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HERBARIUM
BOTANICAL GARDEN

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THE IDENTITY OF CUNURIA CASIQUIARENSIS (EUPHORBIACEAE)
AND A RANGE EXTENSION

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When Croizat (1945) described "Cunuria (?) casiquiarensis," a euphorbiaceous tree from Amazonian Venezuela, he was uncertain of the proper generic assignment, but stated that "Cunuria is suggested by the intangibles of habit, and the characters of the foliage, but the inflorescence is somewhat unconventional" Baldwin & Schultes (1947) excluded it from Cunuria, stating that it suggests Pogonophora Miers ex Benth, but were unable to make a certain generic placement in the absence of staminate flowers. Jablonski (1967) accepted this assignment with reservation, placing Cunuria casiquiarensis in synonymy under Pogonophora schomburgkiana Miers ex Benth, the only species of Pogonophora known at that time. A second species of Pogonophora has since been described from West Africa (Letouzey, 1969).

I have recently examined the holotype and an isotype of Cunuria casiquiarensis. The leaves are similar in shape, texture, and venation to those of Pogonophora schomburgkiana, but the secondary veins of Pogonophora are much more prominent. However, C. casiquiarensis differs from P. schomburgkiana in a number of important characters. The fruits of the latter are obovoid, have a smooth surface, and upon dehiscence leave an awl-shaped columella and a saucer-shaped persistent calyx, whereas those of C. casiquiarensis are more nearly globose, have a somewhat roughened surface, and upon dehiscence leave a thin columella tipped by three short lateral wings (which do indeed sometimes drop off thus making the columella appear awl-shaped) and an extremely abbreviated calyx that is not at all saucer-shaped. The fruits of C. casiquiarensis are borne on peculiar thickened, elongated, striate, somewhat clavate pedicels that are frequently curved, while those of P. schomburgkiana are on much shorter pedicels or are nearly sessile. Most importantly, C. casiquiarensis produces two seeds per locule, while Pogonophora produces only one, thus indicating that Croizat's species belongs to either subfamily Phyllanthoideae or subfamily Oldfieldioideae, following the most recent classification of the Euphorbiaceae (Webster, 1975), and is not at all closely related to either Cunuria Baill. in the Crotonoideae or to Pogonophora in the Acalyphoideae.

Indeed, in all characters Cunuria casiquiarensis is a perfect match for the plant usually known as Richeria loranthoides (Kl.) Muell. Arg. As pointed out by Webster (1975; in Webster & Huft, in prep.), however, this species does not belong to Richeria, which is in the Phyllanthoideae, but constitutes instead the monotypic

genus Podocalyx Kl., which belongs in the Oldfieldioideae. The full synonymy of this species is as follows:

PODOCALYX LORANTHOIDES Kl., Arch. Naturgesch. 7:202. 1841; London J. Bot. 2:52. 1843. TYPE: In the region of the junction of the Orinoco and the Rio Negro, Schomburgk 978 (B, not seen, probably destroyed). Richeria loranthoides (Kl.) Muell. Arg. in DC. Prodr. 15(2):496. 1866.

Cunuria casiquiarensis Croizat, J. Arnold Arbor. 26:192. 1945. TYPE: Venezuela: Amazonas: Alto Casiquiare, Capihuara, alt. 120 m, 29 May 1942, Ll. Williams 15690 (Holotype: US! marked holotype in Croizat's hand, contrary to the implication of the protologue that the holotype is at A; no specimens were found at A; isotype: F!).

Podocalyx loranthoides is well known from Amazonian Venezuela and adjacent Brazil. The collection cited below extends the range of this genus to Peru.

PERU: Loreto: Requena, in Quebrada Parnayary just upstream from Genaro Herrera, 4°56'S, 73°44'W, 27 April 1981, MacRae & Ruiz 89 (F).

I am indebted to K. Barringer, W. Burger, M. Nee, and T. Plowman for comments on the manuscript.

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ANODA HENRICKSONII (MALVACEAE), NEW SPECIES FROM THE
SOUTHERN CHIHUAHUAN DESERT REGION

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In compiling a treatment of Malvaceae for the Chihuahuan Desert Flora, Stuart Kendall Strong and I have been the deeply grateful recipients of contributions of treatments for several genera from acknowledged specialists and experts in this family including especially Paul A. Fryxell and David M. Bates. Several genera appearing under our names are actually excerpted from recently published treatments by Dr. Fryxell, whose revision of the Malvaceae of Mexico is apparently in an advanced state of completion. One taxonomically difficult genus, Anoda Cav. has for several years been under careful and thorough study by Dr. Bates. It would of course be preferable that a consideration of the taxonomic placement and merits of the taxa of Anoda in the Chihuahuan Desert Region be presented in the context of a complete, mature monograph. But since it appears that Dr. Bates' study will not be complete for some time to come, perhaps a matter of years, it devolves upon me to provide a name for a taxon from the Chihuahuan Desert Region that appears to be quite distinct.

ANODA HENRICKSONII M. C. Johnst., sp. nov. A A. cristata basi forte perenni, laminis foliorum cordatis, caulibus foliis calycibus ovariisque stellato-hirsutulis, carpellis 10 differt; a A. wrightii basi valde perenni, petalis non flavis, pericarpis dorsaliter subscariosis differt.

ANODA HENRICKSONII M. C. Johnst., new sp. Perennial herbs ca 4.5 dm tall, root-crown woody, ca 1 cm thick; stems branched especially in lower half, stems sparsely or in upper part densely stellate-hirsutulous, the erect radii 0.2-0.3 mm long, mixed with a few simple hairs 0.2-0.3 mm long. Leaf-blades hastate-deltoid or the upper ones hastate-lanceolate, (2.5-)3-6 cm long, (1.5-)2-3.5(-5) cm wide, deeply cordate at base, acute at tip, coarsely to minutely antrorse-serrate, paler beneath than above partly owing to denser pubescence; petioles finely stellate-hirsutulous, (2-)3-4(-4.5) cm long. Pedicels (2-)3-4 cm long in flower, (3.5-)4-6 cm long in fruit, filiform, joined ca 5 mm below calyx; calyx externally densely stellate-hirsutulous or finely stellate-tomentose, 9-12 mm long, very deeply 5-lobed, lobes lance-oblong, abruptly acuminate to a fine point, eventually (in fruit) the limb flattish and the lobes more or less involute; petals obovate, (13-)14-17 mm long, "pink" or "pink-lavender" when fresh, when dry pale violet grading to whitish at base; androecium included; ovary densely stellate-hirsutulous. Fruit (slightly immature, from Henrickson 13305) depressed, disk-like about a third as high as wide, almost as broad as calyx-limb, on top finely and densely stellate-hirsutulous, with 10 mericarps, each mericarp at juncture of flat top and rounded dorsum with a more or less horizontal acute peripheral projection ca 1.5 mm long, with the pericarp firm, chartaceous, at the top with chevron-patterned thickening, at the dorsum becoming thin and subscarios with a single thick midvein, the endocarp vanishingly or tissue-paper thin and represented only as a scarcely discernible external layer of the minutely roughened seed.

MEXICO, Zacatecas, Sierra del Astillero, 24°37' N., 101°8' W., small ravine northwest of summit, with Clematis, Acacia, Sicyos, Aloysia, Opuntia, etc., 2000 meters, "infrequent", 22 Sept. 1973, James Henrickson 13305 (LL, unicate, holotype); Zacatecas, Pico de Teyra, 24°34'N., 102°11' W., northwest slope, ravine, with Fouquieria, Yucca, Dalea, Opuntia, Mimosa, Prosopis, etc., 2050 meters, 23 Sept. 1973, Henrickson 13405b (LL, unicate).

Anoda henricksonii seems to be related to A. cristata (L.) Schlecht. in the depressed, disk-like fruit, the exceedingly thin endocarp adherent to the seed, the subscariosous pericarp-dorsum, and the non-yellow petals; it differs notably in the strong, perennial base, the cordate leaf-blades, and the vestiture of the stems, leaves, calyx and ovary, and the unique thickening pattern of the pericarp-top. The new species may also be compared to A. wrightii Gray whose vestiture is probably very similar and whose leaf-blades are similarly cordate, but A. wrightii comprises annual herbs with mostly orange-yellow petals and a peculiar reticulate thickening of the pericarp-dorsum.

The new species comes from a very poorly collected region in northern Zacatecas, where several mountain-ranges remain essentially wholly unknown botanically. Dr. Henrickson was the first and last botanist to explore the Pico de Teyra, an isolated igneous mass badly disturbed by goat-browse and the only known locality for the recently described Thalictrum henricksonii M. C. Johnst. and other endemic taxa. His was the second botanical foray to enter the Sierra del Astillero, a massive mostly calcareous range with moderately high vegetational integrity, a range that still promises to yield much of interest to the thorough explorer.

CONTRIBUTION TO THE LICHEN FLORA OF VENEZUELA, V.

Manuel López-Figueiras

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Facultad de Farmacia. Universidad de Los Andes,
Mérida, Venezuela.

A new list of the Lichen Flora of Venezuela is provided in this work. It has to be pointed out the inclusion of several new records for this Flora.

The material collected from the western part of Venezuela has been examined by specialists in this field.

Coccocarpia erythrocardia (Müll. Arg.) L. Arvidss.

Estado Mérida: En Morro Negro, área de Pico de Horma, al sureste de Mesa Quintero, López-Figueiras 22892, 23090.

Dictyonema sericeum (Sw.) Berk.

Estado Lara: Cerro Zamuro, cercanías de Villa Nueva, carretera Guarico-Villa Nueva, López-Figueiras & M. Hale 19881.

Estado Mérida: La Carbonera, cercanías de Mérida, López-Figueiras 12947.

El Maciegal, cuenca del río La Pedregosa, cercanías de Mérida 10574.

Alrededores del Portachuelo, vía El Morro-Aricagua, López-Figueiras 12909.

En Morro Negro, área de Pico de Horma, al sureste de Mesa Quintero, López-Figueiras & H. Rodríguez 23015.

Estado Táchira: Páramo de Tamá, vertiente oriental del Pico Banderas, M. Hale & López-Figueiras 45281, 45441, 45444.

Pico El Cobre, un sector del páramo de Tamá, López-Figueiras & Ruiz Terán 9990.

Valle del Páramo de Tamá, entre Villa Páez y Betania, M. Hale & López-Figueiras 45206.

Páramo de Tamá, en el camino a El Descanso, López-

Figueiras 16731, 24487.

Páramo El Rosal, López-Figueiras 10151.

1rst. record for the Andes area.

Dirinaria applanata (Fée) Awasti.

Estado Falcón: Sierra Ziruma o Empalado, cerro Socopo, López-Figueiras & R. Wingfield 22523.

Sierra San Luis, Piedra de Agua, cercanías de San Luis, López-Figueiras & R. Wingfield 22421.

Península de Paraguaná: A lo largo de Monte Cano, matorral espinoso, López-Figueiras 21264, 21293, 22480.

A lo largo del arroyo Santa Ana, cerro Santa Ana, López-Figueiras & R. Wingfield 21335, 21827, 21838, 21840.

Estado Lara: Sierra Ziruma o Empalado, alrededores de Sinamaica, cercanías de Cerro Azul, López-Figueiras & R. Wingfield 21565.

Serranía de Bobare, en cerro Pávia, entre Barquisimeto y la Encrucijada, vía a Coro, López-Figueiras & R. Smith 21116, 21117.

Carretera Barbacoas-Hato Arriba - El Tocuyo, cuenca de la quebrada Cujisal, López-Figueiras & R. Smith 16571, 16579.

Sabanas de El Altar-Yaritagua, proximidades de un puente sobre el río Turbio, López-Figueiras & R. Smith 16458.

Estado Mérida: Mérida, epífito en árboles de la Avenida Don Tulio con calle Miranda, López-Figueiras 9039A.

La Carbonera, vía Mérida-La Azulita, López-Figueiras & M. Keogh 9202, 9221.

Jají, vía La Playa, López-Figueiras 17560.

El Moral, vía Guaraque-Mesa Quintero, López-Figueiras & H. Rodríguez 22840.

Páramo de Mariño, cercanías de Tovar, López-Figueiras 24737.

Estado Táchira: Proximidades de La Providencia, cercanías de Rubio, carretera vieja San Cristobal-Rubio, López-Figueiras & H. Rodríguez 25623.

Estado Trujillo: Páramo El Morro, final de la vía Carache-Los Cortijos, proximidades del entronque con la carretera Carache-Agua de Obispo, López-Figueiras 28427.

Entre el Filo de San Isidro y La Becerrera, 25 km de Concepción de Carache (por la carretera nueva), López-Figueiras 28067.

1rst. record for north-west region of Venezuela.

Dirinaria confluens (Fr.) Awasti.

Estado Falcón: Inmediaciones del río Ricoa, carretera Coro-Morón, López-Figueiras & R. Wingfield 21692.

Entre La Cruz y La Goya, carretera Coro-Churuguara, López-Figueiras 21875.

Península de Paraguaná: A lo largo de Monte Cano, López-Figueiras 21252, 21291.

Estado Mérida: Mocomboco, vía Aricagua, López-Figueiras-R. Terán 8964.

Estado Trujillo: Vertiente oriental del Páramo El Guache, Los Cortijos, cercanías de Carache, López-Figueiras 28203A, 28400.

Entre Carache y Concepción, López-Figueiras & H. Rodríguez 28007.

Estado Lara: Serranía de Ziruma o Empalado, alrededores de Sinamaica, López-Figueiras & R. Wingfield 21567.

Cumbres de la Serranía de Baragua, más allá de Altagracia-Pedregal, López-Figueiras & R. Smith 20930.

Estado Táchira: Proximidades de Providencia, cercanías de Rubio, López-Figueiras & H. Rodríguez 25620.

Cercanías de Cordero a lo largo de la carretera San Cristobal-Alto de Zumbador, López-Figueiras 24790.

Dirinaria leopoldii (Stein) Awasti.

Estado Lara: Sierra Portuguesa, en Loma de León, proximidades de Barquisimeto, López-Figueiras & R. Smith 21198.

Dirinaria papillulifera (Nylander) Awasti.

Estado Falcón: Alrededores del Treinta, carretera Coro-Churuguara, López-Figueiras 21881.

Península de Paraguaná: A lo largo de Monte Cano, López-Figueiras & R. Wingfield 22479, 22488.

Dirinaria purpurascens (Vainio) Moore.

Estado Falcón: Península de Paraguaná, a lo largo de Monte Cano, López-Figueiras 21251, 22476.

1rst. record for north-west area of Venezuela.

Hypotrachyna velloziae (Vainio) Hale

Estado Lara: En el camino entre el fundo "Buenos Aires" y Humocaro Alto, López-Figueiras & M. Hale 19670.

Physcia stellaris (L.) Nylander

Estado Lara: Alrededores de "El Manzano", zona xerófila, vía Barquisimeto-Río Claro, López-Figueiras 16043.

Parmotrema bangii (Vainio) Hale

Estado Lara: Carretera Barbacoas-Hato Arriba-El Tocuyo, cuenca del río Cocuisa, López-Figueiras & R. Smith 16605.

Parmotrema gardneri (Dodge) Hale

Estado Lara: Fundo "Buenos Aires", cercanías de Humocaro Alto, López-Figueiras & M. Hale 19564, 19604.

Estado Mérida: Páramo de Las Coloradas, potreros de San Rafael, López-Figueiras 15575.

La Carbonera, vía Mérida-La Azulita, M. Hale & López-Figueiras 44036.

Estado Trujillo: Páramo de Guaramacal, cercanías de Boconó, López-Figueiras & M. Hale 19955, 19959.

Parmotrema neotropicum Kurokawa

Estado Lara: Sierra Portuguesa, cercanías de Villa Nueva, López-Figueiras & M. Hale 19825.

Estado Táchira: Villa Páez-Betania, valle del Páramo de Tamá, M.E. Hale & López-Figueiras 45142.

Parmotrema stechelii (Vainio) Hale

Estado Mérida: Potreros de San Rafael, Páramo de Las Coloradas, M.E. Hale & López-Figueiras 44292.

Pseudevernia furfuracea (L.) Zopf

Estado Trujillo: Vertiente oriental del Páramo del Jabón, límites con el estado Lara, López-Figueiras 26554.

1st. record for South America.

Ramalina aspera Räs.

Estado Lara: En Canape, 18 km de Barquisimeto, en la vía a Quíbor, López-Figueiras & R. Smith 20732.

Ramalina celastri (Sprengel) Krog & Swinscow

Estado Falcón: Sierra de San Luis, alrededores de La Tabla, vía Churuguara-Coro, López-Figueiras 19372, 19373.

Estado Mérida: El Paramito, cercanías de El Morro, López-Figueiras 14697.

Finca "La Culata", parte alta del Valle, cercanías de Mérida, López-Figueiras 13624.

Estado Lara: Sierra de Barbacoas, a lo largo de la vía entre Las Porqueras y Las Palmas, López-Figueiras 22220.

Ramalina usnea (L.) R.H. Howe. Race I. Sekikaic acid.

Estado Falcón: Península de Paraguaná, Cerro de Santa Ana, López-Figueiras 19429, 19430B.

1rst. record for Falcón State.

Ramalina usnea (L.) R.H. Howe. Race Divaricatic acid.

Estado Falcón: Península de Paraguaná, a lo largo de Monte Cano, López-Figueiras 21290, 21306A, 21308.

Península de Paraguaná, cerro Santa Ana, López-Figueiras, 19244, 19424B, 21381.

1rst. record for Falcón State.

Schistophoron variabile Tibell

Estado Lara: Serranía de Bobare, en Pico-Pico, López-Figueiras & R. Smith 20778.

Tylophoron crassiusculum Tibell

Estado Mérida: Monte Zerpa, proximidades de la Hecicera, cercanías de Mérida, López-Figueiras 22795, 22798.

Estado Lara: Sierra Portuguesa, en Villa Nuevita, vía Guarico-Villa Nueva, López-Figueiras & M. Hale 19764.

Xanthoria elegans (Link) Th. Fr. As Caloplaca elegans (Link) Th. Fr. in Vareschi 1973.

Estado Mérida: Páramo de Mucuchíes, alrededores de la Torre de T.V., M. Hale & López-Figueiras 44615.

Pico El Gavilán, Páramo de Mucuchíes, López-Figueiras & M. Keogh 11866.

Páramo de Mucuchíes, alrededores del Pico El Aguila, López-Figueiras 23527.

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Special thanks are due to R. Smith and R. Wingfield for their kind help during our field work in Lara and Falcón States respectively. The author also gratefully acknowledge the financial support from CONICIT (grant S1-26-BIO-SI: 0981) and from the Consejo de Desarrollo Científico y Humanístico, ULA (grant FA-43-81).

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gist 14(4):219-254.
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245.

NOTES ON NEW AND NOTEWORTHY PLANTS. CLXVIII

Harold N. Moldenke

AEGIPHILA PERUVIANA var. *OBLONGIFOLIA* (Rusby) Mold., stat. nov.
Aegiphila oblongifolia Rusby, Bull. Torrey Bot. Club 27: 81.
1900.

ALOYSIA BOLIVIENSIS Mold., sp. nov.

Frutex, ramulis subtetragonis minutissime puberulis; foliis plerumque quaternis aromaticis petiolatis; petiolis gracillimis 5--6 mm. longis minutissime puberulis; laminis foliorum anguste lanceolatis maturitate ca. 5 cm. longis 2 cm. latis apicaliter obtusis subrotundisve basaliter abrupte acutis supra minutissime puberulis rugulosis subtus densissime puberulis; inflorescentiis axillaribus plerumque quaternis toto 2--4 cm. longis; pedunculis variis gracillimis minutissime puberulis 1--2 cm. longis densissime multifloris; calicibus extus densissime pubescentibus, margine 5-lobatis, lobis purpureis; corolla albida extus puberulis.

A low shrub, about 1.5 m. tall; branches rather slender, subtetragonal, densely and very minutely puberulent throughout; principal internodes 2.5--4 cm. long, rather uniform; leaf-scars elevated and prominent, parallel to the branches, oblong, ca. 2.5 mm. long; leaves mostly quaternate, sometimes ternate, aromatic, rather uniform in shape and size, but decreasing in size on the upper inflorescence-bearing portions of the branches; petioles very slender, 5--6 mm. long, densely and very minutely puberulent; leaf-blades narrowly lanceolate, at maturity about 5 cm. long and 2 cm. wide, smaller in the upper inflorescence-bearing portion of the branches, apically obtuse or rotundate, basally abruptly acute, marginally uniformly and bluntly serrulate from the apex practically to the base, very minutely puberulent and shallowly rugulose above, very densely puberulent beneath; inflorescence axillary, mostly quaternate at each node of the upper portion of the branches, in all 2--4 cm. long during anthesis; peduncles various in length even at the same node, very slender, 1--2 cm. long, very minutely puberulent; floriferous portion of the spike 1--2 cm. long during anthesis, densely many-flowered; calyx very densely pubescent on the outer surface, the rim deeply 5-lobed, the lobes narrowly triangular and apically attenuate and usually purplish; corolla small, white, externally puberulent.

The species is based on *J. C. Solomon 7410* from a thorn scrub of *Prosopis*, *Dodonaea*, and *Atriplex* 2 km. east (below) of Mecapaca, at 16°40' S., 68°01' W., at 2900 m. altitude, La Paz, Bolivia, collected on March 28, 1982, and deposited in the Lundell Herbarium at the University of Texas.

LEIOTHRIX MUCRONATA var. *GLABRA* Mold., var. nov.

Haec varietas a forma speciei typica pedunculis glabris recedit.

This variety differs from the typical form of the species in having its peduncles glabrous.

The variety is based on *Julian A. Steyermark* 75926 from wet soil of a large swamp in the east-central portion of the summit of Apácará-tepui, at 2450--2500 m. altitude, Chimantá Massif, Bolívar, Venezuela, collected on June 21 or 22, 1953, and deposited in the United States National Herbarium in Washington. The collector notes: "in dense clumps; leaves shorter than those of 75925".

LIPPIA LAMIANA (Mold.) Mold., comb. nov.

Lantana lamiana Mold., *Lilloa* 5: 413. 1940.

VITEX GIGANTEA var. *CONGESTIFLORA* Mold., var. nov.

Haec varietas a forma typica speciei inflorescentiis valde congestis pedunculis valde abbreviatis usque ad 5 mm. longis recedit.

This variety differs from the typical form of the species in its very congested inflorescences, the peduncles less than 1 cm. long.

The variety is based on *Robin B. Foster* 3858 from along the edge of a *cocha* near the settlement of Limoncocha, at 240 m. altitude, Napo, Ecuador, collected on September 27, 1977, and deposited in the Britton Herbarium at the New York Botanical Garden. The tree apparently comes into full anthesis while still leafless.

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ADDITIONAL NOTES ON THE *ERIOCAULACEAE*. LXXXVIII

Harold N. Moldenke

ERIOCAULON QUINQUANGULARE L.

Additional & emended synonymy: *Leucocephala graminifolia* Roxb., Hort. Beng., imp. 1, 68. 1814. *Leucocephala graminifolia* Roxb., Fl. Ind. 3: 612 & 865. 1832. *Eriocaulon graminifolium* L. ex C. B. Robinson, Philip. Journ. Sci. Bot. 7: 415, in syn. 1912.

Additional & emended bibliography: J. F. Gmel. in L., Syst. Nat., ed. 13, imp. 1, 2: 206. 1791; Roxb., Hort. Beng., imp. 1, 68. 1814; LaMaout & Decne., Trait. Gén. Bot. 589. 1868; C. B. Robinson, Philip. Journ. Sci. Bot. 7: 415. 1912; Fyson, Journ. Ind. Bot. 2: 139, 204, & 259--260, fig. 1 & 2, pl. 9. 1921; Fyson, Indian Sp. Erioc. pl. 9. 1923; C. A. Gardn., Enum. Pl. Austral. Occid. 1: 17. 1930; Worsdell, Ind. Lond. Suppl. 1: 376. 1941; Savage, Cat. Linn. Herb. Lond. 21. 1945; Balapure, Journ. Bomb. Nat. Hist. Soc. 68: 374. 1971; Amaratunga, Ceyl. Journ. Sci. Biol. 12: 189. 1977; Babu, Herb. Fl. Dehra Dun 546 & 548. 1977; Monteiro-Scanavacca & Mazzoni, Revist. Bras. Bot. 1: 63. 1978; Sharma, Shetty, Vivekan., & Rathakrish., Journ. Bomb. Nat. Hist. Soc. 75: 38. 1978; Singh, Journ. Bomb. Nat. Hist. Soc. 75: 318. 1978; Holm, Pancho, Herberger, & Plucknett, Geogr. Atlas World Weeds 148. 1979; Mold., Phytologia 41: 453, 455, & 462. 1979; Monteiro, Giuliatti, Mazzoni, &

Castro, Bol. Bot. Univ. S. Paulo 7: 48. 1979; Roxb., Hort. Beng., imp. 2, 68. 1980; Mold., Phytol. Mem. 2: 208, 254, 256, 262, 268, 270, 272, 285, 292, 336, 403, 405, 409, 412, & 603--604. 1980; Mold., Phytologia 50: 260 & 262 (1982) and 53: 270, 279, & 280. 1983.

Additional & emended illustrations: LaMaout & Decne., Trait. Gén. Bot. 589. 1868; Fyson, Journ. Indian Bot. 2: 139, fig. 1 & 2, pl. 9. 1921; Fyson, Indian Sp. Erioc. pl. 9. 1923.

Balapure (1971) reports this species "quite common in moist places" in the Nagarjun hill forest, citing *Balapure 70631*, but Sharma and his associates (1978) refer to it as "rare" around Benna, at 1125 m. altitude, citing *Shetty 11953*. The Fadens report the "leaves often maroon-tinged". Babu (1977) reports the species common in moist grassy localities in the sal forest of the Dehra Dun section of India, flowering there from September to December, citing *Babu 34943 & 34943a*. Singh (1978) found it growing in tanks, lakes, puddles, ponds, and ricefields, flowering from December to April, but "not found along rivers or other streams". The Bremers encountered it at 100 feet altitude, in both flower and fruit in February. Cramer describes it as having the "stems 5-angled, the flowers ashy-white" and found it growing in shallow soil of rock hollows and "common and abundant in association with *Dopatrium nudicaule* in soggy ground among short grass", at sealevel to 90 m. altitude, flowering and fruiting in January and February. Sinclair reports it "common in marshy ground above sand dunes" in West Bengal, while Saldanha & Ramamoorthy encountered it only as an "occasional annual herb with needle-like leaves in full sun on moist soil in wet deciduous forests" in Mysore.

Other recent collectors describe *E. quinquangulare* as a common annual herb with white or "dirty-white" heads and pinkish or red leaves. They have found it growing in old paddy fields, in full sun exposure along streams, near marshes and drying-up ponds, and in moist fields after harvest, at 300--1070 m. altitude, in both flower and fruit in January, August, October, and December. Saldanha speaks of the heads as "dark" [in fruiting stage?].

Lecomte (1912) cites for this species only unnumbered collections made by Baudouin, by Germain, by Talmy, and by Thorel in Cochinchina [Vietnam].

Material of *E. quinquangulare* has been misidentified and distributed in some herbaria as *E. truncatum* Hamilt.

Additional citations: INDIA: Karnataka: *Ramamoorthy HFP.1255* (W--2797022); *Saldanha 12259* (W--2797020), *15203* (W--2797019), *15451* (W--2697021); *Saldanha & Ramamoorthy HFP.1195* (E--2317324). West Bengal: *J. Sinclair 3191* (W--2918902). SRI LANKA: *Bremer & Bremer 25* (W--2877163); *Cramer 5095* (W--2867785), *5096* (W--2867784); *Faden & Faden 77/194* (W--2877986); *Jayasuriya 1948* (E--2368436); *Soejarto 4841* (W--2888998); *Townsend 73/81* (Ac); *Wirawan 1026* (W--2923135).

ERIOCAULON QUINQUANGULARE var. *ELATIUS* Mold.

Additional bibliography: Mold., Phytologia 41: 453. 1979; Mold.,

Phytol. Mem. 2: 604. 1980.

ERIOCAULON QUINQUANGULARE var. *MARTIANUM* Wall.

Additional bibliography: Mold., *Phytologia* 41: 453. 1979; Mold., *Phytol. Mem.* 2: 268, 272, 403, & 604. 1980.

Additional citations: SRI LANKA: *Sumithraarachchi*, Austin, & Austin DBS.996 (W--2915590).

ERIOCAULON RAVENELII Chapm.

Additional synonymy: *Eriocaulon engleri* Ruhl. ex Mold., *Phytologia* 52: 128, in syn. 1982.

Additional bibliography: Kral in Godfrey & Wooten, *Aquat. Wetl. Pl. Southeast. U. S.* 504, 515, 516, & 518, fig. 299. 1979; Mold., *Phytologia* 41: 453. 1979; J. T. & R. Kartesz, *Check-list Vasc. Fl.* 2: 197. 1980; Mold., *Phytol. Mem.* 2: 17, 22, 403, & 604. 1980; Duncan & Kartesz, *Vasc. Fl. Ga.* 36. 1981; Wunderlin, *Guide Vasc. Pl. Cent. Fla.* 125. 1982.

Additional illustrations: Kral in Godfrey & Wooten, *Aquat. Wetl. Pl. Southeast. U. S.* 516, fig. 299. 1979.

Recent collectors have encountered this plant in wet soil between clumps of sawgrass and in moist prairie openings between trees in pine flatwoods, in both flower and fruit in January.

Wunderlin (1982) refers to it as "Occasional; scattered localities" in wet pine flatwoods and swamps, flowering in "Summer".

The *Muenschner & Muenschner 14057*, distributed as *E. ravenelii*, actually is *Lachnocaulon glabrum* Körn.

Additional citations: FLORIDA: Collier Co.: *Lakela 31686* (Ne--53071, Ne--53072). Dade Co.: *Ware & Beck 4055* (Ne--97224). Highlands Co.: *Stoutemire 1703* (Mi). Lee Co.: *R. Kral 22923* (Go). MOUNTED ILLUSTRATIONS: Kral, *Sida* 2: 294. 1966 (Ld); Kral in Godfrey & Wooten, *Aquat. Wetl. Pl. Southeast. U. S.* fig. 299. 1979 (Ld).

ERIOCAULON RECURVIFOLIUM C. H. Wright

Additional bibliography: Mold., *Phytologia* 33: 10. 1976; Mold., *Phytol. Mem.* 2: 220 & 604. 1980.

ERIOCAULON REDACTUM Ruhl.

Additional synonymy: *Eriocaulon sieboldianum* sensu Hook. ex Bennet, *Fl. Howrah 99*, in syn. 1976 [not *E. sieboldianum* L., 1965, nor Sieb., 1966, nor Sieb. & Zucc., 1858, nor "Sieb. & Zucc. ex Steud.", 1966, nor Steud., 1894].

Additional bibliography: Hook. f., *Fl. Brit. India* 6: 577. 1893; Bennet, *Sci. Cult.* 33: 121. 1967; Bennet, *Fl. Howrah 99*. 1976; Mold., *Phytologia* 34: 488. 1976; Mold., *Phytol. Mem.* 2: 262, 285, & 604. 1980.

Bennet (1976), citing his *no. 1040*, avers that this species is "Common in paddy-fields with a thin layer of water or without water: occasionally in other swampy areas" and gives the overall distribution as "General; common", flowering from

September to November. He notes that "Ruhland followed by Moldenke treats this species [as] distinct from *E. sieboldianum* Sieb. & Zucc.; though Fyson (J. Ind. Bot. Soc. 3: 15--16. 1923) treats them as conspecific."

ERIOCAULON REGNELLII Mold.

Additional bibliography: Mold., *Phytologia* 24: 496. 1972; Mold., *Phytol. Mem.* 2: 142 & 604. 1980.

ERIOCAULON REITZII Mold. & Sm.

Additional bibliography: Mold., *Phytologia* 36: 487--488. 1977; Klein, *Sellowia* 31: 131 (1979) and 32: 312. 1980; Angely, *S. Am. Bot. Bibl.* 2: 679. 1980; Mold., *Phytol. Mem.* 2: 142 & 604. 1980.

ERIOCAULON REMOTUM H. Lecomte

Additional bibliography: Mold., *Phytologia* 41: 453--454. 1979; Mold., *Phytol. Mem.* 2: 207, 208, 401, & 604. 1980.

ERIOCAULON RITCHIEANUM Ruhl.

Additional bibliography: Fyson, *Journ. Indian Bot.* 2: 139, fig. 9. 1921; Fyson, *Indian Sp. Erioc.* pl. 43 & 44. 1923; Anon., *Kew Bull. Gen. Index* 111. 1959; Worsdell, *Ind. Lond. Suppl.* 1: 375. 1941; Mold., *Phytologia* 33: 10, 18, & 19. 1976; Mold., *Phytol. Mem.* 2: 262, 401, 402, & 604. 1980.

Additional illustrations: Fyson, *Journ. Indian Bot.* 2: 139, fig. 9. 1921; Fyson, *Indian Sp. Erioc.* pl. 41. 1923.

Additional citations: MOUNTED CLIPPINGS: Fyson, *Journ. Indian Bot.* 3: 13. 1922 (W).

ERIOCAULON ROBINSONII Mold.

Additional bibliography: Mold., *Phytologia* 34: 488. 1976; Mold. *Phytol. Mem.* 2: 292 & 604. 1980.

ERIOCAULON ROBUSTIUS (Maxim.) Mak.

Additional bibliography: Mak., *Illust. Fl. Jap.* [725]. 1924; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 36: 488. 1977; Holm, Pancho, Herberger, & Plucknett, *Geogr. Atlas World Weeds* 148. 1979; Mold., *Phytol. Mem.* 2: 198, 278, 299, 301, 303, 304, 403, & 604. 1980; Bartholomew & al., *Journ. Arnold. Arb.* 64: 95. 1983; Mold., *Phytologia* 53: 266. 1983.

Additional illustrations: Mak., *Illust. Fl. Jap.* [725]. 1924; Mak., *Illust. Fl. Nipp.* 772, fig. 2314. 1940.

Recent collectors have found this plant growing in wet rice-fields and dried-up paddy-fields, at 1500 m. altitude, in both flower and fruit in October.

Material has been misidentified and distributed in some herbaria as *E. buergerianum* Körn. On the other hand, the 1980 *Sino-Amer. Exped. 1187*, distributed as *E. robustius*, actually is *E. alpestre* Hook. f. & Thoms.

Additional citations: CHINA: Hupeh: 1980 *Sino-Amer. Exped.* 2061 (N). JAPAN: Honshu: Hashimoto 850 (M); Iwatsuki & Koyama 792 (N); Murata 19689 (N), 20853 [Pl. Jap. Exsicc. 995] (N);

Togasi 915 (Mi). MOUNTED ILLUSTRATIONS: Mak., *Illust. Fl. Nipp.* 772, fig. 2314. 1940 (Ld).

ERIOCAULON ROBUSTIUS var. *NIGRUM* Satake

Additional bibliography: Mold., *Phytologia* 24: 497. 1972; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

ERIOCAULON ROBUSTIUS var. *PERPUSILLUM* (Nakai) Satake

Additional bibliography: Mold., *Phytologia* 24: 497. 1972; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

ERIOCAULON ROBUSTO-BROWNIANUM Ruhl.

Additional & emended bibliography: Fyson, *Journ. Indian Bot.* 2: 264--266, pl. 18. 1921; Fyson, *Indian Sp. Erioc.* 41, pl. 18. 1923; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Anon., *Kew Bull. Gen. Index* 111. 1959; Hocking, *Excerpt. Bot. A.* 23: 292 & 389. 1974; Mold., *Phytologia* 41: 454. 1979; Mold., *Phytol. Mem.* 2: 262, 268, 272, 285, 403, & 604. 1980; Mold., *Phytologia* 53: 335 & 347. 1983.

Additional & emended illustrations: Fyson, *Journ. Indian Bot.* 2: 265, pl. 18. 1921; Fyson, *Indian Sp. Erioc.* 41, pl. 18. 1923.

Recent collectors refer to this species as a common, aquatic, marshy herb with white heads. They have encountered it in wet deciduous forests, in flower in February and May and in fruit in February, May, and November. Saldanha notes (on his no. 15632) "locally common marshy herbs to 5 ft."

Material of *E. robusto-brownianum* has been misidentified and distributed in some herbaria as *E. polycephalum* Hook. f. On the other hand, the *Saldanha 12327*, distributed as *E. robusto-brownianum*, actually is *E. polycephalum* Hook. f.

Additional citations: INDIA: Karnataka: *Saldanha 13725* (W--2797018), *15632* (W--2797024), *16445* (W--2797017). MOUNTED CLIPPINGS & ILLUSTRATIONS: Fyson, *Journ. Indian Bot.* 2: 264. 1921 (W); Fyson, *Kew Bull. Misc. Inf.* 1914: 331. 1914 (W, W); Naik, *Journ. Indian Bot. Soc.* 52: 110, fig. 2. 1973 (Ld).

ERIOCAULON ROBUSTUM Steud.

Additional bibliography: Fyson, *Indian Sp. Erioc.* 47, pl. 29 & 30. 1923; Mak., *Gensyoku Yagai-shokubutu* [Nature-Col. Wild Pl.] 3: 193. 1933; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 34: 489. 1976; Mold., *Phytol. Mem.* 2: 262, 285, & 604. 1980.

Additional illustrations: Fyson, *Indian Sp. Erioc.* 47, pl. 29 & 30. 1923; Mak., *Gensyoku Yagai-shokubutu* [Nature-Col. Wild Pl.] 3: 193 (in color). 1933.

Sinclair reports this species "rare" in moist rocky places on steep hillsides, in both flower and fruit in April.

Additional citations: INDIA: Tamil Nadu: *J. Sinclair 3436* (W--2918899).

ERIOCAULON ROCKIANUM Hand.-Mazz.

Additional bibliography: Mold., *Phytologia* 25: 69. 1972; Mold.,

Phytol. Mem. 2: 278 & 604. 1980.

ERIOCAULON ROLLANDII Rousseau

This taxon is now known as *E. pellucidum* f. *rollandii* (Rousseau) Mold., which see.

ERIOCAULON ROSEUM Fyson

Additional bibliography: Fyson, Journ. Indian Bot. 2: 139, 204, & 205, fig. 13. 1921; Fyson, Indian Sp. Erioc. 32. 1923; Worsdell, Ind. Lond. Suppl. 1: 376. 1941; Mold., Phytologia 29: 223. 1974; Mold., Phytol. Mem. 2: 272 & 604. 1980.

Additional & emended illustrations: Fyson, Journ. Indian Bot. 2: 139 & 205, fig. 13. 1921; Fyson, Indian Sp. Erioc. 32. 1923.

ERIOCAULON ROSULATUM Körn.

Additional bibliography: Mold., Phytologia 29: 223. 1974; Mold., Phytol. Mem. 2: 142 & 604. 1980.

ERIOCAULON ROUXIANUM Steud.

Additional bibliography: Mold., Phytologia 33: 11. 1976; Mold., Phytol. Mem. 2: 262 & 604. 1980.

ERIOCAULON RUBESCENS Mold.

Additional bibliography: Mold., Phytologia 25: 69. 1972; Mold., Phytol. Mem. 2: 115 & 604. 1980.

ERIOCAULON RUFUM H. Lecomte

Additional bibliography: Mold., Phytologia 41: 451 & 454. 1979; Mold., Phytol. Mem. 2: 207, 208, 403, & 604. 1980.

ERIOCAULON RUHLANDII Schinz

Additional bibliography: Mold., Phytologia 26: 36. 1973; Mold., Phytol. Mem. 2: 243, 245, & 604. 1980.

ERIOCAULON SACCATUM Van Royen

Additional bibliography: Mold., Phytologia 33: 11. 1976; Mold., Phytol. Mem. 2: 326 & 604. 1980.

ERIOCAULON SACHALINENSE Miyabe & Nakai

Additional bibliography: Mold., Phytologia 26: 36. 1973; Mold., Phytol. Mem. 2: 299 & 604. 1980.

Additional citations: MOUNTED CLIPPINGS & ILLUSTRATIONS: Miyabe & Nakai, Bot. Mag. Tokyo 42: 479. 1928 (W); Satake, Bull. Tokyo Sci. Mus. 4: pl. 8, fig. 15. 1940 (Ld--photo of type).

ERIOCAULON SANTAPAU Mold.

Additional bibliography: Bole & Almeida, Journ. Bomb. Nat. Hist. Soc. 74: 227. 1977; Mold., Phytologia 41: 454. 1979; Mold., Phytol. Mem. 2: 262 & 604. 1980.

ERIOCAULON SATAKEANUM Tatew. & Itô

Additional bibliography: Mold., *Phytologia* 36: 488. 1977; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

ERIOCAULON SCARIOSUM J. E. Sm.

Additional & emended bibliography: Steud., *Syn. Pl. Glum.* 2: [Cyp.] 269, 270, 273, & 334. 1855; Rotherham, Briggs, Blaxwell, & Carolin, *Flow. Pl. N. S. Wales* 50 & 187, pl. 121. 1975; Mold., *Phytologia* 36: 488. 1977; Mold., *Phytol. Mem.* 2: 336, 339, 340, & 604. 1980.

Additional illustrations: F. M. Bailey, *Weeds Poison. Pl. Queensl.* 207. 1906; Rotherham, Briggs, Blaxwell, & Carolin, *Flow. Pl. N. S. Wales* 50, pl. 121 (in color). 1975.

Recent collectors have found this plant growing on "dripping rock face overlooking the sea in association with *Lobelia alata*, *Juncus planifolius*, *Hydrocotyle* sp., etc." at 20 m. altitude in New South Wales. In Queensland Paijmans reports it "locally common on moist sandy riverbanks" and "very common at the most inner edge of sandy lake shores", in both flower and fruit in August.

Additional citations: AUSTRALIA: New South Wales: *Coveny* 737 [Nat. Herb. N.S.W. 120948] (Ba). Queensland: *Paijmans* 2868 (E--2804469), 3040 (E--2804470). MOUNTED ILLUSTRATIONS: Beadle, Evans, Carolin, & Tindale, *Fl. Sydney Reg.*, ed. 2, fig. 49. 1972 (Ld).

ERIOCAULON SCHIEDEANUM K&orn.

Additional bibliography: Mold., *Phytologia* 41: 455. 1979; Mold., *Phytol. Mem.* 2: 62 & 604. 1980.

Additional citations: MEXICO: Jalisco: *Pringle* 6146 in part (It).

ERIOCAULON SCHIMPERI K&orn.

Additional & emended synonymy: *Eriocaulon volkensis* var. *mildbraedii* Ruhl., *Wiss. Ergebn. Deutsch. Zentralafr. Exped.* 2 (1): 57--58. 1910. *Eriocaulon schimperi* Engl. ex Mold., *Phytol. Mem.* 2: 403, in syn. 1980.

Additional bibliography: Ruhl., *Wiss. Ergebn. Deutsch. Zentralafr. Exped.* 2 (1): 57--58. 1910; Fedde & Schust., *Justs Bot. Jahresber.* 39 (2): 10. 1913; Mold., *Phytologia* 29: 223--224. 1974; Mold., *Phytol. Mem.* 2: 203, 220, 222--224, 226, 230, 235, 239, 403, & 604. 1980.

Ash refers to this species as having shiny light-green leaves, white flower-heads, and indigo-blue anthers, and reports it local in tufted groups in "seepage of tuff rocks and earth banks" associated with *Veronica glandulosa*, *Limosella africana*, etc. at 2400 m. altitude, flowering in June.

Additional citations: ETHIOPIA: *Ash* 2479 (W--2819900).

ERIOCAULON SCHIMPERI var. *GIGAS* Mold.

Additional bibliography: Mold., *Phytologia* 25: 71. 1972; Mold.,

Phytol. Mem. 2: 230 & 604. 1980.

ERIOCAULON SCHIPPPII Standl.

Additional bibliography: Mold., Phytologia 41: 455. 1979; Mold., Phytol. Mem. 2: 74, 233, & 604. 1980; Mold., Phytologia 50: 243. 1982.

Recent collectors refer to this plant as forming mats in charco and clear running streams 20 cm. to 1 m. deep, at 200 m. altitude, associated with *Juncus repens*, *Benjaminia fuirena*, and *Rhynchospora* sp. They describe it as a rooted annual, the submerged inflorescences black, the emergent ones white.

Additional citations: MEXICO: Tabasco: Cowan & Magana 3269 (N), 3273 (N). COSTA RICA: Guanacaste: Gómez-Laurito 7190 (So--83351). Puntarenas: W. W. Thomas 2324 (N).

ERIOCAULON SCHLECHTERI Ruhl.

Additional bibliography: Mold., Phytologia 29: 224. 1974; Mold., Phytol. Mem. 2: 235, 240, & 604. 1980.

ERIOCAULON SCHOCHIANUM Hand.-Mazz.

Additional bibliography: Mold., Phytologia 29: 224. 1974; Mold., Phytol. Mem. 2: 278 & 604. 1980.

Forrest refers to this plant as 3--6 inches tall, with gray "flowers", and found it growing in marshy pastures at 3000 m. altitude, in both flower and fruit in August.

Additional citations: CHINA: Yunnan: Forrest 11773 (Ba).

ERIOCAULON SCHOCHIANUM var. *PARVICEPS* Hand.-Mazz.

Additional bibliography: Mold., Phytologia 25: 71. 1972; Mold., Phytol. Mem. 2: 278 & 604. 1980.

ERIOCAULON SCHULTZII Benth.

Additional bibliography: Mold., Phytologia 41: 453 & 455. 1979; Mold., Phytol. Mem. 2: 336 & 604. 1980.

ERIOCAULON SCHWEICKERDTI Mold.

Additional bibliography: Mold., Phytologia 25: 71. 1972; Mold., Phytol. Mem. 2: 237 & 604. 1980.

ERIOCAULON SCLEROCEPHALUM Ruhl.

Additional bibliography: Mold., Phytologia 36: 488--489. 1977; Mold., Phytol. Mem. 2: 89, 91, & 604. 1980.

ERIOCAULON SCORPIONENSE Van Royen. Alpine Fl. N. Guin. 2: 841--843, fig. 285 F--0 [as "*scorpionensis*"]. 1979.

Synonymy: *Eriocaulon scorpionensis* Van Royen, Alpine Fl. N. Guin. 2: 842, sphalm. 1979.

Bibliography: Van Royen, Alpine Fl. N. Guin. 2: 825, 841--843, fig. 285 F--0. 1979; Mold., Phytologia 50: 254, 260, & 270. 1982.

This species is based on Croft & Hope LAE.65932 from Mount Scorpion, Territory of New Guinea, deposited in the herbarium of the Bishop Museum, Honolulu. It was collected in a cushion bog in al-

pine grasslands at 3500 m. altitude, in both flower and fruit in May and is known thus far only from the original collection.

Citations: MOUNTED ILLUSTRATIONS: Van Royen, *Alpine Fl. N. Guin.* 2: 841, fig. 285 F--O. 1979 (Ld)

ERIOCAULON SEDGWICKII Fyson

Additional bibliography: Fyson, *Indian Sp. Erioc.* pl. 16. 1923; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 33: 12. 1976; Mold., *Phytol. Mem.* 2: 262 & 604. 1980.

Additional illustrations: Fyson, *Indian Sp. Erioc.* pl. 16. 1923.

The *Padhye* 9, distributed as *E. sedgwickii*, actually is *E. xeranthemum* Heyne.

Additional citations: MOUNTED CLIPPINGS: Fyson, *Journ. Indian Bot.* 2: 260. 1921 (W).

ERIOCAULON SEEMANNII Mold.

Additional bibliography: Mold., *Phytologia* 36: 489. 1977; F. C. Seymour, *Phytol. Mem.* 1: 85. 1980; Mold., *Phytol. Mem.* 2: 62, 75, 78, 83, & 604. 1980; Mold., *Phytologia* 50: 243 (1982) and 53: 293. 1983.

Recent collectors describe this plant as an annual or perennial herb, 10--20 cm. tall, with whitish "flowers" or flower-heads. They have found it growing in sandy soil of primary oak woods, "disperse en el lodo del charco con *Eragrostis*, *Utricularia*, *Juncus repens* (escasa) en suelo arenoso-arcilloso, sabana, pastizal", at 200--2100 m. altitude, in anthesis in July, and in both flower and fruit in February, March, and November. Cowan refers to the plant as an "hierba perenne acuática, sumergida arraigada 3--4 cm., escasa con flor entre pastos y *Cyperaceae* en la playa del charco, no sumergida cuando florea" and also as an herb, 20--30 cm. tall, common in water with *Utricularia*, *Xyris*, and *Rynchospora*.

The "Cabo Gracias a Dios" records previously listed by me are really from Zelaya (Nicaragua), since the cape region is officially included in that province. Seymour (1980) cites Atwood 3611 and Seymour 3677 from Zelaya.

Material of *E. seemannii* has been misidentified and distributed in some herbaria as "*E. ehrenbergianum* Klotz ex Koern."

Additional citations: MEXICO: Tabasco: C. Cowan 2665 (Ld), 2781 (Ld); Magaña & Cowan in Cowan 2836 (Ld, N). Veracruz: Fay, Byrne, & Calzada 873 (N, W--2879271). NICARAGUA: Zelaya: F. C. Seymour 3611 (Ft), 3677 (Ld, N); W. D. Stevens 10384 (Ld). COSTA RICA: Guanacaste: Gómez-Laurito 7170 (So--83524).

ERIOCAULON SEKIMOTOI Honda

Additional bibliography: Mold., *Phytologia* 26: 36--37. 1973; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

Additional citations: MOUNTED ILLUSTRATIONS: Satake, *Bull. Tokyo Sci. Mus.* 4: pl. 11, fig. 22. 1940 (Ld--photo of type).

ERIOCAULON SEKIMOTOI f. *GLABRUM* Satake

Additional bibliography: Mold., *Phytologia* 25: 72. 1972; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

ERIOCAULON SELLOWIANUM Kunth

Additional bibliography: Correa, *Dicc. Pl. Uteis Bras.* 1: 349. 1926; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 41: 455. 1979; Angely, *S. Amer. Bot. Bibl.* 2: 679. 1980; Mold., *Phytol. Mem.* 2: 142, 177, 186, 353, 400, 403, & 604. 1980.

Additional illustrations: Correa, *Dicc. Pl. Uteis Bras.* 1: 349. 1926.

Frenzel says of this plant: "flores escranquicadas, pétalos pretas", found it flowering in March, and distributed it as *Paepalanthus* sp. Recent collectors have encountered it in deep, wet, humus muck, describing the "bracts and flowers white".

Additional citations: BRAZIL: Goiás: *Gates & Estabrook* 54 (N). Paraná: *Dombrowski* 9420 (Ld); *Frenzel* 738 (Eu--4762). ARGENTINA: Corrientes: *Krapovickas, Cristóbal, Maruñan, Mroginski, Pira, & Pueyo* 21273 (N).

ERIOCAULON SELLOWIANUM var. *LONGIFOLIUM* Mold.

Additional bibliography: Mold., *Phytologia* 36: 489. 1977; Mold., *Phytol. Mem.* 2: 142, 177, 186, & 604. 1980.

Recent collectors have encountered this plant in brejo and in boggy depressions, in anthesis in March and November and in both flower and fruit in October. Héring and his associates refer to it as growing to 20 cm. tall. Tessmann says of it: "anteras preto, nao raro em lugares pantanosos", the flower-heads white.

Additional citations: BRAZIL: Goiás: *Héring, Paula, Mendonça, & Salles* 2308 (N). Paraná: *Dombrowski & Neto* 333 (Ld); *Hatschbach* 41881 (Ld); *Kummrow* 1627 (Ld); *Tessmann* 73 (Eu--4764).

ERIOCAULON SELLOWIANUM var. *MINOR* Mold.

Additional bibliography: Mold., *Phytologia* 33: 13. 1976; Mold., *Phytol. Mem.* 2: 142, 400, & 604. 1980.

ERIOCAULON SELLOWIANUM var. *PARANENSE* (Mold.) Mold. & Sm.

Additional bibliography: Mold., *Phytologia* 41: 455. 1979; Angely, *S. Amer. Bot. Bibl.* 2: 679. 1980; Mold., *Phytol. Mem.* 2: 142, 177, 402, 403, 426, & 604. 1980.

Tessmann says of this plant: "conjunto de flores branco, anteras preto-esverdeadas" and found it growing on campos, in flower in December.

Additional citations: BRAZIL: Paraná: *Tessmann* 328 (Eu--4765).

ERIOCAULON SENEGALENSE N. E. Br.

This species is now regarded as synonymous with *E. plumale* N. E. Br.

ERIOCAULON SENILE Honda

Additional bibliography: Mold., *Phytologia* 29: 226. 1974; Mold., *Phytol. Mem.* 2: 301, 303, & 604. 1980.

Additional citations: MOUNTED CLIPPINGS & ILLUSTRATIONS: Honda, *Bot. Mag. Tokyo* 42: 507. 1928 (W); Satake, *Bull. Tokyo Sci. Mus.* 4: pl. 3, fig. 5. 1940 (Ld--photo of type).

ERIOCAULON SENILE f. *PILOSUM* T. Koyama

Additional bibliography: Mold., *Phytologia* 25: 73. 1972; Mold., *Phytol. Mem.* 2: 301 & 604. 1980.

ERIOCAULON SESSILE Meikle

Additional synonymy: *Eriocaulon diaguissance* R. Bourdu, *Bull. Soc. Bot. France* 104: 157, fig. D--F. 1957.

Additional bibliography: Anon., *Kew. Bull. Gen. Index* 111. 1959; Mold., *Phytologia* 41: 456. 1979; Mold., *Phytol. Mem.* 2: 207, 217, 401, & 604. 1980.

Additional citations: MOUNTED ILLUSTRATIONS: Bourdu, *Bull. Soc. Bot. France* 104: 157, fig. A--F. 1957 (Ld).

ERIOCAULON SETACEUM L.

Additional & emended bibliography: J. F. Gmel. in L., *Syst. Nat.*, ed. 13, imp. 1, 2: 206. 1791; Domin, *Ann. Jard. Bot. Buitenz.* 24 [ser. 2, 9]: 247. 1911; Arber, *Bot. Gaz.* 74: 84. 1922; C. A. Gardn., *Enum. Pl. Austral. Occid.* 1: 17. 1930; Fyson, *Indian Sp. Erioc.* pl. 1. 1923; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Savage, *Cat. Linn. Herb. Lond.* 21. 1945; Anon., *Kew. Bull. Gen. Index* 111. 1959; Giuliotti, *Bol. Bot. Univ. S. Paulo* 6: 44. 1978; Hocking, *Excerpt. Bot. A.* 31: 16. 1978; Erickson, George, Marchant, & Morcombe, *Flow. Pl. West. Austr.*, ed. 2, 176, 219, & 225, pl. 565. 1979; Holm, Pancho, Herberger, & Plucknett, *Geogr. Atlas World Weeds* 148. 1979; Mold., *Phytologia* 41: 456. 1979; Mold., *Phytol. Mem.* 2: 262, 268, 270, 272, 274, 275, 285, 292, 336, 402, 403, 435, 446, & 604. 1980; Mold., *Phytologia* 50: 252. 1982.

Additional illustrations: Fyson, *Indian Sp. Erioc.* pl. 1. 1923; Erickson, George, Marchant, & Morcombe, *Flow. Pl. West. Austral.*, ed. 2, pl. 565 (in color). 1979.

Collectors in Australia describe this plant as "frequent in fast-flowing water of sandy creeks, more or less floating, rooting in sand, the inflorescence dark-gray", and have found it in both flower and fruit in March. Lecomte (1912) cites for it only an unnumbered collection of Lecomte & Finet from Annam and one of Thorel from Cochinchina (Vietnam).

Recent collectors have also encountered this species on pine savannas, at 1300 m. altitude, in Thailand.

Additional citations: THAILAND: *Niyondham & O'Connor 15751* (N). AUSTRALIA: Northern Territory: *Lazarides & Adams 218* (W--2900309). Western Australia: *Symon 12069* [Herb. White Inst. 54862] (Ba--388403).

ERIOCAULON SETACEUM var. *CAPILLUS-NAIADIS* (Hook. f.) Mold.

Additional bibliography: Hundley & Ko in Lace, *List Trees Shrubs*

Burma, ed. 3, 293. 1961; Mold., Phytologia 41: 456. 1979; Mold., Phytol. Mem. 2: 268, 272, 283, 400, 403, & 604. 1980; Mold., Phytologia 50: 252. 1982.

Recent collectors refer to this plant as an aquatic growing in ponds on pine savannas, only the flowers emergent above the surface of standing water, at 1300 m. altitude, in anthesis in March. Geesink and his associates encountered it in *Melaleuca* savannas on a limestone plateau in Thailand.

Additional citations: THAILAND: Geesink, Hattink, & Phengklai 6571 (Ac); Niyondham & O'Connor 15721 (Ac),

ERIOCAULON SETICUSPE Ohwi

Additional bibliography: Mold., Phytologia 41: 456--457. 1979; Mold., Phytol. Mem. 2: 301 & 604. 1980.

Additional citations: JAPAN: Kiushu: *Togasi* 1415 (Mi).

ERIOCAULON SEXANGULARE L.

Additional & emended synonymy: *Eriocaulon wallichianum* Heyne ex Mart. in Wall., Pl. Asiat. Rar. 3: 27. 1832. *Eriocaulon wallichianum* f. *submersum* Arber, Bot. Gaz. 74: 84 & 94. 1922. *Eriocaulon wallichianum* f. *submersa* Arber, Monocot. 88 & 251. 1925. *Eriocaulon wallichianum submersum* Auct. apud Worsdell, Ind. Lond. Suppl. 1: 376. 1941. *Eriocaulon wallichianum* Mart. ex Hu, Enum. Chin. Mat. Med. 54 & 196, sphalm. 1981.

Additional bibliography: J. Burm., Thes. Zeyl. 108-109. 1737; J. F. Smel. in L., Syst. Nat., ed. 13, imp. 1, 2: 206. 1791; G. Don in Sweet, Hort. Brit., ed. 3, 633. 1839; Hayata, Icon. Pl. Formos. 10: 54. 1921; E. D. Merr., Bibl. Enum. Born. Pl. 110. 1921; Arber, Bot. Gaz. 74: 94, pl. 2, fig. 19 C & E. 1922; Fyson, Journ. Indian Bot. 2: pl. 39 & 40. 1922; Fyson, Indian Sp. Erioc. pl. 39 & 40. 1923; Arber, Monocot. 88 & 251, fig. 66 C & E. 1925; C. E. C. Fischer, Kew Bull. Misc. Inf. 1930: 159. 1930; E. D. Merr., Sunyatsenia 1: pl. 1. 1930; Worsdell, Ind. Lond. Suppl. 1: 376. 1941; Savage, Cat. Linn. Herb. Lond. 21. 1945; Chopra, Nayar, & Chopra, Gloss. Indian Med. Pl. 109. 1956; Hundley & Ko in Lace, List Trees Shrubs Burma, ed. 3, 293. 1961; Lourteig, Taxon 15: 31. 1966; Amaratunga, Ceyl. Journ. Sci. Biol. 12: 189. 1977; Chang, Fl. Taiwan 5: [179] & 187--188. 1978; Mold., Phytologia 41: 457. 1979; Fosberg & Canfield, Micronesica 16: 194. 1980; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield, Vasc. Pl. Palau 12. 1980; Mold., Phytol. Mem. 2: 250, 252, 262, 268, 270, 272, 275, 278, 281, 283, 285, 289, 290, 292, 296, 298, 303, 304, 307, 314, 353, 404, & 605. 1980; Hu, Enum. Chin. Mat. Med. 54 & 196. 1981; Mold., Phytologia 50: 253 & 260 (1982) and 53: 277. 1983.

Additional illustrations: Hayata, Icon. Pl. Formos. 10: 54. 1921; Arber, Bot. Gaz. 74: 94, pl. 2, fig. C & E. 1922; Arber, Monocot. 88, fig. 19 C & E. 1925; E. D. Merr., Sunyatsenia 1: pl. 1. 1930.

Chang (1978) gives the distribution of this species as the Ryukyu Islands, China, India, Sri Lanka, Burma, Indochina, Malaysia, and Africa. On Taiwan he says it occupies marshes. He

cites Hsu 27329, Odashima 144523, Suzuki 27317, and Tanaka 27295. Huber states that in Sri Lanka it occurs as "a weed in unplowed paddy fields", at 40 m. altitude, flowering and fruiting in September, and known locally as "kok mota". Hu (1981) lists the vernacular names, "ku-ching ts'ao", "ku-ching-tzü", and "ku-chu", applied both to this species and to *E. buergerianum* Kbrn. He states that *E. sexangulare* occurs in the Chinese materia medica as "Scapus Eriocaulonis". Chopra and his associates (1956) also aver that it is employed as a drug in China. In India, they say, it occurs in the Deccan Peninsula from Kanara southward.

Other recent collectors have found *E. sexangulare* growing on open sandy grasslands and at the edges of reservoirs, at 30 m. altitude, in both flower and fruit in August, October, and November. Geesink and his associates encountered it in *Melaleuca* forests on a sandstone plateau in Thailand. Fosberg reports it "common locally in damp *Sphagnum*" in Madagascar. Ahmed found it growing among 3-foot-tall grasses in fresh water in Singapore, describing the flowers as white in February. In Hong Kong the Woos refer to it as "one of the commonest components in freshwater swamps", describing it as caespitose, the leaves bluish-green, and the inflorescences white to grayish-white.

Lecomte (1912) cites for this species only unnumbered collections on Lecomte & Finet from Annam, of Lecomte & Finet and of Pierre from Cochinchina, and of Balansa, of Bon, and of Muret from Tonkin, Vietnam.

Material of *E. sexangulare* is very often misidentified and distributed in herbaria as the very similar *E. longifolium* Nees [= *E. willdenovianum* Mold.]. On the other hand, the Suzuki 23 & s.n., distributed as *E. sexangulare* and so cited by me in a previous installment of these notes, seem better placed as representing *E. australe* R. Br., while Bremer & Bremer 816, Congdon 989, Koyama & al. 15229, and Sinclair 8732 seem to be *E. willdenovianum* Mold.

Additional citations: MADAGASCAR: Fosberg 52575 (W--2922704). SRI LANKA: Huber 299 (W--2891324). HONG KONG: Hu 7949 (Mi); Taam 1547 (Mi); Woo & Woo 873 (Mi). THAILAND: Geesink, Hattink, & Phengklai 6554 (Ac), 6563 (Ac); Geesink, Hiesko, & Charoenphol 7543 (Ac); Shimizu, Toyokuni, Koyama, Yahara, & Niyondham T.26264 (Ac). MALAYA: Singapore: Ahmad SA.1407 (Ac); J. Sinclair 4977 (W--2937280). RYUKYU ARCHIPELAGO: Iriomote: Gressitt 550 (Mi). TAIWAN: Odashima s.n. [Tanaka & Shimada 13575] (Mi). LOCALITY OF COLLECTION UNDETERMINED: Blackburn s.n. (E--2133719). MOUNTED CLIPPINGS & ILLUSTRATIONS: Hook. f., Curtis Bot. Mag. 120: pl. 7391. 1894 (Ld); Hayata. Icon. Pl. Formos. 10: 55. 1921 (W); M. R. Henderson, Malay. Wild. Fls. Morocot., imp. 2, 212, fig. 127. 1974 (Ld); Keng, Ord. Fam. Malay. Seed Pl. 313, fig. 183. 1969 (Ld); Koidz., Bot. Mag. Tokyo 28: 171. 1914 (W); Kunth, Enum. Pl. 3: 564 & 566. 1841 (W, W); E. D. Merr., Sunyatsenia 1: pl. 1. 1930 (Ba); Mold. in Humbert, Fl. Madag. 36: [23], fig. 3 (1). 1955 (Ld); Wall., Pl. Asiat. Rar. 3: 27. 1832 (W).

ERIOCAULON SEXANGULARE var. *MICRONESICUM* Mold., *Phytologia* 43: 355. 1979.

Synonymy: *Eriocaulon sexangulare* var. *miconesica* Mold., *Phytologia* 50: 260, in syn. 1982.

Bibliography: Mold., *Phytologia* 43: 355. 1979; Fosberg & Canfield, *Micronesica* 16: 194. 1980; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield. *Vasc. Pl. Palau* 12. 1980; Mold., *Phytol. Mem.* 2: 311 & 605. 1980; Mold., *Phytologia* 50: 253 & 260. 1982.

Collectors have found this plant growing in and about puddles in roads through savannas, at 5--30 m. altitude, in both flower and fruit in July, September, and November, describing it as a caespitose herb, 25--30 cm. tall, with bright-green basal leaves and white flower-heads. Evans reports it "locally common in seasonal rainwater pools on savannas". The Cushings refer to it as occurring in "occasional clumps at the edges of mud puddles". Fosberg found it "very local in wet spots on savannas", while Canfield says that it is an "uncommon herb in lignified clay on exposed old roads", growing there in association with *Gleichenia*, *Isachne*, *Eragrostis*, *Utricularia*, and *Burmanna*. The vernacular name, "kai", is recorded for it.

The Volkens collections, cited below, were previously incorrectly cited as *E. willdenovianum* Mold.

Fosberg & Canfield (1980) cite the additional *Hosokawa* 7228, *Kanehira* [1935], and *Stone* 4626 from the Palau Islands.

Citations: PALAU ISLANDS: Babeldaob: *Canfield* 339 (W--2850829); *Otobed* P.10143 (Ld--photo of type, W--2850824--type). Nekken: *Fosberg* 50606 (W--2850828). Yap: *M. V. Cushing* 431 (W--2850827); *Cushing & Cushing* 356 (W--2850826); *M. Evans* 283 (W--2850825); *Volkens* 406 (W--617490, W--775970).

ERIOCAULON SEXANGULARE f. *VIVIPARUM* Mold.

Additional bibliography: Mold., *Phytologia* 29: 229--230. 1974; Mold., *Phytol. Mem.* 2: 268, 296, & 605. 1980.

Recent collectors describe this plant as having the "heads globose, white, bulbils usually growing out of the top" and have found it growing in shallow water or protected places, often by *Pandanus* clumps", in both flower and fruit in November.

Additional citations: MALAYA: Pahang: *Stone & Mahmud* 12313 (W--2853601).

ERIOCAULON SIAMENSE Mold.

Additional bibliography: Mold., *Phytologia* 25: 75--76. 1972; Mold., *Phytol. Mem.* 2: 285 & 605. 1980.

Recent collectors have encountered this plant in thin layers of humus in sandy places on sandstone savannas, at 1100--1300 m. altitude, in both flower and fruit in November and December, describing it as having "basal rosettes and sheaths red, flower-heads ["glomerules"] white".

Additional citations: THAILAND: *Beusekom, Phengkhilai, Geesink, & Wongwan* 4567 (Ac, E--2384870, W--2902896), 4571 (Ac, E--2384875); *Charoenphol, Larsen, & Warncke* 4800 (E--2368144).

ERIOCAULON SIGMOIDEUM C. Wright

Additional bibliography: Mold., *Phytologia* 36: 490. 1977;
Mold., *Phytol. Mem.* 2: 89, 91, 403, & 605. 1980.

ERIOCAULON SIKOKIANUM Maxim.

Additional bibliography: Mak., *Illust. Fl. Jap.* [725]. 1924;
Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 34:
492. 1976; Mold., *Phytol. Mem.* 2: 299, 301, & 605. 1980.

Additional illustrations: Mak., *Illust. Fl. Jap.* [725]. 1924.

Additional citations: MOUNTED ILLUSTRATIONS: Mak., *Illust. Fl.*
Nipp. 772, fig. 2315. 1940 (Ld).

ERIOCAULON SIKOKIANUM var. *MATSUMURAE* (Nakai) Satake

Additional bibliography: Mold., *Phytologia* 25: 76. 1972; Mold.,
Phytol. Mem. 2: 301 & 605. 1980.

Additional citations: MOUNTED CLIPPINGS & ILLUSTRATIONS: Nakai,
Bot. Mag. Tokyo 24: 5. 1910 (W); Satake, *Bull. Tokyo Sci. Mus.* 4:
pl. 5, fig. 9. 1940 (Ld--photo of type).

ERIOCAULON SILICICOLA Ridl.

Additional bibliography: Mold., *Phytologia* 25: 76. 1972; Mold.,
Phytol. Mem. 2: 296 & 605. 1980.

ERIOCAULON SILVEIRAE Mold.

Additional bibliography: Mold., *Phytologia* 25: 76--77. 1972;
Mold., *Phytol. Mem.* 2: 142 & 605. 1980; Angely, *S. Amer. Bot.*
Bibl. 2: 669. 1980.

Additional citations: MOUNTED CLIPPINGS: Alv. *Silv., Fl. Mont.*
1: 15--16. 1928 (Ld, N, W).

ERIOCAULON SINGULARE Mold., *Phytologia* 48: 253 & 254, fig. 1. 1981.

Bibliography: Mold., *Phytologia* 48: 253 & 254, fig. 1 (1981),
50: 247 & 270 (1982), and 53: 322. 1983.

Illustrations: Mold., *Phytologia* 48: 254, fig. 1. 1981.

The Macedo collection which forms the basis for this species
was previously incorrectly reported by me as *E. macrobolax* Mart.,
but Martius gives no indication in his description (nor do Körn-
nicke or Ruhland) that *E. macrobolax* has a compound capitulum as
does *E. singulare*. The general appearance and habit of the two
taxa, however, are strikingly similar and one wonders if these
previous authors perhaps missed this distinctive character not
otherwise known in the genus *Eriocaulon*, but which is seen well
in *Paepalanthus planifolius* (Bong.) Körn. and its varieties.
Eriocaulon singulare has been found growing in brejo.

Citations: BRAZIL: Minas Gerais: Macedo 2589 (N--type), 2620
(N). Paraná: Gottsberger & Poelt s.n. [21.7.1979] (Gr--196-80,
Gr). MOUNTED ILLUSTRATIONS: Mold., *Phytologia* 48: 254, fig. 1.
1981 (Ld).

ERIOCAULON SINII Ruhl.

Additional bibliography: Mold., *Phytologia* 26: 39. 1973; Mold.,
Phytol. Mem. 2: 278, 281, & 605. 1980.

ERIOCAULON SMITINANDI Mold.

Additional bibliography: Mold., *Phytologia* 41: 457. 1979; Mold., *Phytol. Mem.* 2: 285 & 605. 1980.

ERIOCAULON SOLLYANUM Royle

Additional & emended bibliography: Fyson, *Journ. Indian Bot.* 2: 139, 150, 206, 260, & 320, fig. 3, pl. 10. 1921; Fyson, *Indian Sp. Erioc.* pl. 10. 1923; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Bennet, *Fl. Howrah* 99. 1976; Babu, *Herb. Fl. Dehra Dun* 548. 1977; Mold., *Phytologia* 41: 457--458. 1979; Mold., *Phytol. Mem.* 2: 229, 250, 256, 262, 268, 270, 278, 285. 290, 301, 314, 326, 403, & 605. 1980; Mold., *Phytologia* 53: 308 & 311. 1983.

Additional & emended illustrations: Fyson, *Journ. Indian Bot.* 2: 139, fig. 3, pl. 10. 1921; Fyson, *Indian Sp. Erioc.* pl. 10. 1923.

Ramamoorthy refers to this plant as a common herb in open harvested paddy fields, with white flower-heads, and found it both in flower and fruit in January.

Bennet (1979), citing his no. 1014, gives the distribution of the species as "General; common. Usually found in paddy-fields with a thin layer of water; also sometimes in swampy areas" in West Bengal, where it is said to flower from September to November.

Additional citations: INDIA: Gujarat: *Koelz 13342* (Mu). Karnataka: *Ramamoorthy HFP.1368* (W--2797015). MOUNTED CLIPPINGS: K8rn., *Linnaea* 27: 645. 1854 (W).

ERIOCAULON SOLLYANUM var. *SUMATRANUM* Van Royen

Additional bibliography: Mold., *Phytologia* 41: 457--458. 1979; Mold., *Phytol. Mem.* 2: 314, 326, 403, & 605. 1980.

Additional citations: GREATER SUNDA ISLANDS: Sumatra: *Toroës 5963* (Mi), *6008* (Mi).

ERIOCAULON SONDERIANUM K8rn.

Additional bibliography: Mold., *Phytologia* 29: 230. 1974; Mold., *Phytol. Mem.* 2: 239, 243, 245, & 605. 1980.

Recent collectors have encountered this plant along stream-sides, at 5800--9200 feet altitude, describing it as cespitose, the flower-heads white, in both flower and fruit in November and December. Bayliss refers to it as an "uncommon aquatic" in Lesotho.

Additional citations: SWAZILAND: *Kemp 1152* (W--2941440). LESOTHO: *Bayliss BS.5060* (E--2231262). SOUTH AFRICA: Orange Free State: *Bolus 8269* (E--2487924); *Hilliart & Burt 8714* (E--2383651).

ERIOCAULON SOUCHEREI Mold.

Additional bibliography: Mold., *Phytologia* 25: 77. 1972; Mold., *Phytol. Mem.* 2: 285, 292, & 605. 1980.

ERIOCAULON SPARGANIOIDES Bong.

Additional bibliography: Mold., *Phytologia* 25: 77. 1972; Mold.,

Phytol. Mem. 2: 142 & 605. 1980.

Additional citations: MOUNTED CLIPPINGS: Bong., Mem. Acad. Sci. St.-Petersb., ser. 6, 1: 637. 1831 (W); Kunth, Enum. Pl. 3: 579--580. 1841 (W).

ERIOCAULON SPECTABILE F. Muell.

Additional bibliography: T. B. Muir, *Muelleria* 2: 140. 1972; Mold., *Phytologia* 41: 458. 1979; Mold., *Phytol. Mem.* 2: 336, 339, & 605. 1980; Mold., *Phytologia* 53: 310. 1983.

The *G. C. Taylor 92*, distributed as *E. spectabile*, actually is the type collection of *E. hooperae* Mold.

ERIOCAULON SPHAGNICOLA Ohwi

Additional bibliography: Mold., *Phytologia* 26: 39. 1973; Mold., *Phytol. Mem.* 2: 299, 405, & 605. 1980.

Additional citations: MOUNTED ILLUSTRATIONS: Satake, *Bull. Tokyo Sci. Mus.* 4: fig. 17. 1940 (Ld--photo of type).

ERIOCAULON SPONGIOSIFOLIUM Alv. Silv., *Arch. Mus. Nac. Rio Jan.* 23: 161, pl. 3. 1921.

Additional & emended bibliography: Alv. Silv., *Arch. Mus. Nac. Rio Jan.* 23: 161, pl. 3. 1921; Worsdell, *Ind. Lond. Suppl.* 1: 376. 1941; Mold., *Phytologia* 29: 230. 1974; Mold., *Phytol. Mem.* 2: 142 & 605. 1980.

Additional illustrations: Alv. Silv., *Arch. Mus. Nac. Rio Jan.* 23: pl. 3. 1921.

Citations: MOUNTED CLIPPINGS & ILLUSTRATIONS: Alv. Silv., *Arch. Mus. Nac. Rio Jan.* 23: 161, pl. 3 (Ld, W); Alv. Silv., *Fl. Mont.* 1: pl. 4. 1928 (Ld, W).

ERIOCAULON SPRUCEANUM Körn.

Additional bibliography: Mold., *Phytologia* 33: 15--16 (1976) and 36: 34 & 491. 1977; Mold., *Phytol. Mem.* 2: 108, 115, 142, & 605. 1980; Mold., *Phytologia* 53: 325. 1983.

Recent collectors have found this plant growing in brejo, on rocks in waterfalls, and in "wet to marshy savannas leading to gallery forests", describing it as an aquatic, the flower-heads white. They have found it in flower in June and in both flower and fruit in February and November.

Additional citations: COLOMBIA: Meta: Killip 34260 in part (W--1771077). Vaupés: Schultes & Cabrera 19907 (W--2198926). VENEZUELA: Amazonas: Thomas & Rogers 2611 (N), 2614 (N). Apure: Davidse & González 14286 (Ld). BRAZIL: Amazônia: Calderón, Monteiro, & Guedes 2631 (Ld, W--2931259). Distrito Federal: Héringher, Paula, Mendonça, & Salles 1662 (N, N).

ERIOCAULON SPRUCEANUM f. *AMPHIBIUM* Herzog

Additional bibliography: Mold., *Phytologia* 26: 39. 1973; Mold., *Phytol. Mem.* 2: 142 & 605. 1980.

ERIOCAULON SPRUCEANUM f. *FLUITANS* Herzog

Additional bibliography: Mold., *Phytologia* 26: 39--40. 1973;

Mold., Phytol. Mem. 2: 142 & 605. 1980; Mold., Phytologia 53: 325. 1983.

Austin and his associates have found this plant floating in the water of an igarapé; their collection, cited below, was previously uncorrected cited as *E. melanocephalum* Kunth.

Additional citations: BRAZIL: Amapa: Austin, Nauman, Rabelo, Rosário, & Santos 7302 (Ld, N, W--2932764).

ERIOCAULON SPRUCEANUM f. *VIVIPARUM* Mold.

Additional bibliography: Mold., Phytologia 36: 491. 1977; Mold., Phytol. Mem. 2: 108, 142, & 605. 1980.

Additional citations: COLOMBIA: Meta: Killip 34260 in part (W--1771077).

ERIOCAULON STANTONII Satake

Additional bibliography: Mold., Phytologia 36: 491. 1977; Mold., Phytol. Mem. 2: 257 & 605. 1980.

ERIOCAULON STEINBACHII (Mold.) Mold.

Additional bibliography: Mold., Phytologia 29: 230. 1974; Mold., Phytol. Mem. 2: 174 & 605. 1980.

ERIOCAULON STELLULATUM Körn.

Additional & emended bibliography: Fyson, Journ. Indian Bot. 2: 317 & 319. 1922; Fyson, Indian Sp. Erioc. 55. 1923; Worsdell, Ind. Lond. Suppl. 1:376. 1941; Mold., Phytologia 33: 16. 1976; Mold., Phytol. Mem. 2: 262, 270, 285, & 605. 1980.

Additional illustrations: Fyson, Journ. Indian Bot. 2: 319. 1922; Fyson, Indian Sp. Erioc. 55. 1923.

Additional citations: MOUNTED CLIPPINGS: Körn., Linnaea 27: 620. 1854 (W).

ERIOCAULON STELLULATUM var. *LAOSENSE* Mold.

Additional bibliography: Mold., Phytologia 25: 79. 1972; Mold., Phytol. Mem. 2: 290 & 605. 1980.

ERIOCAULON STENOPHYLLUM R. E. Fries

Additional bibliography: Mold., Phytologia 33: 16. 1976; Mold., Phytol. Mem. 2: 235 & 605. 1980.

ERIOCAULON STEYERMARKII Mold.

Additional bibliography: Hocking, Excerpt. Bot. A.23: 389. 1974; Mold., Phytologia 41: 458. 1979; Mold., Phytol. Mem. 2: 115, 122, 124, 142, & 605. 1980; Mold. in Harley & Mayo, Toward Checklist Fl. Bahia 73. 1980.

Additional citations: VENEZUELA: Bolívar: B. Maguire 33182 (W--2168898), 33512a (W--2168910); Steyermark, Smith, Smith, Dunsterville, & Dunsterville 105518 (W--2925902); Steyermark & Wurdack 341 (W--2407714), 763 (W--2407795). BRAZIL: Goiás: Irwin, Harley, & Smith 33115 (W--2709599).

ERIOCAULON STEYERMARKII var. *BAHIENSE* Mold.

Additional bibliography: Mold., Phytologia 41: 458. 1979; Mold.

in Harley & Mayo, Toward Checklist Fl. Bahia 73. 1980; Mold., Phytol. Mem. 2: 142 & 605. 1980.

ERIOCAULON STILLULATUM Hook.

Additional bibliography: Mold., Phytologia 25: 79. 1972; Mold., Phytol. Mem. 2: 336 & 605. 1980.

ERIOCAULON STOLONIFERUM Welw.

Additional bibliography: Mold., Phytologia 29: 231. 1974; Mold., Phytol. Mem. 2: 224, 233, 403, & 605. 1980.

Additional citations: MOUNTED ILLUSTRATIONS: H. Hess, Bericht. Schweiz. Bot. Gesell. 65: 148, fig. 1 & 2. 1955 (Ld).

ERIOCAULON STRAMINEUM Körn.

Additional bibliography: Mold., Phytologia 33: 16. 1976; Mold., Phytol. Mem. 2: 142, 172, & 605. 1980.

ERIOCAULON STRIATUM Lam.

Additional bibliography: Mold., Phytologia 33: 16. 1976; Mold., Phytol. Mem. 2: 250, 252, 254, & 605. 1980.

Additional citations: MOUNTED CLIPPINGS & ILLUSTRATIONS: Kunth, Enum. Pl. 3: 560 & 561. 1841 (W, W); Poir. in Lam., Encycl. Méth. Bot. 1: 213, pl. 50, fig. 1. 1791 (Ld).

ERIOCAULON STRICTUM Milne-Redhead

Additional bibliography: Mold., Phytologia 41: 458. 1979; Mold., Phytol. Mem. 2: 200, 226, 229. 235, 237, & 605. 1980.

Material of this species has been misidentified and distributed in some herbaria as *Cyperaceae* sp.

Additional citations: BURUNDI: Michel 2768 (E--1785177). MOUNTED ILLUSTRATIONS: Milne-Redhead in Hook., Icon. Pl. 34: pl. 3388. 1939 (W).

ERIOCAULON STUHLMANNI N. E. Br.

Additional bibliography: Mold., Phytologia 29: 228 & 231--232. 1974; Mold., Phytol. Mem. 2: 205, 207, 226, 403, & 605. 1980.

ERIOCAULON SUBGLAUCUM Ruhl.

Additional bibliography: Mold., Phytologia 33: 16. 1976; Mold., Phytol. Mem. 2: 268 & 605. 1980.

Additional citations: SRI LANKA: Sohmer & Waas 10226 (E--2581776).

ERIOCAULON SUBMERSUM Welw.

Additional bibliography: Mold., Phytologia 29: 232. 1974; Giullietti, Bol. Bot. Univ. S. Paulo 6: 44. 1978; Mold., Phytol. Mem. 2: 233 & 605. 1980.

ERIOCAULON SUBULATUM N. E. Br.

Additional bibliography: Mold., Phytologia 29: 232. 1974; Mold., Phytol. Mem. 2: 235, 237, 240, 250, & 605. 1980.

[to be continued]

BOOK REVIEWS

XIV

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(Arranged in alphabetic order of the
authors, organizations, etc.)

"INTRODUCTORY MYCOLOGY (THIRD EDITION)" by Constantine
J. Alexopoulos and Charles W. Mims. xix + 632 pp.,
many figs. John Wiley & Sons, New York. 1979. \$32.95

This edition is only a few pages longer than the second
edition (xviii + 613 pp.), however since a wider page
size (36 mm. wider) and two columns instead of one are
used, it would appear that there is a considerable in-
crease in textual matter. The figures in the newer ed-
ition are somewhat enlarged over those in the previous
one. As with earlier editions, the present one is writ-
ten in a concise but attractive manner and there are
numerous excellent figures. A useful and profitable
textbook for both undergraduate and graduate students
in mycology, there are many references to allow the
serious scholar to make a further search on a particu-
lar topic. The book is well made with substantial
binding. - There is still almost no chemistry present-
ed except for a brief statement on the uses of some
constituents of lichens in pharmacy, etc. The lichens
are treated in a terminal chapter, almost in the nature
of an appendix. The book also includes a glossary of
terms and author and subject indexes.

G M H

"THE HAWAII GARDEN: TROPICAL SHRUBS," by H. F. Clay
and J. C. Hubbard. xvii + 295 pp., 103 col. pls.
20 X 28 cm. The University Press of Hawaii, 2840
Kolowala St., Honolulu. 1978. \$35.00.

Except for pages with family descriptions, throughout
this splendid volume one full page color plate faces
a rather full page of descriptive text. Besides the
usual general description, with some detailed notes,
there are paragraphs on habit, growing conditions,
uses, propagation, diseases and insect enemies, prun-
ing, etc. (It was a surprise to learn (p 120) that
crepe myrtle is used medicinally in parts of Asia).

The illustrations are both decorative and useful for identifying or demonstrating the plant. This volume is said the first of its kind - the first to color-illustrate the many shrubs currently being grown in Hawaii. Another book in the series "The Hawaiian Garden" has also appeared - "Tropical Exotics" - which includes herbs, shrubs, and trees which have been introduced to Hawaii and feature a remarkable beauty. A series of sixteen volumes is planned and is now in process of publication. The last volume will be a comprehensive index to the entire series. While these volumes have special appeal to the horticulturist, with many practical suggestions for growing the plants, they naturally will also interest the botanist. One volume will deal with ethnobotany. This series will undoubtedly represent one of the most handsome and useful published in recent years. The volumes are being offered at a bargain price.

G M H

"NATURE CLOSE UP, A FANTASTIC JOURNEY INTO REALITY", by Andreas Feininger. 160 pp., 94 photos, of which 12 in color. Dover Publications, Inc., 180 Varick St., New York. 1981. \$8.95.

This is a republication essentially identical with the original of the Viking Press published in 1977 with the title "The Mountains of the Mind" (but with the same sub-title). It presents striking examples of the way in which small structures, even down to the microscopic, may appear to resemble objects or scenes of large size, such as landscapes. Plants, animals, and minerals are represented in this magnificent collection.

G M H

"SUPPLEMENT TO INDEX BERGEYANA," edited by Norman E. Gibbons (deceased), Kathleen B. Pattee, and John G. Holt. vii + 442 pp., Williams & Wilkins, 428 E. Preston St., Baltimore, MD 21202. 1981. \$38.95.

"Index Bergeyana", an alphabetic listing by generic and specific (etc.) name of the Bacteria (Schizomycetes) was published in 1966; it contained some 29,000 names (not organisms) and when published was recognized as incomplete. Names omitted from the "Index" were published in the International Journal of Systematic Bacteriology. Bergey's Manual of Determinative Bacteriology (1923-) came out in an 8th edition in 1974, thus giving an opportunity for publishing the present "Supplement", which incorporates the three published addenda of the IJSB together with additional data. The editors have drawn on the "Biosystem-

atic Index of Biological Abstracts" for names published after 1965. The present volume has two large sections: the series of scientific names in alphabetic order; and the bibliography (132 pp.) constituting more than a quarter of the pages covered. This index supplement contains (as does the main "Index") scientific names at all levels. Names above genus rank are set in boldface capitals, those of genus and sub-genus in boldface (such as Citrobacter koseri Frederiksen) (the authority in Roman), and the species and infra-specific names in italics, as just shown. Where the name is not validly published or is illegitimate, this is noted, sometimes with additional information under "Comment". Where there is no such notation, the taxon may be regarded as valid; where the name is not acceptable, the reasons are given, usually by reference to the appropriate section of the "Bacteriological Code" (1976). There is no census of the entries but at a "guesstimate" this was reckoned at over 20,000 names, valid and invalid. It is very important to use this work in connection with the main work, "Index Bergeyana", published also by Williams and Wilkins. The two together represent the current status of bacterial nomenclature worldwide at this time.

G M H

"SCIENCES IN COMMUNIST CHINA: A SYMPOSIUM PRESENTED AT THE NEW YORK MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, DECEMBER 26-27, 1960. - Amer. Assn. Adv. Sci. Publ. No. 68: XII + 872 pp., 23 figs., many tabs. 1961. \$14.00.

This volume represents essentially a series of reviews on the developments in and the status of the various scientific disciplines in Communist China. There are five main divisions of the text: (1) Science and society (introductory concerning the sciences in general, effect of politics, education, training of scientists, and also consideration of the anthropological sciences); (2) Biological and medical sciences (botany, zoology, agriculture, pharmacology, medicine, public health); (3) Atmospheric and earth sciences (geography, geophysics, geology, meteorology, hydrology, oceanography); (4) Mathematics and physical sciences (incl. nuclear physics, solid state physics, chemistry, astronomy); (5) engineering sciences and electronics (mining, metallurgy, electrical, civil, hydraulic, mechanical, and chemical engineering). - In the chapter "Botanical Sciences", the situation in this area before 1949 (the year that the Communists established the central government at Peking) and after 1949 is reviewed and com-

pared. Plant taxonomy (including mycology) is reviewed (pp. 164-72), also geobotany (172-4), and economic botany (183-4). It is concluded that there is now much greater activity in this whole field than previously. Much of the research is along applied lines. Relatively more stress is being paid to taxonomy and physiology than to ecology, morphology, and cytology, this being due to the dearth of trained persons. An effort is being made to publish a Flora of China (in approx. 80 volumes) in the next 10 years; this will be written in the Chinese language. - It is calculated that approximately 2 to 3 thousand wild plant species are economically important. A flora of the economic plants is being planned, which will include fiber, essential oil, starch, fat, tannin, and medicinal plants. Some sources of starch being investigated include Dioscorea species, Pteridium aquilinum, and species of Lilium, Lycoris, and Smilax. - The chapter on "Genetics and animal and plant breeding" (297-321) tells of efforts at research partly limited by the dogmas of Lysenko and Michurin. Fortunately, however, there is no dominant cult as there was in Russia, and apparently the ideas of Mendel are being accepted and applied to a greater extent. - Each chapter has many references, mostly to the Chinese literature (in Chinese).

G M H

"A CHECKLIST OF ECONOMIC PLANTS IN AUSTRALIA," compiled by W. Hartley. iv + 214 pp. Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia. 1979 (1980).

This compilation is a most useful one, providing a single listing by alphabetic order of genera and species and one single listing of common names also in alphabetic order. The brochure really represents a third edition of "Standardized Plant Names" (ed. 1, 1942; ed. 2, 1953) put out by the CSIRO as Bulletins No. 156 and 172 (resp). The title might well have indicated that higher plants only are included since there are no fungi, algae, mosses, etc. Besides its much larger size and higher species count, this listing has a greatly widened scope. Thus, there are now besides the grasses and other forage plants and weeds of the original editions, crop plants, toxic plants, and forest trees. There are references to the more important literature. Ornamental and garden plants are mostly not included. Many cultivar names will be found in the listing. The publication is most handy to one who is in any way concerned with the enormous flora of Australia, so often not adequately covered in plant lists, floras, etc.

"THE BIOLOGY AND TAXONOMY OF THE SOLANACEAE," edited by J. G. Hawkes, R. N. Lester, and A. D. Skelding. Linnean Society Symposium, Ser. No. 7: xvii + 738 pp., 35 pls., 102 tabs. Academic Press, New York, London 1979 (1980). \$103.50.

This large volume includes 11 sections (taxonomy and floristics; ethnobotany; alkaloids; flavonoids, terpenes, and proteins; anatomy and fine structure; morphology and morphogenesis; floral biology, incompatibility, and haploidy; biosystematics of genera and sections; biosystematics of domesticates; resolutions; and indexes (2)), with 52 chapters and 74 contributors. In this work, although some 84 genera of the family are considered, the most attention is paid to the following genera: Solanum, Lycopersicon, Nicotiana, Capsicum, Brunfelsia, and Mandragora. There are ca 3000 species in the family, most in Solanum (with ca 1600 species). A very useful feature of this valuable work is an informative abstract and table of contents at the head of each chapter. The following subjects were found of special interest (with pages indicated). Many include original data. (W. G. D'Arcy)

The classification of the Solanaceae (pp. 3-47): this general coverage includes a useful tabulation of genera listing the monographs available for each, also treatments of morphology, anatomy, etc. Many references are given. A history of the study of the family is included, as well as the phytogeography, indicating a strong concentration of members in South America.

South American Solanaceae: a synoptic survey (A. T. Hunziker): a review with key to subfamilies and tribes. An enumeration of the tribes and genera includes notes on selected species, their distribution and habitats. Also discussed are centers of diversity, levels of endemism and distribution peculiarities.

Solanaceae in India (D. B. Deb) (87-112): The family is represented by 24 genera, of which 10 are native. There are 108 species known, of which 33 are native, 16 naturalized, 40 cultivated, and 19 under experimental cultivation. The taxonomy and distribution of selected taxa are discussed with distribution maps.

Solanum in Nigeria (Z. O. Gbile) (113-20): of 20 species, subspecies, and varieties occurring in Nigeria, 15 are indigenous. The group is important to Nigerians because most members produce edible fruits and leaves. Two groups of indigenous taxa are recognized: lowland and highland (i.e., areas of over 1220 m. elevation).

Australian genera of the Solanaceae (L. Haegi) (121-4): About 90 spp. are considered native, of which all but 8 are endemic. Most occur in the wet or dry tropics and

are short-lived subwoody herbaceous perennials. There are a few annuals and small trees.

The genus Solanum in Australia (D. E. Symon) (125-30): Only 3 groups of spp. are well developed here, those of Solanum, Nicotiana (ca 20 endemic spp.), and the endemic genera of Anthocercis, Anthotroche, Duboisia, and Isandra.

Solanaceous hallucinogens and their role in the development of New World cultures (R. E. Schultes) (137-60): Plants of 4 subfamilies are reviewed in the light of modern developments of our knowledge of them.

Aboriginal uses of Australian Solanaceae (N. Peterson) (171-89): Food and drug uses are known, including use of narcotics. Confusion has surrounded which spp. were chewed and which were used in hunting to poison water-holes: this is clarified. An annotated list of spp. is appended.

The steroid alkaloids of Solanum. (K. Schreiber) (193-202): The literature on the alkaloid glycosides and alkalamines is reviewed. Five groups of these compounds include the solanidines, spirosolanes, and 3-aminospiristanes.

Distribution of steroidal alkaloids in Australian species of Solanum (V. Bradley et al.) (203-8): Of 84 spp. examined, 20 had less than 0.1% alkaloid in any part, 34 had alkaloids in fruit only, and 30 showed alkaloids in leaf, stem, or fruit. Several new ones were isolated. The most important spp. for production of solasodine are S. laciniatum and S. aviculare.

The alkaloids of the Solanaceae (W. C. Evans) (241-4): Genus Datura contains a wide spectrum of tropane alkaloids, as do also Anthocercis and Duboisia. All taxa of subtribe Hyoscyaminae contain mixtures of hyoscyamine-scopolamine type of alkaloids; other taxa variously contain no tropane alkaloid, alkaloids of hyoscyamine type, and those of tigloyl oxytropane type. Alkaloid inheritance in Datura hybrids is discussed.

Flavonoids of the Solanaceae (J. B. Harborne and T. Swain) (257-68): Little is known of the pattern in wild spp. The flavonols, kaempferol and quercetin, are universal, often as the 3-glucosides and 3-rutinosides. More complex triglycosides are common, especially in Solanum. Flavones are apparently rare. Other phenolic derivatives are abundant, especially caffeoyl esters and coumarins. Solanaceae shows some links to Convolvulaceae.

The diterpenes of Nicotiana species and N. tabacum cultivars. (W. W. Reid) (273-8)

The diterpenes are synthesized within the trichomes and excreted on the leaf surface; they are of either the labdane or divane classes. Terpene precursors of tobacco flavor are discussed.

Use of protein characters in the taxonomy of Solanum and other Solanaceae (R. N. Lester)(285-303): the 8 Solanum spp. studied proved serologically distinct but their affinities agreed with division of genus into 2 genera: Solanum and Stellatipilum.

Hair types as taxonomic characters in Solanum (A. Seithe)(307-19): 8 types of hairs are recognized. An attempt to use stomatal characters in systematic and phylogenetic studies of the Solanaceae (J. Bessis and M. Guyot)(321-6): 56 spp. (45 genera) studied.

Pollen morphology of the Sapiglossideae (Solanaceae) (J. L. Gentry, Jr)(327-34): the diverse pollen morphology in this genus indicates the need for a re-evaluation of the genus.

The pollen morphology of Nigerian Solanum species (Z. O. Gbile and M. A. Sowunmi)(335-42): Pollen characteristics are sufficiently diverse to permit identification of various spp. (etc.) by this means.

A review of branching patterns in the Solanaceae (A. Child)(345-6): A possible evolutionary pattern is traced from branching patterns in the reproductive phase of members of the family.

Sex forms in Solanum and the role of pollen collecting insects (D. E. Symon)(385-97): true monoecism and dioecism are unknown in Solanum.

Floral biology of Capsicum and Solanum melongena (L. Quagliotti)(399-419): Abnormalities of Capsicum floral morphology are considered and the physiological control of flowering and fruiting is discussed. Genetic aspects of male sterility and production of haploids are commented on. For S. melongena, floral morphology and physiology, heterostyly, and pollination biology are reviewed.

The genus Nicotiana: evolution of incompatibility in flowering plants (K. K. Pandey)(421-34).

Biosystematic and taxometric studies of the Solanum nigrum complex in eastern North America. (C. B. Heiser, Jr., D. L. Burton, and E. E. Schilling, Jr.)(513-27)
Crossability relationships between some species of Solanum, Lycopersicon, and Capsicum cultivated in Nigeria. (M. O. Omidiji)(599-604).

Biosystematic studies in Lycopersicon and closely related species of Solanum. (C. M. Rick)(667-78): Taxa of Lycopersicon are closely allied and well isolated from other genera. Solanum sect. Petota sub-sect. Juglandifolia is the group most closely related to Lycopersicon and probably represent ancestors. All have 12 chromosomes, which are morphologically similar.

A preliminary biochemical systematic study of the genus Capsicum. (M. J. McLeod et al.)(701-13): Using isozyme analysis, the relationships of domesticated

chili peppers and their hypothetical progenitor spp. and several wild taxa were studied. A high correlation was found with results from genetic and chemotaxonomic research.

G M H

"SPORES. FERNS. MICROSCOPIC ILLUSIONS ANALYZED. Vol. II. Representative species with spore cases that differ from "true fern" sporangia. xvii + 370 pp. 807 figs. (28 in color). Mistaire Laboratories, Millburn, N. J. 1978 (1979). \$50.00."

The earlier volume was published in 1965 (see EBA. 14: 367-8; 1969) and was devoted to a study of many different groups in Pteridophyta and comparisons with the pollen grains of Pinaceae members. In the present volume, a study of and comparison with various species of a relatively few genera is carried out. Thus, there are studies of many species of Lycopodium, Lygodium, Anemia, Selaginella, Ophioglossum, Botrychium, Osmunda, Athyrium, and Lorinseria. The original plan had been to produce in the second volume a comprehensive study of spore protection, but instead this study of specific cases was prepared, representing the fruit of about fifty years of research by the author. Since only about 34 taxa are covered in the present volume, it is planned to publish further volumes with additional studies of individual taxa. Lycopodium is used as a kind of standard for spore structure and arrangement of spores: 14 Lycopodium taxa were studied in detail. This work starts out with Marsilea (4-leaved water clover), one of the fern allies, showing large microphotograph reproductions of sporocarps and their enclosed spores. Near the end of the text are many illustrations used to explain the structure of the trilete spore (i.e. with 3 flat sides and 1 curved). Included in the format are reproductions of two of the author's journal articles, a catalog of the Mistaire Reference Library (partial?), reference books and articles, plant names, abbreviations, symbols, definitions, and a name index. This is truly a most interesting book for anyone interested in the geometry and significant structure of pteridophyte spores. (Clara S. Hires, author).

G M H

"A GUIDE TO THE LITERATURE ON THE HERBACEOUS VASCULAR FLORA OF ONTARIO," by J. L. Hodgins. viii + 73 pp., 1 fig., 2 maps. Botany Press, 90 Wolfrey Ave., Toronto, Ontario. 1979. \$4.00.

Listings are given of books, papers (journal articles), maps, and botanical surveys (by area and by author), as well as lists of journals, maps for botanizing, list of public herbaria in Ontario, and a Provincial floral check list, the latter including all taxa known from Ontario, including varieties, forms, hybrids, and general escapes. In the listing of papers, many are arranged in the alphabetic order of the genus.

G M H

"ESSENTIAL OILS, ETC.", edited by Annerose Horn.

Miltitzer Berichte ueber Aetherische Oele, Riechstoffe, usw. Ausgabe 1977: 1-268. Chemisches Kom-
binat Miltitz, DDR. 1979.

Approximately 1250 abstracts on essential oils, constituents of same, aromatic substances, flavoring materials, and miscellaneous related are presented, covering the period from July 1976 to June 1977. This serial earlier known as "Berichte von Schimmel & Co. AG" has been appearing for about a century.

G M H

"PLANTAE OCCIDENTALES: 200 YEARS OF BOTANICAL ART IN BRITISH COLUMBIA," by Maria Newberry House and Susan Munro. xv + 117 pp., 62 col. figs. and 109 black and white figs. University of British Columbia, Botanical Garden, Vancouver, B. C. Tech. Bull. No. 11. 1979. \$10.95.

A beautiful and useful sampling of the work of B. C. artists in recreating many different plant specimens is shown here and described in some detail. A history of botanical studies of the wild plants of the Province is a chief feature, while the following reproductions of many of the works of art in the exhibition convey an excellent impression of the valuable sketches and paintings represented. A good descriptive section of the plants represented includes general information on the species, including folk lore. A final biographic part gives brief stories of each of the artists. Unfortunately no complete listing of the plants in the exhibition (such as in the form of an index) is given.

The reproductions are scattered and it is difficult to locate any single entity since there is apparently no particular order of the illustrations. Nonetheless the work is one which will preserve much of the content of this splendid exhibition of plant still lifes. (The title shows a "typo" in using "Occidentalis" in place of "Occidentales.")

G M H

"FLORA OF TAIWAN," with H.-L. LI (Chairman, Editorial Committee). Volume Six. xi + 665 pp. Epoch Publishing Co., Ltd., Taipei, Taiwan. 1979 (1980).

The five large volumes of detailed vascular plant descriptions is terminated with this Index volume, which presents in addition to the indices a variety of information, viz., (1) Statistics of the taxa covered, showing a total of 4061 species and infra-specific taxa (3577 spp.) in 1360 genera and 228 families. (2) A checklist of the vascular plants of Taiwan (Pteridophyta; Spermatophyta), showing the scientific names with the equivalent in Chinese. (3) Bibliography: 37 pages of references (all in Roman characters). (4) Index of Chinese names (in Chinese characters). (5) Index of scientific (Latin) names. (6) Errata (22 pp.) (7) List of new taxa and new names (from all five volumes; total approx. 170). Thus is completed the set of well-made volumes detailing the vascular flora of the Republic of China (Taiwan) and another unit is completed in the eventual ongoing botanical description of the world. Of course many gaps remain but it is to be hoped that other areas such as mainland China will follow this excellent example of a descriptive flora.

G M H

"CHECKLIST OF UNITED STATES TREES (NATIVE AND NATURALIZED, compiled by E. L. Little, Jr. - U.S. Dept. Agr. For. Serv. Agr. Handbook No. 541: iv + 375 pp. 1979. \$10.00 (cloth bound).

This very useful and accurate listing supersedes the 1953 checklist (Agric. Handbook No. 41). Included is a total of 748 species, of which 679 (216 genera, 73 families) are native and 69 are naturalized. The scientific names, synonymy, vernacular names, and geographic ranges are given. In the listing, 49 states are covered but not the 50th, Hawaii. There are 8 very handy appendices: (1) alphabetic list by scientific name (the trees in the main body are also so arranged; the appendix listing is intended for convenient reference) (2) alphabetic listing by common names (3) scientific names applied since 1951 (4) list of author abbreviations (5) commercial names for lumber (alphabetic order) (6) rules for use of common English names (7) listing of plant families in alphabetic order and another one by the Engler (Dalle Torre and Harms) arrangement (8) summary of changes in specific names since the 1953 checklist. This book will be of great value to botanists, foresters, and others.

G M H

"TREES, SHRUBS, AND FLOWERS TO KNOW IN ONTARIO, by Sheila M. McKay, P. M. Catling, and Betsy Gordon. 1-210, many figs., 2 maps, 1 col. pl. J. M. Dent & Sons (Canada) Limited, Don Mills, Ontario M3B 2R8 1979. Can. \$ 6.95.

Of the 2000-2500 species of vascular plants found in Ontario, the approximately 500 commonest ones are treated in this book. Ferns, gymnosperms, and angiosperms are included in the text. The order of arrangement is as follows: Introduction discussing the vegetational zones; trees (evergreen and deciduous); small trees or shrubs; vines; flowers (by flower color); sedges; grasses; aquatic plants; and ferns. The numerous line drawings mostly one for each species are a considerable help to identification. Glossary; index.

G M H

"POLLEN FLORA OF ARGENTINA: MODERN SPORE AND POLLEN TYPES OF PTERIDOPHYTA, GYMNOSPERMAE, AND ANGIOSPERMAE, by Vera Markgraf and H. L. D'ANTONI. ix + 208 pp., 10 figs., 1 map, 43 pls. with 374 figs. University of Arizona Press, Tucson. 1979.

This text-cum-atlas is no doubt of much interest to palynologists since it treats the spores and pollens of plants growing in the Southern Hemisphere. The useful and informative introduction is rendered in both English and Spanish and the text of the balance of the work is written in a manner which should make it understandable to both English (and Spanish) (and other) language users. Photomicrographs, morphological descriptions, and keys are provided for 374 pollen types. The keys are distributed among the four plant geographic regions of Argentina: Amazonic, Chaqueño (Chaco), Andean-Patagonian, and subantarctic dominions. There is a separate key to genera of pteridophytes of the Fuego Patagonia region. The order of subject matter is somewhat unusual: the keys follow the descriptions of the spores/pollens. Included are useful supplements: glossary; bibliography; and alphabetic indices (genus, family, common names). This useful book in a loose-leaf format is available for the moderate price of \$9.50 (US).

G M H

"THE PTERIDOPHYTES OF KANSAS, NEBRASKA, SOUTH DAKOTA, AND NORTH DAKOTA, U.S.A" by Aleta Jo Petrik-Ott. Beihefte zur Nova Hedwigia Heft 61: 1-332, 66 maps, 56 pls. J. Cramer, A. R. Gantner Verlag K. G., Vaduz, Liechtenstein. 1979. DM. 100.--

This is the first comprehensive work dealing with the Pteridophyta of the "heart" of the central plains and prairies of the USA. 65 taxa are included, each with a complete description and illustration as well as distribution maps (for each, one showing the range of the taxon in North America, another the range in the four states of the title). Keys to the various groups, synonymy, chromosome numbers, time of sporulation, habitat, and distribution are detailed, the last with specimen citations. The Introduction cites other studies of the general area, individual states, and regions within states. A large bibliography, glossary, indexes, and addendum complement the work. All herbarium specimens cited were examined carefully. A chapter is appended of unverified records, questionable collections, and excluded taxa, including 8 citations which could not be verified.

G M H

"KEYS TO IOWA VASCULAR PLANTS," by Richard W. Pohl (Iowa State University) vii + 198 pp., 26 figs. Kendall/Hunt Publishing Company, Dubuque, Iowa. 1973. \$7.95.

Six keys will be found in this spiral-bound volume. These are keys to (1) 16 important plant families considered to be the most outstanding with a large proportion of the flora; (2) families of the pteridophytes (ferns and allies); (3) families of seed plants, also genera and species as found in Iowa (this the chief part of volume, pp. 12-177); (4) fruits; (5) winter twigs; and (6) leafless flowering trees and shrubs, as usually found in early spring. Also included are a glossary with figures and an index of families. This is an excellent guide to identifying the plants of Iowa (and adjacent states) and one convenient to use in the field or herbarium. The book opens flat on the table when in use.

G M H

"A PRELIMINARY CHECK-LIST OF AUSTRALIAN GRASSES," by B. K. Simon. Queensland Dept. Primary Ind., Bot. Branch (Brisbane). Tech. Bull. No. 3: 88 pp. 1978

Approx. 1100 taxa of Gramineae are listed with indication of location, followed by an index of species and a bibliography.

G M H

"VASCULAR PLANTS OF BRITISH COLUMBIA: A DESCRIPTIVE RESOURCE INVENTORY. xxiv + 754 pp., 1 map. Univ. of British Columbia Press. Vancouver, B.C. Tech. Bull.

NO. 4 (Botanic Garden). 1977. \$28.00 (Canad.)

Following several pages with general information on the nature of the plant life of the Province, how to use this inventory, and the computer program by which it was obtained comes the complete computerized inventory of the Flora of British Columbia Project (FBCP). This represents the first comprehensive data collection covering all known vascular species of the Province. Included are 3,137 taxa. Actually, this volume is the first stage in plans for a detailed flora of the Province which will eventually appear, it is planned, in several volumes. For the various taxa, data include: vernacular name, flower color, flowering season, duration, chromosome status, economic and poison status, ornamental value, distribution, endangered sp. status, etc.

G M H

"AMINOGLYCOSIDE ANTIBIOTICS," edited by H. Umezawa and I. R. Hooper. Handbook of Experimental Pharmacology (continuation of Handbuch der experimentellen Pharmakologie). Vol. 62: XV + 368 pp., 26 figs. 51 tabs., 950 g. Springer-Verlag Berlin, Heidelberg, New York 1982. DM. 280.-- (US \$ 93.-- approx.).

The first practically useful antibiotic was a member of the aminoglycoside group - streptomycin (discovered ca 1944). Other antibiotics were introduced later, including penicillin, erythromycin, chloramphenicol, and the tetracyclines. Around 1957, resistant strains of staphylococci appeared in many hospitals; kanamycin (another aminoglycoside) proved effective in its control. However, later it became evident that some bacteria were developing resistance to kanamycin through the development of special enzymes. In about 3 years, synthetic derivatives of the aminoglycosides (AG) were developed which would inhibit the growth of these resistant strains. The chemistry and biochemistry of the AG is the subject matter of this volume. Studies in the synthesis of the AG compounds have also been most profitable in extending the chemist's knowledge of carbohydrate chemistry. The subject matters of the 7 chapters of this book are: 1) Naturally occurring AG - the scores of compounds known include dehydrostreptomycin, the neomycins, paromomycins, verdamycin, nebramycin, numerous gentamicins, sisomicin, fortamicins, myomycin, hygromycin, and others. 2) Total chemical synthesis and modifications of various AG. 3) Biosynthesis and mutasynthesis (mutational biosynthesis) of the AG: formation of idiotrophs (blocked mutants), blockage of biosynthetic pathways, etc. 4) Antibacterial activities of the AG. 5) Mechanisms of action of the AG. 6) Mech-

anisms of resistance to the AG. 7) Toxicology and pharmacology of the AG. - All of the 12 authors of this volume are Japanese except for the American Irving R. Hooper, who is also one of the editors, and who is from Beaufort, N. Ca. (not N. Y. as given on p. iv). There are extensive bibliographies at the ends of the chapters and a terminal subject index. - This most useful and unique volume clarifies and summarizes important findings from the oriental nation where most of the researches on this group of antibiotic compounds have been carried on for the last decade or so. The text should find its way into individual as well as institutional libraries where medical or chemical researches are being pursued.

G M H

¹FUNGORUM RARIORUM ICONES COLORATAE. PARS X", by S. P. Wasser. 32 pp., 9 col. pls., 6 text figs. J. Cramer, Vaduz, Liechtenstein. 1979. DM. 35,--

Textual descriptions and fine colored plates are given for 14 taxa of rare and interesting taxa of mushrooms. Agaricus tabularis Pk., A. squamuliferus (Moell.) Pil., A. spissicaulis (Moell.) Moell., A. bernardii Qué., A. longicaudus S. Wasser, A. xanthodermus Gen. var. leptotoides R. Mre., Cystoderma rugosoreticulata (Lorinser) S. Wasser, C. superbum Huijism., Leucocoprinus bohusi S. Wasser, L. denudatum (Rabenh.) Sing., L. breadolae (Schulz.) Mos., Leucoagaricus macrorrhizus Locq., L. moseri (S. Wasser) S. Wasser, and Galeropsis desertorum Vel. et Dvor.

G M H

"AUSTROBOLETUS AND TYLOPILUS SUBGENUS PORPHYRELLUS, WITH EMPHASIS ON NORTH AMERICAN TAXA," by Carl B. Wolfe, Jr. - Bibliotheca Mycologica Band 69: 1-148 65 figs., 5 pls., 1 tab. J. Cramer, Vaduz, Liechtenstein. 1979. DM. 40,00.

Six species of North American Tylopilus are recognized and described in detail. Besides 6 new combinations, new states are proposed for T. porphyrosporus var. olivaceobrunneus (Zeller et Bailey) comb. et stat. nov. (Boletus o.) and var. sordidus (Frost) comb. nov. (B. s.). Sect. Truncatosporus sect. nov. was created to receive T. amylosporus (Smith) Thiers. Two species are recognized in Austroboletus (Corner) stat. et gen. nov. (Boletus subgen. A.). The following new combinations are made: Austroboletus cookei (Sacc. et Syd.) (Boletus c.); A. dictyotus (Boedijn) (Porphyrellus d.);

A. dictyotus var. kinabaluensis (Corner) (B. d. var.k.)
A. festivus (Singer) (Porphyrellus f.); A. fusisporus
 (Kawamura apud Imazeki et Hongo) (P. f.); A. longipes
 (Massee) (B. l.); A. malaccensis (Pat. et Baker) (Phyll-
 oporus m.); A. mucosus (Corner) (B. m.); A. niveus
 (Stevenson) (Tylopilus n.); A. novaezelandiae (McNabb)
 (Porphyrellus n.); A. subviridens (Hongo) (Porphyrellus
 s.); A. tristis (Pat. et Baker) (B. t.). - Hence, actual-
 ly 12 species of Austroboletus have been published
 here as collected in various parts of the world. In
 the section "Type Studies", new combinations under
 other genera, validations, etc., are presented. Also
 included is a tentative key to the world taxa of
Austroboletus and Tylopilus subgen. Porphyrellus.

G M H

"FLORA OF THE NIAGARA FRONTIER REGION, SUPPLEMENT,"
 by C. A. Zenkert (deceased) and R. H. Zander. Bull.
 Buffalo Soc. Nat. Sciences 16: iv + iv + 62 pp., 1
 map. 1975.

This issue supplements the Flora (1934) (Bull. 16) with
 hundreds of new records, including 106 species and var-
 ieties added to the Flora. The total number of spec-
 ies and varieties of vascular plants now known for this
 region is 1,808, of which 448 are introduced.

G M H

"DRUG INFORMATION SOURCES (A WORLD LIST). Anonymous.
 American Journal of Pharmacy 136: 52-70; 152-164;
 257-267; 1964. - 137: 35-40; 69-81; 1965.

This is a compilation of books which deal with the
 drugs, pharmaceuticals, and specialties (proprietarys)
 of the various countries of the world, including the
 United States, Argentina, Australia, Austria, Belgium,
 and 28 other nations, as well as international titles.
 Besides the citation of the work, there is a paragraph
 of description and criticism about each. The list was
 compiled by the Drug Information Sources Committee
 (Chairperson, Anne McCann) of the Pharmaceutical Sec-
 tion, Science-Technology Division, Special Libraries
 Association.

G M H

"NOMENCLATURE IN THE MACHINE AGE," by E. L. Yochelson.
 Systematic Zoology 15: 88-91; 1966.

Discussion of the changes bound to come in biological
 nomenclature with the use of electronic computers.

G M H

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