ISOTYPUS in CR.

Trees to about 10 m tall, leafy internodes 0-3 cm long, 1.5-4 mm thick, glabrous, becoming pale grayish and striate; stipules (ocreae) 4-8 mm long, the distal tube 2-3 mm broad, thin and caducous, the basal portion persisting with the leaves and originating below the petiole-base, glabrous. Leaves often borne close together near the ends of branches, deciduous, petioles 1.5-3 cm long, 1-2.5 mm thick, terete (except near the lamina-base), glabrous, articulated with the stem 2-6 mm above the differentiated base of the ocrea; laminae (7) 9-18 cm long, 3-9.5 cm broad, broadly oblong to elliptic-oblong, obtuse to rounded at the apex and often very short acuminate at the tip, obtuse to rounded at the base, margin entire or drying undulate, the laminae drying very

stiffly chartaceous and often pale greenish gray in color (the newly expanded leaves drying thin and brown), smooth and glabrous on both surfaces, with 6 to 10 pairs of major secondary veins, the tertiary veins forming a very fine (0.2-0.6 mm) reticulum that is slightly raised on both surfaces and paler in color than the enclosed leaf-areas on the lower surface when dry. Inflorescences terminal or axillary, 1 or 2 from the same node, 10-15 cm long at anthesis, racemose with the flowers usually solitary (rarely 2 together) and separate along the thin (0.5-1 mm) glabrous rachis, the rachis longitudinally ridged but not thickened at the pedicel-bases, the subtending bracts and bracteoles less than 0.5 mm long, deciduous, pedicels 2-4 mm long; the flowers appearing to be bisexual, 4-6 mm long and 7 mm broad, the hypanthium narrowed for 0.5-2 mm above the articulation with the pedicel, hypanthium 2-3 mm long with perianth-lobes 2-3 mm long, anthers about 0.8 mm long, stigmas 3, exserted and thickened. Fruit (not fully mature ?) partly enclosed within the perianth-base (hypanthium), perianth-lobes becoming half the length of the developing fruit, free and separate from the upper half of the fruit; achene apparently somewhat turbinate with an expanded and rounded distal half.

As presently known, this species is endemic to the deciduous forest formations of Guanacaste Province below 300 m. elevation. It appears to be a member of the riparian forest community and flowers during the dry season, from February to April. The following collections represent this species: from the Comelco property near Bagaces, *P. A. Opler 555 & 763*, Feb. 21, 1972 and April 28, 1972; from near Canas, *R. Daubenmire 614* March 9, 1970; and from Santa Rosa National Park, *Boucher 716*, March 12, 1977, and *D. Janzen 10915*, May 16, 1978.

Coccoloba guanacastensis is closely related to *C. padiformis* and some of our specimens have been identified as that species by R. A. Howard. While recognizing the close relationship with *C. padiformis*, the differences between the two are quite striking. The flowers of *C. guanacastensis* are generally about twice as large as those of *C. padiformis*. The dried leaves of *C. guanacastensis* are thinner and they possess a raised reticulum on the upper surface which is not at all apparent in material of *C. padiformis*. More important is the fact that the new species has the base of its petioles arise well above the differentiated base of their associated sheathing stipule, a condition I have not seen in *C. padiformis*. In addition, *C. guanacastensis* has only been found in the very dry (December through May) deciduous woodlands of northwestern Costa Rica, whereas our material of *C. padiformis* is only known from evergreen formations or forests which are largely evergreen. Thus, the two species appear to differ both in ecology and in morphology.

Bilderdykia aubertii (Henry) Moldenke has been found growing in the city of San Jose above the former area of the zoo near the end of Calle 11 (*Burger & Antonio 10860*, Sept 1978). This climber was at first mistaken for a species of *Antigonon* with immature flowers, but we soon realized that it was a genus not previously recorded for Costa Rica. The species can climb to over 15 meters high and its distal stems are pendant. The small whitish flowers in open inflorescences at the ends of hanging stems can cover walls and smaller shrubs. It is occasionally planted as an ornamental in Europe but it originated in the Himalayas. This species is also referred to as *Fallopia aubertii* (Henry) J. Holub and *Polygonum aubertii* Henry.

Podopteris mexicanus Humboldt & Bonpland is also a genus and species newly discovered in the Costa Rican flora. It has been found at the edge of seasonally inundated areas in deciduous woodland near Palo Verde, Guanacaste. The species has been collected by William Haber on March 17, 1977, and by Daniel Janzen in December of the same year.

Ruprechtia costata Meisner is not a new record for Costa Rica but it does present a taxonomic problem. (It was previously reported as *R. cumingii*, a South American species.) The Costa Rican collections, all from lowland Guanacaste, have much smaller leaves and fruit than is typical for material from northern Central America, and it does not seem advisable to give the distinctive Costa Rican collections the status of species or subspecies at this time.

Acknowledgement

This work has been supported in part by National Science Foundation Grants GB-3106, GB-7300, GB-28446, and DEB-8103184 for the Flora of Costa Rica project. Other grants have supported ecological research in the deciduous forest formations of Guanacaste Province and these have been responsible for obtaining many of the new collections. Previous contributions to this series can be found in *Phytologia*, Volume 26, pages 131 to 135 and 421 to 434, and in Volume 31, pages 267 to 272.

REVISED GENERIC CONCEPTS OF CUPRESSUS L. (CUPRESSACEAE).

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The taxonomy of the Cupressus genus seems to be open to considerable controversy at present. A re-evaluation of the nomenclature seems essential to avoid further taxonomic confusion.

In his monograph of the New World cypresses, Wolf (Aliso 1: 1-250. 1948) elaborated on the problem of generic concepts. Namely, that the species are separated by minor vegetative characters and geographic distribution, as confirmed by Little (Phytologia 20: 429-445. 1970).

As new populations were discovered wild, many distinct kinds were variously classified under previously named species, in several herbaria and in taxonomic manuscripts. It has been suggested that the differences in the species are due, in part, to geographic isolation, natural selection and environmental adaptation.

Under a conservative treatment, 15 species and 12 varieties of Cupressus L. are here recognized as natives of the Northern Hemisphere. In the New World 8 species and 9 varieties are recognized as natives of the southwest United States and Mexico. In the Old World 7 species and 3 varieties are recognized as natives of North Africa, the eastern Mediterranean, the Himalaya and southwest China.

I have basically followed the conservative treatment given by Little (1970) for the New World cypresses, as did Krussmann (Handb. Nadlh. 1. 1972), except that 2 additional Mexican varieties are here recognized. Zavarin (Phytochem. 6: 1387-1394. 1967) reported his works in chemical research of heartwood tropolones, the minor differences related seemed to confirm the close relationships.

Steward (Biol. Conserv. 2: 10-12. 1969) and Barry (Soc. Hist. Natur. Afr. Nord Bull. 61: 95-196. 1970) recognized 3 Mediterranean kinds, which are here considered as varieties of one, as suggested by Ferrandes (Com. Econ. Eur. Nov. 1979 Seminary: 45-49).

Franco (Portug. Acta Biol. Ser. B. 9: 183-195. 1969) recognized 2 Himalayan and 2 Chinese species, but placed a fifth, namely Cupressus funebris Endl. in the Chamaecyparis Spach. genus. However, Zavarin (1967) included C. funebris as a Cupressus because of its close affinities in heartwood tropolones to C. sempervirens. Cheng and Fu (Fl. Reip. Pop. Sin. 7: 328-336.

1978) recognized 4 Chinese kinds, 1 Himalayan species and also retained C. funebris as a Cupressus species.

CUPRESSACEAE Bartl., Ord. Nat. Pl. 90. 95. 1830.

Evergreen trees or shrubs with fragrant wood and foliage; buds non-scaly; leaves scale like, appressed; male cones small; female cones globose, generally woody, with 4-12 scales bearing numerous seeds; cotyledons 2-6, bluntly acute.

Type Genus: CUPRESSUS Linn., Gen. Pl. 294. 1737. Type Species: CUPRESSUS SEMPERVIRENS L., Sp. Pl. 1002. 1753.

1. CUPRESSUS ARIZONICA Greene, Bull. Torrey Club 9: 64. 1882.

a) CUPRESSUS ARIZONICA var. ARIZONICA (typical)

Tree to 30 m; bark gray, furrowed; leaves pale gray green, acute, glands inconspicuous; male cones 2-5 mm, scales 8-20; female cones 15-25 mm, scales 6-12; cotyledons 3-4, 10-14 mm.

Type: United States, New Mexico, San Francisco Mts, Catron Co, 1 Nov 1880, Greene s.n. (NY, Isotype).

Typical C. lusitanica hybridizes with typical C. arizonica in northern Mexico (Martinez, Anal. Inst. Biol. 18: 79. 1947).

b) CUPRESSUS ARIZONICA var. GLABRA (Sudw.) Little, Madrono 18: 162. 1966. Smooth-bark Arizona cypress.

Tree to 20 m; bark red, scaly; leaves blue-gray, glands distinct; male cones 3-5 mm, scales 10-18; female cones 20-30 mm, scales 6-10; cotyledons 3-5, 9-13 mm. Possibly a hybrid between typical C. arizonica and C. Bakeri.

Type: United States, Arizona, Verde Canyon, Yavapai Co, 29 Dec 1909, Sudworth s.n. (RSA, USFS, Isotypes).

c) CUPRESSUS ARIZONICA var. MONTANA (Wiggins) Little, Madrono 18: 163. 1966. San Pedro Martir cypress.

Tree to 20 m; bark gray, furrowed; leaves dark gray green, glands distinct; male cones 3 mm, scales 8-14; female cones open upon maturity, to 30 mm, scales 8-12; cotyledons 3-5, 8-10 mm.

Type: Mexico, Baja California, Sierra San Pedro Martir, La Encantada, 2300 m, 22 Sept 1930, Wiggins & Demaree 4990 (NY, RSA, Isotypes).

d) CUPRESSUS ARIZONICA var. NEVADENSIS (Abrams) Little, Madrono 18: 164. 1966. Piute cypress.

Tree to 20 m; bark gray, furrowed; leaves light gray green, glands distinct; male cones 3-5 mm, scales 10-16; female cones 20-30 mm, scales 6-8; cotyledons 3-5, 7-15 mm.

Type: United States, California, Piute Mts, Kern Co, nr Bodfish, 1524-1830 m, 29 July 1915, Abrams 5368 (RSA, Isotype).

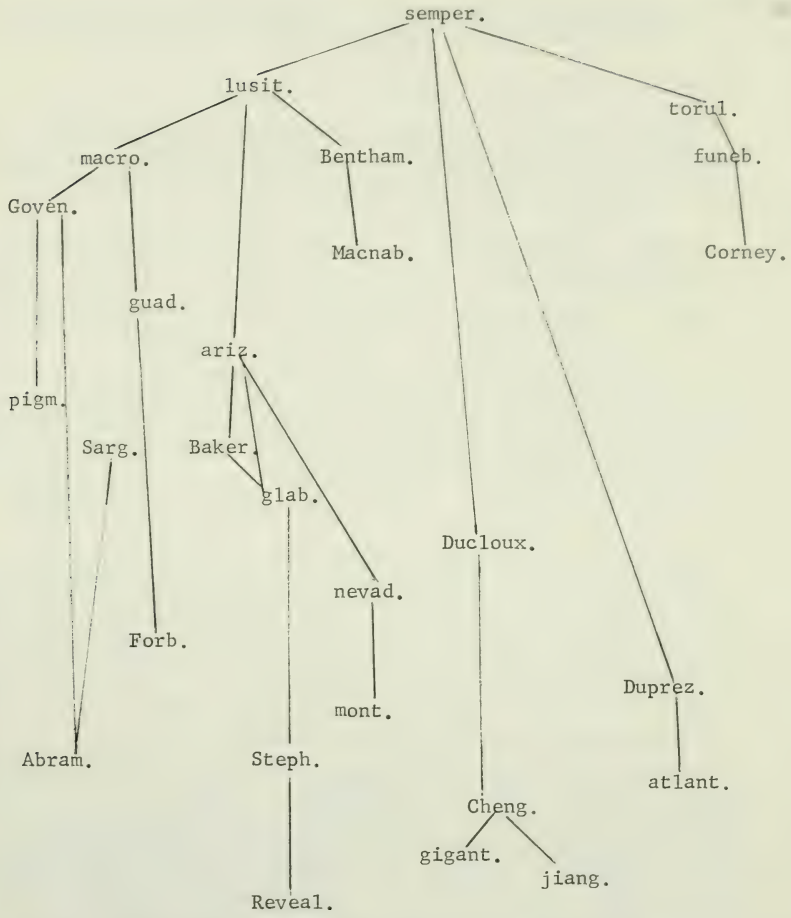

Fig. 1. Evolution of the Cupressus genus. Due to space limitations, specific names were abbreviated.

e) CUPRESSUS ARIZONICA var. REVEALIANA Silba, var. nova.

Arbor affinis var. Stephensonii, sed differt foliis glandulosa et affinis var. glabra, sed distinguenda in galbulis, 15-20 mm longis.

Tree to 10 m with a rounded crown; bark red, scaly; leaves gray green, 1-1.5 mm, glands apparent; male cones 3-4 mm, 1.8 mm thick, scales 8-12; female cones glaucous brown, 15-20 mm, scales 6-10, umbos prominent; seeds brown, often glaucous; cotyledons 4-6, 9-10 mm.

Type: Mexico, Baja California, Sierra Juarez, El Rincon, 1200 m, 21 Apr 1974, Moran 21251 (SD, Holotype).

f) CUPRESSUS ARIZONICA var. STEPHENSONII (Wolf) Little, Madrono 18: 164. 1966. Cuyamaca or Stephenson cypress.

Tree to 16 m; bark red, scaly; leaves blue gray, glands inconspicuous; male cones 2-4 mm, scales 8-14; female cones 20-35 mm, scales 6-8; cotyledons 3-6, 8-13 mm.

Type: United States, California, Cuyamaca Mts, San Diego Co, King Creek, 1219 m, 1 Dec 1938, Wolf 9467 (NY, RSA, Isotypes).

2. CUPRESSUS BAKERI Jeps., Fl. Calif. 1: 61. 1909. Baker cypress.

Synonymy: Cupressus Bakeri subsp. Matthewsii Wolf, Aliso 1: 83. 1948.

Tree to 30 m; bark red, scaly; leaves gray green, glands distinct; male cones 2-3 mm, scales 8-12; female cones 12-20 mm, scales 4-8; cotyledons 3-4, 8-10 mm.

Type: United States, California, se. Siskiyou Co, nr Dana, 1220 m, Aug 1898, Baker s.n. (JEPS, Holotype). Specimen : California, Siskiyou Co, Seiad Creek, 1158 m, 9 Oct 1934, Wolf & Johnson 6169 (NY).

Zavarin (1967) did not find any significant differences in the two entities of C. Bakeri recognized by Wolf (1948).

3. CUPRESSUS CHENGIANA Hu, Taiwania 10: 57. 1964. Cheng cypress.

a) CUPRESSUS CHENGIANA var. CHENGIANA (typical).

Synonymy: Cupressus fallax Franco, Portug. Acta Biol. 9: 190. 1969.

Tree to 30 m; bark brown gray, fissured; leaves gray green, obtuse, glands distinct; male cones 2-3 mm, scales 8-12; female cones globose, 15-25 mm, scales 8-10; seeds tan; cotyledons 2, 9-13 mm.

Type: China, Szechuan, Tatsienlu, 2400 m, 2 Nov 1930, Cheng 2066 (A, Holotype; BM, Isotype). Specimen : Szechuan, nw. Wenchuanhsien, 2 Nov 1930, Cheng 2073 (NY).

b) CUPRESSUS CHENGIANA var. JIANGEENSIS (Zhao) Silba, comb. nova. Cupressus jiangeensis Zhao, Acta Phytotax. Sin. 18: 210. 1980.

Tree to 27 m; leaves green; female cones ovoid, to 12 mm, scales 12; seeds yellowish brown.

The description of this taxon given by Zhao (1980) seems to fit in the general range of C. Chengiana given by Cheng (1978), except in foliage color and number of cones scales. Only one tree was discovered in its native habitat (N. Zhao, pers. comm. 1981).

Type: China, Szechuan, Jiange Xian, 840 m, 21 Jun 1978, Cai & Min 101-104 (PE, Isotypes).

4. CUPRESSUS CORNEYANA Carr., Tr. Conif., 128. 1855.

Tree to 45 m; bark gray, fissured or shreddy; leaves acute, yellowish green, glands apparent; male cones 3-5 mm, scales 14-18; female cones 12-20 mm, scales 8-10; cotyledons 3-5, 8-13 mm.

Specimens: Bhutan, Dewangiri, cult., 6 Jan 1838, Griffith 27 (K); Bhutan, Norbding, Pele La, wild, 2550 m, 16 Apr 1979, Grierson & Long 1079 (E).

5. CUPRESSUS DUCLOUXIANA Hickel, Camus in Les Cypres, 91. 1914.

Tree to 60 m; bark red brown, fissured; leaves obtuse, blue green, glands apparent; male cones 4-6 mm, scales 12-16; female cones 15-30 mm, scales 6-8; seeds warty; cotyledons 2, 13-18 mm. long.

Specimens: China, Yunnan, Kunming, cult., ann. 1907, Ducloux 5439 (P); Tibet, Trulung, Pome, wild, 1950 m, 11 Jan 1947, Ludlow, Sherriff & Elliot 12130 (BM).

6. CUPRESSUS FUNEBRIS Endl., Syn. Conif. 58. 1847.

Tree to 35 m; bark gray brown, fissured; branchlets flattened; leaves acute, pale green, glands apparent; male cones 3-5 mm, scales 12-16; female cones 8-15 mm, scales 8, opening upon maturity; cotyledons 3-5, 8-10 mm.

Specimens: China, w.; Changyang, Trieko, 1219 m, ann. 1903, Wilson 333 (NY); Nanking, nr Kwan-yin-tung, 10 Aug 1927, Chiao 14809 (NY).

7. CUPRESSUS GIGANTEA Cheng et Fu, Acta Phytotax. Sin. 13: 85, pl. 16. 1975. Giant or Tsangpo River cypress.

Tree to 45 m; bark gray-purple-brown, fissured; leaves blue-gray-green, obtuse , glands distinct; female cones 16-20 mm, scales 12, umbos prominent; cotyledons 2, 11-13 mm.

Type: China, Tibet, Tsangpo River, Lang Xian, 3000 m, Quing-Zang 3318, 1974 (PE, Isotype).

Fig. 2. Type tree of Cupressus Chengiana var. jiangeensis in center, other trees are C. funebris. Photo courtesy of N. Zhao (received 1981).

8. CUPRESSUS GOVENIANA Gord., Journ. Hort. Soc. 4: 295. 1849.
a) CUPRESSUS GOVENIANA var. GOVENIANA (typical)
Tree to 12 m; bark gray, furrowed; leaves dark green, acute, glands absent; male cones 3-4 mm, scales 12-14; female cones 15-20 mm, scales 6-10; seeds brown, warty; cotyledons 3-5, 8-12 mm.
Specimen: United States, California, Monterey Co, nr Carmel, ann. 1868-9, Kellog & Harford 932 (NY).

b) CUPRESSUS GOVENIANA var. ABRAMSIANA (Wolf) Little, Phytologia 20: 435. 1970. Santa Cruz cypress.
Tree to 18 m; leaves bright green; male cones 3-4 mm, scales 10-16; female cones 20-30 mm, scales 8-10; seeds non-warty, flattened, often glaucous; cotyledons 3-5, 9-12 mm.
Type: United States, California, Santa Cruz Mts, Santa Cruz Co, 487 m, Wolf 6235 (RSA Prop. No. 2185), 9 Nov 1934, (RSA, Holotype; NY, Isotype).

c) CUPRESSUS GOVENIANA var. PIGMAEA Lemm., Handb. W.-Amer. Cone-Bearers. Ed. 3. 77. 1895. Mendocino cypress.
Tree to 60 m; bark gray brown; leaves dull, blackish green ; male cones 3-4 mm, scales 12-14; female cones 15-20 mm, scales 8-10; seeds black, warty; cotyledons 3-4, 8-12 mm.
Type: United States, California, Mendocino Co, White Ashy Plains nr Mendocino, 300 m, Aug 1894, Lemmon 188 (UC, Holotype).

9. CUPRESSUS GUADALUPENSIS Wats., Proc. Am. Acad. 14: 300. 1879.
a) CUPRESSUS GUADALUPENSIS var. GUADALUPENSIS (typical)
Tree to 20 m; bark red, scaly; leaves acute, blue green, glands apparent; male cones 3-6 mm, scales 14-18; female cones 25-40 mm, scales 8-10; seeds glaucous brown; cotyledons 3-6, 7-13 mm.
Type: Mexico, Guadalupe Island off coast of Baja California, 900 m, 1892-3, Francheschi s.n. (UC, Holotype); ann. 1875, Palmer 92 (NY).

b) CUPRESSUS GUADALUPENSIS var. FORBESII (Jeps.) Little, Phytologia 20: 435. 1970.
Tree to 10 m; leaves rich green; male cones 3-4 mm, scales 10-14; female cones 20-30 mm, scales 6-10; seeds brown, non-glaucous; cotyledons 3-6, 6-15 mm.
Type: United States, California, Otay Mt, San Diego Co, 610 m, 30 Dec 1907, Forbes s.n. (JEPS, Holotype).

10. CUPRESSUS LUSITANICA Mill., Gard. Dict., ed. 8. n.3. 1768.
a) CUPRESSUS LUSITANICA var. LUSITANICA (typical)
Synonymy: Cupressus Lindleyi Klotzsch ex Endl., Syn. Conif. 59. 1847.
Tree to 30 m; bark gray, furrowed or shreddy; leaves acute, gray green, glands inconspicuous; male cones 3-4 mm, scales 14-16; female cones open upon maturity, 12-15 mm, scales 6-8; cotyledons 4, 8-10 mm.

Specimens: Portugal, Bussaco, cult., March 1887, A. Moller 214 (NY); Mexico, San Luis Potosi region, wild, ann. 1878, Parry & Palmer 848 (NY); Mexico, Cerro del Pino Ayotla, ann. 1888, Urbina s.n. (MEXU).

I have not observed any significant difference in bark, cotyledons or male and female cones of Mexican and Portuguese material, only differences in leaf color and size.

b) CUPRESSUS LUSITANICA var. BENTHAMII (Endl.) Carr., Tr. Conif., ed. 2. 155. 1867.

Tree to 20 m; bark gray brown; branchlets flattened; leaves bright green, glands apparent; male cones 2-4 mm, scales 16; female cones 10-15 mm, scales 4-8; cotyledons 3-4, 10-13 mm.

Type: Hort. Huber. Hyeris, cult., 28 Jan 1867, Shuttleworth 122 (NY, Isotype); Mexico, Vera Cruz, Nogales, wild, 2 May 1937, Matuda 1175 (MEXU, NY, Specimens).

11. CUPRESSUS MACNABIANA Murr., Edin. New Phil. Journ. II. 1: 293. pl. 11. 1855. MacNab Cypress.

Tree to 10 m; bark gray, furrowed; branchlets flattened; leaves obtuse, dark green, glands distinct; male cones 2-3 mm, scales 6-8; female cones 18-25 mm, scales 6-8; cotyledons 3-5, 10-12 mm.

Specimens: United States, California, Lake Co, ann. 1865, Torrey 87 & Torrey 502 (NY).

Cupressus Macnabiana hybridizes with C. Sargentii in Lake County, California (Lawrence, Biochem. Syst. 2: 113-119. 1975).

12. CUPRESSUS MACROCARPA Hartw., ex Gord., Journ. Hort. Soc. Lond. 2: 187. 1847. Monterey cypress.

Tree to 25 m; bark gray, furrowed; leaves obtuse, dark green, glands inconspicuous; male cones to 6 mm, scales 12-14; female cones 20-40 mm, scales 8-12; seeds warty; cotyledons 3-5, 10-12 mm.

Specimens: United States, California, Monterey Co, Monterey, ann. 1850, C. Parry s. n. (NY); Monterey Co, Cypress Point, 18 July 1882, Pringle s.n. (NY).

13. CUPRESSUS SARGENTII Jepson, Fl. Calif. 1: 61. 1909.

Tree 10-25 m; bark gray or brown, furrowed; leaves bluntly acute, gray green, glands apparent; male cones 3-5 mm, scales 10-12; female cones 15-30 mm, scales 4-10; seeds glaucous brown; cotyledons 3-5, 9-20 mm.

Type: United States, California, Red Mt, Mayacamas Range, Mendocino Co, 914 m, 17 Jun 1908, Jepson 3027 (JEPS, Holotype); Alameda Co, Cedar Mt, 16 Apr 1926, Mason s.n. (NY).

14. CUPRESSUS SEMPERVIRENS L., Sp. Pl. 1002. 1753.

a) CUPRESSUS SEMPERVIRENS var. SEMPERVIRENS (typical)

Synonymy: Cupressus horizontalis Mill., Gard. Dict. ed. 8, n.2. 1768. Cupressus Royleï Carr., Tr. Conif. 1: 128. 1855. Cupressus sempervirens var. numidica Trab. ex Barrion, Bull. Soc. Hort. Tunisia et Rev. Hort Algerie. 17: 309. 1913.

Tree to 40 m; bark gray brown, furrowed; leaves obtuse, dark green, glands apparent; male cones 2.5-3 mm, scales 12-14; female cones 20-35 mm, scales 6-14; seeds oval, 3-6 mm; cotyledons 2, 10 mm. long.

Specimens: Iran, nr Lankoran, ann. 1836, Hohenacker s.n. (NY); Lebanon, Tadria, nr Nipoli, 12 Sept 1880, Noe 610 (NY); Tunisia, nr Djebel Serdg, ann. 1897, Tellier s.n. (P).

I have not observed any significant difference in bark, leaf, seed or cotyledons in material from Iran, Lebanon and Tunisia, only differences in branching patterns were noted.

b) CUPRESSUS SEMPERVIRENS var. ATLANTICA (Gaussen) Silba, comb. nova. Cupressus atlantica Gaussen, Le Monde des Plantes 45: 55. 1950.

Tree to 40 m; branchlets flattened; leaves blue green, glands distinct; female cones 18-22 mm, scales 8; cotyledons 2-3, 15-20 mm.

Type : Moroccan High Atlas, Idni, 15 May 1948, Gaussen s.n. (TL, Holotype).

c) CUPRESSUS SEMPERVIRENS var. DUPREZIANA (Camus) Silba, comb. nova. Cupressus Dupreziana Camus, Bull. Mus. Hist. Nat. Paris. 32: 101. 1926.

Tree to 20 m; branchlets flattened; leaves dark green, glands distinct; female cones 12-24 mm, scales 10-12; seeds somewhat flattened with large wings; cotyledons 2, to 15 mm.

Type: Algeria, Tassili Plateau, between Rhat and Djanet, ann. 1925, Lavauden s.n. (P, Holotype).

The two African cypresses closely resemble the Mediterranean cypress in general habit, including bark and cotyledon features. Their differences in cone size, leaf glands and seed shapes are probably due to environmental adaptation (Ferrandes, 1979 Semin. Com. Econ. Eur.:Les Cypres Africains. p. 45-51. Nov. 1979).

15. CUPRESSUS TORULOSA Don, Lamb. in Decr. Gen. Pinus, ed. 1.2: 18. 1824; Don in Podr. Fl. Nepal, 55. 1. 1825.

Tree to 50 m; bark gray brown, shreddy; leaves acutish, dark green, glands inconspicuous; male cones 3-5 mm, scales 12-16; female cones 13-20 mm, scales 10-12; cotyledons 2, rarely 3, 6-10 mm. long.

Type: India, Kumaon, Sooreh, 1500 m, 12 Jan 1818, Wallich 6046A (K, Holotype); Kumaon, Sooreh, ann. 1832, Wallich 6046B (NY).

I have examined material of C. cashmeriana Royle from the Les Cedres Botanical Garden, Saint Jean Cap Ferrat, France. Trees basically differ from C. torulosa in branching pattern and leaf color. In bark, cone, cotyledon, fragrance and seed features I have not observed any significant differences. This cypress may be regarded as a juvenile cultivar of C. torulosa as suggested by Harrison (Handb. Conif. 4. 1966).

Summary

A brief investigation of taxonomic concepts in the Cupressus genus are given. Descriptions of vegetative parts and herbarium specimens are listed for comparisons and documentation. The evolution chart (fig. 1.) is based on similarities in bark, cone, cotyledon, hardiness, heartwood tropolones, leaf and seed characteristics and also habitat.

Nearly all the taxa listed here are in cultivation in the Jermyns Arboretum, Winchester and at Wakehurst Place, Sussex, both in England. Hilliers Nurseries Ltd., Winchester, England and Plus Trees, Argyll, Scotland have seedlings available of nearly all species.

BOOK REVIEWS

Alma L. Moldenke

"THE SHAPING OF CAMBRIDGE BOTANY - A Short History of Whole-plant Botany in Cambridge from the Time of Ray into the Present Century" by S. M. Walters, xv & 121 pp., 84 b/w photos & figs, 1 color plate frontispiece. Cambridge University Press, London & New York, N. Y. 10022. 1981. $42.50.

This gem of a publication comes from the present director of the University Botanic Garden upon "the occasion of the sesquicentenary of Henslow's New Botanic Garden, 1831--1981". The introduction presents the earlier development of botany associated with the development of medicine and horticulture as distinct from the later development of zoology out of human anatomy and physiology with biology as a still later or retrospective melding of the two. The other chapters describe successively and very effectively herborizing under Ray, horticulture under Bradley, the Linnean classification under the Martyns, growth of natural science under Henslow, divisions within botany under Babington, Vines and Lynch, the New Botany School under Ward, Gilbert-Carter, etc. The illustrations of historic, botanical and artistic interest greatly enhance the text.

"GROWING ORCHIDS -- Cymbidiums and Slippers" by J. N. Rentoul, iv & 172 pp., 139 color & 59 b/w photos, 6 draw., 3 maps. University of Washington Press, London & Seattle, Washington 98105. 1981. $29.95.

This attractive book is carefully prepared for the professional and the amateur orchid raiser and/or breeder. Because of its simple, reasoned, forthright explanations and its many beautiful close-up color photographs of orchid blossoms it should also interest many folks who just enjoy reading about and/or looking at flowers. The author, well into his fifth decade of working with orchids, uses the two genera, *Cymbidium* and *Paphiopedilum,* mainly for demonstrating their discovery, growing conditions, pollination, hybridizing, chromosome number, classification, propagation by seed, pseudobulbs and meristem, diseases and pests, etc. The price of the book is reasonable indeed.

The author and any other writers should be discouraged from using the terms "clone" and "sibling" in any other or more limited sense than that already established in biological literature.

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