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A NEW GENUS *VERNONANTHURA* (VERNONIEAE, ASTERACEAE)

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ABSTRACT

Vernonanthura is described for 62 Neotropical species previously placed in *Vernonia* with *Baccharis brasiliana* L. as type. The genus differs from *Vernonia* in the woody habit, the erect sometimes xylopodial bases, the thyrsoid to pyramidal inflorescences, and the often prominent basal appendages on the anther thecae.

KEY WORDS: Asteraceae, Vernonieae, *Vernonanthura, Vernonia*, new genus

During the last decade, the author has produced a number of papers in which many genera have been segregated from *Vernonia* Schreb. Among these papers are many that treat the "*Lepidaploa* Complex" (Robinson 1987a, b, c; 1988a, b, c; 1990), the members of which are considered part of the subtribe Vernoniinae, but which were initially distinguished as a group from typical *Vernonia* only by the extremely scorpioid cymose or seriate cymose forms of their inflorescences or by their lophate pollen grains. In the papers on the *Lepidaploa* Complex, the limits of typical *Vernonia* in eastern North America, México, and the Bahamas have been left imprecisely defined, and some Neotropical elements of the Vernoniinae that were less obviously distinct from *Vernonia* were left in the latter genus, in spite of the realization that they eventually needed to be removed. Improved knowledge of the limits of typical *Vernonia* and the need for fully revised concepts for floristic treatments make the description of the present new genus necessary at this time. The new genus includes the largest group of Neotropical species that has remained in *Vernonia*. None of the existing generic names in the Vernonieae has been found to apply to this group. The new name is derived from the generic name *Vernonia* plus the complex ending derived from "anthera" (anther) and "oura" (tail), referring to the frequently tailed anther bases.

Vernonanthura H. Robinson, *gen. nov.* TYPE: *Baccharis brasiliana* L.

Plantae erectae fruticosae vel arborescentes raro volubiles (*Vernonanthura cocleana* [Keeley] H. Robinson); xylopodia saepe praesentia; caules teretes vel angulati (*V. pinguis* [Griseb.] H. Robinson) medulla solida, pilis simplices vel T-formibus. Folia alternata sessilia vel longe petiolata; laminae lineares vel lanceolatae vel late oblongae vel obovatae, base obtusae vel attenuatae raro cordatae vel auriculatae (*V. amplexicaulis* [Fries] H. Robinson) margine integrae ad dense serratae apice obtusae vel breviter acuminatae supra glabrae vel pilosulae vel scabrae subtus glabrae vel tomentosae glandulo-punctatae, nervis secondariis patentiter pinnatis. Inflorescentiae thyrsoideae vel pyramidaliter paniculatae, ramis dense ad laxe vel leniter seriato-cymosis vel corymbiformis, foliis in nodis inferioribus inflorescentiae leniter vel valde minoribus, bracteolis superiores parvis, pedunculis nullis vel brevibus plerumque ad 8 mm longis raro longioribus (*V. tweedieana* [Baker] H. Robinson). Capitula homogama; involucra plerumque late campanulata; bracteis $1\frac{1}{2}$-3plo numeriores quam floribus plerumque 16-30 (ca. 60 in *V. crassa* [Vell. Conc.] H. Robinson) in seriebus 4-10 valde imbricatis subcoriaceis ovatis vel oblongis apice obtusis raro bracteis inferioribus apice acutis et reflexis (*V. angulata* [H. Robinson] H. Robinson) interioribus persistentibus; receptacula epaleacea. Flores 4-30 in capitulo; corollae lavandulae vel albae anguste infundibulares, faucibus distinctis interne glabris, lobis linearibus glanduliferous, pilis nullis, ductis interioribus longitudinalibus numerosis; thecae antherarum base breviter vel longe appendiculatae; appendices apicales oblongo-ovatae, appendices et connectivae saepe abaxialiter glanduliferae, parietibus cellularum tenuibus; base stylorum disciformiter nodulosi. Achaenia prismatica vel obovata glabra vel dense setulifera et glandulifera 8-10 costata, idioblastis non glandularibus plerumque in aggregatis 1-3 cellularibus, rhaphides subquadratis vel late oblongis; carpopodia superne constricta in partibus superioribus saepe setulifera et glandulifera; setae pappi biseriatae, seriebus exterioribus brevibus et plerumque squamiformibus, seriebus interioribus capillaris apice plerumque distincte latiores. Grana pollinis in diametro plerumque 37-40 μm typus A tricolporata, tectis perforatis inter colpis continuis, $x = 17$ (Jones 1979, 5 spp.; Keeley 1978, 1 sp.; Stutts 1988, 5 spp.).

Like most American Vernonieae, *Vernonanthura* has a basic chromosome number of $x = 17$. The new genus is clearly a member of the subtribe Vernoniinae in having a well developed basal stylar node and apical anther appendages with thin walled cells and often with glands. Within the subtribe,

the new genus is unlike members of the *Lepidaploa* Complex and similar to *Vernonia* in the Type A rather than lophate pollen, in the lack of truly scorpioid cymes or cymes with large foliose bracts in the inflorescence, in the lack of hairs or spicules on the corolla lobes, and in the subquadrate to short oblong rather than elongate raphids in the achene walls. In all these respects the new Neotropical genus seems to be a close relative of the North Temperate *Vernonia*.

As presently recognized, *Vernonia* sensu stricto is mostly eastern North American, with a few species such as *V. ervendbergii* A. Gray, *V. faustiana* (Chapman & Jones) Turner, *V. greggii* A. Gray, and *V. schaffneri* A. Gray extending into México, and *V. blodgettii* Small and *V. insularis* Gleason reaching the Bahamas. Unlike *Vernonia*, *Vernonanthura* ranges throughout the Neotropical Region from México to Argentina. In the West Indies it includes those species placed by Keeley (1978) in the subsects. *Buzifoliae* Ekman and *Polyanthes* Ekman. Jones (1976) treated some of the Mexican species in his revision of subsect. *Paniculatae* ser. *Umbelliformes* Gleason. South American species were placed by Cabrera in subsects. *Chamaedrys* Cabrera and *Nitidulae* Cabrera, and many are placed in subsects. *Nudiflorae* Cabrera and *Polyanthes* Ekman. Species of the new genus were placed by Stutts (1988) in the ser. *Brasilianae* Stutts, *Nitidulae* (Cabrera) Stutts, and *Puberulae* Stutts, subser. *Chamaedrys* (Cabrera) Stutts, *Lazae* Stutts, *Nudiflorae* Stutts, and *Chaquensis* Stutts. In Baker (1873) members of the genus fell mostly into his informal subsections *Lepidaploae Scorpioideae*, *Scorpioidea Verae*, and *Lepidaploae Paniculatae*. No previous treatment seems to have recognized the species of *Vernonanthura* as a single group apart from other elements of *Vernonia*.

Gleason (1922) noted the most useful distinction between *Vernonia* sensu stricto and other species in tropical North America by his key character, "Inflorescence corymbiform, its branches irregular in length; heads few to many, on peduncles of irregular length or some nearly sessile; species of northern México, the United States, and the Bahama Islands," All the typical *Vernonia* species examined show such inflorescences with shallowly rounded, flattened, or cymose form. In contrast, the inflorescence in *Vernonanthura* is pyramidal to thyrsoid in form with only individual branches showing corymbose or cymose shape. In cases where whole plants are available, a second difference between *Vernonia* and *Vernonanthura* can be seen. In *Vernonia* the bases of the stems arise from a creeping stem, and they are herbaceous. In *Vernonanthura* the stems are erect from a woody base without evident creeping stems. The bases often have xylopodia, as noted in the subsection *Chamaedrys* by Stutts (1988). The plants are shrubs or even trees. A third difference is significant in *Vernonanthura*, but is not found in all the species. *Vernonia* is recognized in the traditional concepts of the genus for its lack of tailed anther bases, and this is actually true of *Vernonia* sensu stricto. However, in *Vernonanthura* a number of species have tails. In some cases, such as *V. diffusa* (Less.) H. Robinson,

V. discolor (Less.) H. Robinson, and *V. petiolaris* (A.DC.) H. Robinson, the tails are highly developed, as long as the tails of *Piptocarpha* R. Br. of the Piptocarphinae, which is traditionally distinguished from *Vernonia* on the basis of that character. The prominently tailed species of *Vernonanthura*, like many Old World species with tailed anthers (Robinson & Kahn 1986), should never have been placed in *Vernonia* as traditionally defined. The type species of *Vernonanthura*, *V. brasiliana* (L.) H. Robinson, has shorter, but nevertheless, distinct tails. These sterile bases of the anthers are obvious in opened florets under the dissecting microscope by their texture. Most other species of *Vernonanthura* have some sterile cells at the anther base, often forming some teeth, but there are members of the genus that have anther bases essentially like those of *Vernonia*.

Other possible distinctions of *Vernonanthura* remain to be critically examined. The corolla lobes of many *Vernonanthura* have elongate internal structures that appear to be thin walled, rather obvious, parallel ducts filling the lobe, and other species seem to share the character in a weaker form. These structures have not been studied in detail, but they have not been noticed in *Vernonia* or *Eremosis* (A.DC.) Gleason. The corolla lobes of *Vernonia*, have thicker and more roughened tips than those of *Vernonanthura*. In one case where a hair was seen on a corolla lobe in *Vernonanthura*, it was not T-shaped, but a few of the rare hairs seen microscopically in *Vernonia* were T-shaped. Most members of the new genus closest to the type have carpopodia with setulae or glands intruding onto the upper, constricted, sclerified part. The glands or setulae do not arise directly from sclerified cells, but their bases are often completely surrounded by such cells. The sclerified parts of carpopodia in *Vernonia* sensu stricto are not constricted above and bear no setulae or glands.

The genus contains the following 62 Neotropical species that have been examined by the author. The list excludes some species that have not been studied as carefully, and the synonymies exclude combinations made in *Cacalia* Burm. by Kuntze (1891) except one name that is a basionym. Four comparatively familiar names, *Vernonia missionis* Gardner, *V. nitidula* Less., *V. polyanthes* Less., and *V. ruficoma* Schlecht. *ex* Baker fall into synonymy respectively under the names *Vernonanthura cymosa* (Vell. Conc.) H. Robinson, *V. montevidensis* (Spreng.) H. Robinson, *V. phosphorica* (Vell. Conc.) H. Robinson, and *V. membranacea* (Gardner) H. Robinson.

Vernonanthura almedae (H. Robinson) H. Robinson, *comb. nov.* BASIONYM: *Vernonia almedae* H. Robinson, Phytologia 46:107. 1980.

Vernonanthura amplexicaulis (Fries) H. Robinson, *comb. nov.* BASIONYM: *Vernonia amplexicaulis* Fries, Ark. Bot. 5(13):5. 1906.

Vernonanthura angulata (H. Robinson) H. Robinson, *comb. nov.* BASIONYM: *Vernonia angulata* H. Robinson, Phytologia 45:170. 1980.

Vernonanthura auriculata (Griseb.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia auriculata* Griseb., *Symb. Fl. Argent.* 164. 1879.

Vernonanthura beyrichii (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia beyrichii* Less., Linnaea 4:275. 1829.
Vernonia denticulata A.DC., *Prodr.* 5:36. 1836.

Vernonanthura brasiliana (L.) H. Robinson, *comb. nov.* BASIONYM: *Baccharis brasiliana* L., *Sp. Pl.* ed. 2, 1205. 1763. *Vernonia brasiliana* (L.) Druce, Rep. Bot. Exch. Cl. Brit. Isles 3:426. 1913 (1914).
Vernonia scabra Pers., *Syn. Pl.* 2:404. 1807.
Vernonia odoratissima H.B.K., *Nov. Gen. Sp.*, ed. fol. 4:32. 1818.
Vernonia assana Mart. *in* A.DC., *Prodr.* 5:38. 1836.

Vernonanthura buxifolia (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia buxifolia* Less., Linnaea 4:313. 1829; based on *Lepidaploa buxifolia* Cass. *Lepidaploa buxifolia* Cass., *Dict. Sci. Nat.* 26:18. 1823; *nom. inval.*, described in *Lepidaploa* prior to validation at generic level.
Vernonia domingensis A.DC., *Prodr.* 5:30. 1836.
Vernonia montana Gleason, Bull. New York Bot. Gard. 4:191. 1906.

Vernonanthura canaminina (Gleason) H. Robinson, *comb. nov.* BASIONYM: *Vernonia canaminina* Gleason, Amer. J. Bot. 10:309. 1923.

Vernonanthura catharinensis (Cabrera) H. Robinson, *comb. nov.* BASIONYM: *Vernonia catharinensis* Cabrera, Sellowia 13:180. 1961.

Vernonanthura chamaedrys (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia chamaedrys* Less., Linnaea 4:259. 1829.
Vernonia ilex Chodat, Bull. Herb. Boissier, ser. II. 4:410. 1902.

Vernonanthura cichoriifolia (Chodat) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cichoriifolia* Chodat, Bull. Herb. Boissier, ser. II. 2:300. 1902.

Vernonanthura chaquensis (Cabrera) H. Robinson, *comb. nov.* BASIONYM: *Vernonia chaquensis* Cabrera, Darwiniana 6:358. 1944.

Vernonanthura cocleana (Keeley) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cocleana* Keeley, Brittonia 39:44. 1987.

Vernonanthura condensata (Baker) H. Robinson, *comb. nov.* BASIONYM: *Vernonia condensata* Baker, J. Bot. 8:202. 1875.

Vernonia sylvestris Glaz., Bull. Soc. Bot. France 56, Mém. 1(3):373. 1909; *nom. nud.*
Vernonia bahiensis Toledo, Arq. Bot. Estado São Paulo, n.s. 1:52. 1939.

Vernonanthura cordata (H.B.K.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cordata* H.B.K., *Nov. Gen. Sp.*, ed. fol. 4:31. 1818.
Vernonia morelana Gleason, Bull. Torrey Bot. Club 46:241. 1919.

Vernonanthura crassa (Vell. Conc.) H. Robinson, *comb. nov.* BASIONYM: *Chrysocoma crassa* Vell. Conc., *Fl. Flumin.* 305. 1825 [1829]. *Vernonia crassa* (Vell. Conc.) Ekman *ex* Malme, Kongl. Svenska Vetenskapsakad. Handl. III. 12(2):24. 1933.

Vernonanthura cronquistii (S.B. Jones) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cronquistii* S.B. Jones, Rhodora 78:194. 1976.

Vernonanthura cuneifolia (Gardner) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cuneifolia* Gardner, London J. Bot. 5:215. 1846.
Vernonia itapensis Chodat, Bull. Herb. Boissier, ser. II. 2:301. 1902.

Vernonanthura cupularis (Chodat) H. Robinson, *comb. nov.* BASIONYM: *Vernonia cupularis* Chodat, Bull. Herb. Boissier, ser. II. 2:299. 1902.

Vernonanthura cymosa (Vell. Conc.) H. Robinson, *comb. nov.* BASIONYM: *Chrysocoma cymosa* Vell. Conc., *Fl. Flumin.* 327. 1825 [1829]; not *Vernonia cymosa* Blume, 1826.
Vernonia missionis Gardner, London J. Bot. 4:115. 1845.

Vernonanthura deppeana (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia deppeana* Less., Linnaea 6:398. 1831.

Vernonanthura diffusa (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia diffusa* Less., Linnaea 4:272. 1829.

Vernonanthura discolor (Less.) H. Robinson *comb. nov.* BASIONYM: *Vernonia discolor* Less., Linnaea 4:274. 1829.

Vernonanthura fagifolia (Gardner) H. Robinson, *comb. nov.* BASIONYM: *Vernonia fagifolia* Gardner, London J. Bot. 5:216. 1846.

Vernonanthura ferruginea (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia ferruginea* Less., Linnaea 4:271. 1829.
Vernonia polycephala A.DC., *Prodr.* 5:39. 1836.
Vernonia crenata Gardner, London J. Bot. 5:218. 1846.

Vernonanthura fuertesii (Urban) H. Robinson, *comb. nov.* BASIONYM:
Eupatorium fuertesii Urban, Repert. Spec. Nov. Regni Veg. 17:9. 1921.
Vernonia fuertesii (Urban) H. Robinson, Phytologia 38:149. 1977.
Vernonia barkeri Ekman *ex* Urban, Ark. Bot. 23A(11):49. 1931.

Vernonanthura havanensis (A.DC.) H. Robinson, *comb. nov.* BASIONYM:
Vernonia havanensis A.DC., *Prodr.* 5:37. 1836.
Vernonia cubensis Griseb., *Cat. Pl. Cub.* 144. 1866.
Vernonia stictophylla Wright, Sauv. Anal. Cien. Havana 6:176. 1894.

Vernonanthura hieracioides (Griseb.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia hieracioides* Griseb., Mem. Amer. Acad. Arts 8:511. 1861.
Vernonia orientis Gleason, Bull. Torrey Bot. Club 40:330. 1913.

Vernonanthura ignobilis (Less.) H. Robinson, *comb. nov.* BASIONYM:
Vernonia ignobilis Less., Linnaea 6:658. 1831.

Vernonanthura laxa (Gardner) H. Robinson, *comb. nov.* BASIONYM:
Vernonia laxa Gardner, London J. Bot. 5:214. 1846.

Vernonanthura liatroides (A.DC.) H. Robinson, *comb. nov.* BASIONYM:
Vernonia liatroides A.DC., *Prodr.* 5:34. 1836.
Vernonia ehrenbergiana Schultz-Bip., Linnaea 20:513. 1847.
Eupatorium tulanum Klatt, Abh. Naturf. Ges. Halle 15:324. 1882.
Vernonia capreaefolia Gleason, Bull. New York Bot. Gard. 4:200. 1906.

Vernonanthura loretensis (Hieron.) H. Robinson, *comb. nov.* BASIONYM:
Vernonia loretensis Hieron., Bot. Jahrb. Syst. 22:676. 1897.

Vernonanthura lucida (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia lucida* Less., Linnaea 4:260. 1829.

Vernonanthura mariana (Mart. *ex* Baker) H. Robinson, *comb. nov.* BASIONYM: *Vernonia mariana* Mart. *ex* Baker, *Fl. Bras.* 6(2):107. 1873.

Vernonanthura membranacea (Gardner) H. Robinson, *comb. nov.* BASIONYM: *Vernonia membranacea* Gardner, London J. Bot. 5:217. 1846.
Vernonia ruficoma Schlecht. *ex* Baker, *Fl. Bras.* 6(2):105. 1873.

Vernonanthura menthaefolia (Poeppig *ex* Spreng.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia menthaefolia* Poeppig *ex* Spreng., *Syst. Veg.*, ed. 16, 3:412. 1826.
Eupatorium perrinianum Spreng., *Syst. Veg.*, ed. 16, 3:412. 1826.
Vernonia ottonis Schultz-Bip., Linnaea 20:508. 1847.
Vernonia grisebachii Schultz-Bip., J. Bot. 1:231. 1863.

Vernonanthura montevidensis (Spreng.) H. Robinson, *comb. nov.* BASIONYM: *Baccharis montevidensis* Spreng., *Syst. Veg.*, ed. 16. 3:460. 1826; not *Vernonia montevidensis* Nees *ex* Otto & A. Dietr.
Vernonia nitidula Less., Linnaea 4:266. 1829.
Vernonia gochnatioides Hook. & Arn. *ex* A.DC., *Prodr.* 7:264. 1838.
Vernonia florida Gardner, London J. Bot. 5:212. 1846.
Vernonia arechavaletae André, Rev. Hort. 73:284. 1901.

Vernonanthura mucronulata (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia mucronulata* Less., Linnaea 4:266. 1829.
Vernonia collina Gardner, London J. Bot. 5:213. 1846.

Vernonanthura nudiflora (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia nudiflora* Less., Linnaea 4:258. 1829.

Vernonanthura oaxacana (Schultz-Bip. *ex* Klatt) H. Robinson, *comb. nov.* BASIONYM: *Vernonia oaxacana* Schultz-Bip. *ex* Klatt, Leopoldina 20:74. 1894.

Vernonanthura oligactoides (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia oligactoides* Less., Linnaea 4:648. 1831.
Vernonia sorocabae Schultz-Bip. *ex* Baker, *Fl. Bras.* 6(2):58. 1873.
Vernonia conyzoides Chodat, Bull. Herb. Boissier, ser. II. 2:303. 1902.

Vernonanthura oligolepis (Schultz-Bip. *ex* Baker) H. Robinson, *comb. nov.* BASIONYM: *Vernonia oligolepis* Schultz-Bip. *ex* Baker, *Fl. Bras.* 6(2):56. 1873.

Vernonanthura paludosa (Gardner) H. Robinson, *comb. nov.* BASIONYM: *Vernonia paludosa* Gardner, London J. Bot. 4:113. 1845.

Vernonanthura patens (H.B.K.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia patens* H.B.K., *Nov. Gen. Sp.*, ed. fol. 4:32. 1818.
Vernonia baccharoides H.B.K., *Nov. Gen. Sp.*, ed. fol. 4:32. 1818.
Vernonia lanceolaris A.DC., *Prodr.* 5:37. 1836.
Vernonia haenkeana A.DC., *Prodr.* 5:37. 1836.
Vernonia micradenia A.DC., *Prodr.* 5:38. 1836.
Vernonia pacchensis Benth., *Pl. Hartw.* 134. 1844.
Vernonia aschenborniana Schauer, Linnaea 19:714. 1847.
Vernonia stuebelii Hieron., Bot. Jahrb. Syst. 21:337. 1895.
Vernonia bangii Rusby, Mem. Torrey Bot. Club 6:52. 1896.
Vernonia weberbaueri Hieron., Bot. Jahrb. Syst. 40:354. 1908.
Vernonia monsonensis Hieron., Bot. Jahrb. Syst. 40:335. 1908.
Vernonia salamana Gleason, Bull. Torrey Bot. Club 46:242. 1919.
Vernonia vargasii Cuatr., Bot. Jahrb. Syst. 77:83. 1956.

Vernonanthura petiolaris (A.DC.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia petiolaris* A.DC., *Prodr.* 5:37. 1836.
Vernonia hilariana Gardner, London J. Bot. 4:113. 1845.

Vernonanthura phaeoneura (Toledo) H. Robinson, *comb. nov.* BASIONYM: *Vernonia phaeoneura* Toledo, Arq. Bot. Estado São Paulo 1(4):95. 1942.

Vernonanthura phosphorica (Vell. Conc.) H. Robinson, *comb. nov.* BASIONYM: *Chrysocoma phosphorica* Vell. Conc., *Fl. Flumin.* 325. 1825 [1829].
Chrysocoma arborea Vell. Conc., *Fl. Flumin.* 326. 1825 [1829].
Vernonia polyanthes Less., Linnaea 6:651. 1831.
Vernonia psittacorum A.DC., *Prodr.* 5:36. 1836.
Vernonia corcovadensis Gardner, London J. Bot. 5:218. 1846.

Vernonanthura pinguis (Griseb.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia pinguis* Griseb., *Symb. Fl. Argent.* 165. 1879.

Vernonanthura piresii (H. Robinson) H. Robinson, *comb. nov.* BASIONYM: *Vernonia piresii* H. Robinson, Phytologia 45:178. 1980.

Vernonanthura prenanthoides (Gleason) H. Robinson, *comb. nov.* BASIONYM: *Vernonia prenanthoides* Gleason, Amer. J. Bot. 10:308. 1923.

Vernonanthura puberula (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia puberula* Less., Linnaea 6:649. 1831.

Vernonanthura rigiophylla (Kuntze) H. Robinson, *comb. nov.* BASIONYM: *Cacalia rigiophylla* Kuntze, *Revis. Gen. Pl.* 2:971. 1891; based on *Vernonia rigiophylla* Schultz-Bip. *ex* Baker. *Vernonia rigiophylla* Schultz-Bip. *ex* Baker, *Fl. Bras.* 6(2):118. 1873; not *Vernonia rigiophylla* A.DC., 1836.
Vernonia elsieae Stutts, Brittonia 35:351. 1983.

Vernonanthura sambrayana (S.B. Jones) H. Robinson, *comb. nov.* BASIONYM: *Vernonia sambrayana* S.B. Jones, Fieldiana, Bot., n.s. 5:34. 1980.

Vernonanthura serratuloides (H.B.K.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia serratuloides* H.B.K., *Nov. Gen. Sp.*, ed. fol. 4:33. 1818.
Perezia paniculata A. Gray, Proc. Amer. Acad. Arts 21:393. 1886.
Perezia vernonioides A. Gray, Proc. Amer. Acad. Arts 22:433. 1887.
Vernonia jaliscana Gleason, Bull. New York Bot. Gard. 4:198. 1906.
Vernonia umbellifera Gleason, Bull. New York Bot. Gard. 4:199. 1906.

Vernonia vernonioides (A. Gray) Bacigalupi, Contr. Gray Herb. 97:77. 1931.
Vernonia camporum M.E. Jones, Contr. West. Bot. 18:69. 1933.
Perezia nervata M.E. Jones, Contr. West. Bot. 18:74. 1933.

Vernonanthura sinclairii (Benth.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia sinclairii* Benth., *Bot. Voy. Sulphur* 109. 1845.

Vernonanthura squamulosa (Hook. & Arn.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia squamulosa* Hook. & Arn., Companion Bot. Mag. 2:44. 1836.
Cacalia praecox Kuntze, *Revis. Gen. Pl.* 3:139. 1898. *Vernonia praecox* (Kuntze) Schumann, Just's Bot. Jahresber. 26(1):382. 1900.

Vernonanthura stellata (Spreng.) H. Robinson, *comb. nov.* BASIONYM: *Conyza stellata* Spreng., *Neue Entdeck.* 2:142. 1820.

Vernonanthura subverticillata (Schultz-Bip. *ex* Baker) H. Robinson, *comb. nov.* BASIONYM: *Vernonia subverticillata* Schultz-Bip. *ex* Baker, *Fl. Bras.* 6(2):99. 1873.

Vernonanthura tuerckheimii (Urban) H. Robinson, *comb. nov.* BASIONYM: *Vernonia tuerckheimii* Urban, *Symb. Antill.* 7:421. 1912.
Vernonia microphylla Alain, Mem. New York Bot. Gard. 21:156. 1971.
Vernonia pusilliflora Alain, Mem. New York Bot. Gard. 25:279. 1973.

Vernonanthura tweedieana (Baker) H. Robinson, *comb. nov.* BASIONYM: *Vernonia tweedieana* Baker, *Fl. Bras.* 6(2):99. 1873.

Vernonanthura viscidula (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia viscidula* Less., Linnaea 4:289. 1829.
Vernonia corymbulosa Mart. *ex* Baker, *Fl. Bras.* 6(2):113. 1873.

Vernonanthura westiana (Less.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia westiana* Less., Linnaea 6:650. 1831.
Vernonia hebeclada A.DC., *Prodr.* 5:36. 1836.

Vernonanthura yurimaguasensis (Hieron.) H. Robinson, *comb. nov.* BASIONYM: *Vernonia yurimaguasensis* Hieron., Verh. Bot. Vereins Prov. Brandenburg 48:195. 1907.
Vernonia albifila Gleason, Bull. Torrey Bot. Club 59:374.

An additional species, *Vernonia schulziana* Cabrera, would belong to the genus according to the treatments by Cabrera (1944) and Stutts (1988), but material has not been seen. Some additional species treated by Jones (1976) in the ser. *Umbelliformes* of México, such as *Vernonia karvinskiana* A.DC., have

narrow ducts in the interiors of their corolla lobes, and they may be related to *Vernonanthura*. Nevertheless, the tips of their involucral bracts are more expanded and their inflorescences are less pyramidal or thyrsoid, and so they are excluded for the present.

LITERATURE CITED

Baker, J.G. 1873. Compositae I. Vernoniaceae *in* C.F.P. Martius, *Flora Brasiliensis* 6(2):2-179.

Cabrera, A.L. 1944. Vernonieas Argentinas (Compositae) Darwiniana 6:227-231.

Gleason, H.A. 1922. Carduales, Tribe 1. Vernonieae North American Flora 33(1):47-110.

Jones, S.B. 1976. Revision of *Vernonia* (Compositae) subsection *Paniculatae* series *Umbelliformes* of the Mexican highlands. Rhodora 78:180-206.

Keeley, S.C. 1978. A revision of the West Indian vernonias (Compositae). J. Arnold Arbor. 59:360-413.

Kuntze, C.E.O. 1891. *Revisio Generum Plantarum*, vol. 2. Arthur Felix, Leipzig, Germany.

Robinson, H. 1987a. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae) I. The genus *Stenocephalum* Sch.-Bip. Proc. Biol. Soc. Wash. 100:578-583.

_____. 1987b. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae). II. A new genus, *Echinocoryne*. Proc. Biol. Soc. Wash. 100:584-589.

_____. 1987c. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae). III. Two new genera, *Cytocymura* and *Eirmocephala*. Proc. Biol. Soc. Wash. 100:844-855.

_____. 1988a. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae) IV. The new genus, *Lessingianthus*. Proc. Biol. Soc. Wash. 101:929-951.

_____. 1988b. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae) V. The new genus, *Chrysolaena*. Proc. Biol. Soc. Wash. 101:952-958.

_____. 1988c. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae) VI. A new genus, *Aynia*. Proc. Biol. Soc. Wash. 101:959-965.

_____. 1990. Studies in the *Lepidaploa* complex (Vernonieae: Asteraceae) VII. The genus *Lepidaploa*. Proc. Biol. Soc. Wash. 103:464-498.

_____. & B. Kahn. 1986. Trinervate leaves, yellow flowers, tailed anthers, and pollen variation in *Distephanus* Cassini (Vernonieae: Asteraceae). Proc. Biol. Soc. Wash. 99:493-501.

Stutts, J.G. 1988. Taxonomic revision of *Vernonia* subsect. *Chamaedrys* (Compositae: Vernonieae). Rhodora 90:37-99.

Phytologia (August 1992) 73(2):77-97.

STUDIES ON THE GENUS *BIDENS* L. (COMPOSITAE) FROM THE EASTERN HEMISPHERE. 3. TYPIFICATION OF NAMES OF *BIDENS, COREOPSIS* L., *GUIZOTIA* CASS., AND *MICROLECANE* (SCHULTZ-BIP.) BENTH. & HOOK. F. FROM AFRICA

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ABSTRACT

Typification is undertaken for names of *Bidens, Coreopsis, Guizotia* and *Microlecane* considered synonymous with names of native species of African *Bidens*. Lectotypes are chosen for 31 names. Neotypes are selected for three names, viz.: *B. diversa* Sherff, *B. holstii* (O. Hoffm.) Sherff (as *C. holstii* O. Hoffm.) and *B. steppia* (Steetz) Sherff (as *C. steppia* Steetz).

KEY WORDS: *Bidens, Coreopsis, Guizotia, Microlecane*, Compositae, typification, taxonomy, Africa

INTRODUCTION

During the course of revisional studies on the genus *Bidens* in Africa, a large number of problems have arisen concerning typification. Thus, it was decided to undertake a special study to help elucidate these difficulties, which have mainly arisen for the following four reasons.

Firstly, numerous type specimens, formerly housed at B, are apparently no longer extant and presumably were destroyed during World War II. Because of this it has been necessary to undertake a comprehensive search of many herbaria (see acknowledgments for list) in order to try to locate duplicates of these specimens.

Secondly, attempts to typify names published before the full adoption of the "type method" have led to difficulties when a collection, known to consist of two or more duplicates, has been cited in the protologue without reference to herbaria where specimens are housed. The usual practice, often employed by later authors, of adopting as the holotype the specimen of the collection located at the institution where the author of the name worked, or where his "own herbarium" is now housed, is considered unsatisfactory. In particular, this procedure is commonly adopted for names published by Otto Hoffmann in Engler's *Botanische Jahrbücher* and *Die Pflanzenwelt Ost-Afrikas* where the sheets at B are designated as the holotypes by later authors, even though no indication is made in these works that the type material is housed at B, and sheets in other herbaria often bear annotations in Hoffmann's hand. The flawed nature of these assumptions is well illustrated by a second example. Schultz-Bipontinus (1846) described *Bidens schimperi* citing only the collection *G.H.W. Schimper 1429*, of which at least fourteen duplicates housed in nine herbaria are known. Mesfin (1984a) has subsequently designated the sheet of this number at P bearing Schultz-Bipontinus's handwriting as the holotype. Clearly he has assumed that this specimen was the one used by Schultz-Bipontinus in the construction of his protologue. This assumption is probably based on the fact that this is the only sheet of *Schimper 1429* which bears one of Cosson's printed labels indicating that it was formerly in Schultz-Bipontinus's own herbarium which is now housed at P. Mesfin's designation, however, must be rejected on two grounds. First, Schultz-Bipontinus's detailed description contains information that he could not have obtained from this sheet alone; second, other duplicates also possess annotations by Schultz-Bipontinus and were doubtless used by him in the construction of the protologue in conjunction with the specimen at P. For these reasons I consider that there is no holotype of *B. schimperi*.

A more favourable approach to this kind of problem, and that adopted here, is to try to ascertain which of the duplicates, if any, were seen by the publishing author. Most frequently this information may be obtained from annotations, etc., in the publishing author's hand. When it has been established which duplicates were examined then a lectotype should be selected from amongst these. If it is not possible to demonstrate which of the duplicates were seen by the author, then the specimen most closely matching the original description should be selected as the lectotype. In particular, one should avoid automatically choosing the specimen at the author's own herbarium on the grounds that this may be considered a mechanical method of lectotype selection by future workers, and therefore liable to be rejected by invocation of Article 8.1 of the *International Code of Botanical Nomenclature* (*ICBN*) (Greuter *et al.* 1988). A similar procedure to the above has been adopted in those cases where more than one collection (syntype collections) has been cited by a publishing author.

Thirdly, in his monographs of *Bidens* (Sherff 1937) and *Coreopsis* (Sherff 1936), Sherff usually adopted the procedure of choosing as the lectotype[1] the first cited specimen, or a specimen of the first cited collection, from among the two or more syntypes or syntype collections of previously published names. On the fifteen occasions where he selected lectotypes for names of African *Bidens* and *Coreopsis*, in only one instance did he not follow this procedure. In this case, the selection of a lectotype for *B. stuhlmannii* (O. Hoffm.) Sherff, his reasoning is as follows: "Hoffmann cited a specimen by Meyer first, but this was a mere scrap, utterly worthless for determination. The fairly large and much better specimen by Stuhlmann, though cited after Meyer's, was clearly the type from which Hoffmann's description was drawn." Indeed, elsewhere Sherff states that the reason a particular specimen has been chosen as the lectotype is because it was the "first one cited" (1937:606). Thus I consider that he has selected lectotypes mechanically, and in accordance with Article 8.1 of the *ICBN* these choices may be superseded. Although in many instances his choice of lectotype is satisfactory, in a number of cases better specimens are available and new lectotypes are here selected from among these.

Fourthly, when describing a new species, Sherff occasionally cited more than one specimen of a collection in different herbaria as the type. In these cases I do not consider that he has designated a holotype as defined by Article 7.3 of the *ICBN*, and so a lectotype has been chosen from among the original material. Further to this point, Sherff often adopted an extremely broad concept of a type specimen, usually including within it all sheets of a particular collection in any one herbarium. Clearly this is not the sense in which most contemporary practising taxonomists use this term. The *ICBN* does not expressly provide a definition of a specimen. Article 9.1, however, states that "The type ..is a single specimen...except...for small herbaceous plants..., [when] the type may consist of more than one individual". From this I interpret that the *ICBN* intends that, except for small herbaceous plants, etc., a type specimen should be one individual, or part thereof. It may, therefore, be argued that in those cases where Sherff's "type specimen" is obviously more than one individual, his act of typification is ineffective. I have, however, adopted the following procedures when dealing with this problem. If the "type material" cited by Sherff was formerly all at B, I consider that it may be taken to have been the holotype, as it is not possible in these circumstances to know if his concept of a specimen corresponds with that of the *ICBN*. The lectotype is then chosen from among the isotypes. If, on the other hand, the "type material" is still extant and is considered to be of more than one individual, the lectotype is chosen from among these specimens (Article 7.5 of the *ICBN*).

Throughout this paper I have attempted to maintain a constant concept

[1]Sherff did not use the term lectotype in either of these works. I consider, however, that his use of the phrase "type specimen" is, in most instances, "an equivalent" (Article 8.3 of the *ICBN*).

of a type specimen when designating lectotypes and neotypes. Usually this is equivalent to a single herbarium sheet, but occasionally, if a sheet bears specimens that are obviously from different plants, only part of this sheet has been selected as the type.

The entries are arranged alphabetically within each genus. Except where indicated, it is not intended that these names should be considered as referring to accepted species. Indeed, all the names discussed under *Coreopsis*, *Guizotia*, and *Microlecane* are considered by me to be synonymous with species of *Bidens*, as are most of the names included under *Bidens* itself. Subsequent papers in this series will indicate the synonymic position of each of the names discussed.

Bidens L.

Bidens abyssinica Schultz-Bip. var. *glabrata* Vatke, Linnaea 39:500. 1875. TYPE: ETHIOPIA. Scholloda, 24 Sep. 1862, *G.H.W. Schimper 285* (LECTOTYPE NOV. [here selected]: Z; Isolectotypes: BM[2 sheets], PRE).

Vatke's original description of *Bidens abyssinica* var. *glabrata* is followed by the citation, in parentheses, of the collection *Schimper 285*. In addition he includes a discussion involving two other *Schimper* numbers (*105* and *305*), here reproduced in full: "Adest in coll. a. 1854 n. 105. e Gaha Meda prope Dschadscha, a Schweinfurthio Beitr. 142 cum. var. altera (quadriaristata Hochst. fide ejusdem) n. 305 e Gageros confusa, a qua primo intuitu diversissima; nostra transitum praebere videtur ad *B. bipinnatum* L. a Kotschyo in Nubia repertum, cui forte stirps abyssinica reducenda." Sherff (1937) selected the three sheets of *Schimper 105* at B as the lectotype. As these are now apparently destroyed, Mesfin (1984a) has chosen the specimen at Z as the new lectotype. It is clear, however, that Vatke had intended that *Schimper 285* should be taken as the type. Throughout this work, when describing new taxa, Vatke consistently cites in parentheses the collection described after the description and before any subsequent notes. Sherff's failure to mention *Schimper 285*, except in a list of specimens examined (1937:402), leads me to believe that he simply did not notice Vatke's citation of this collection. Vatke's discussion shows that he was in fact comparing *Schimper 285* with *Schimper 105*, but it is clear that he did not consider either *Schimper 105* or *305* to be the same taxon as *Schimper 285*. Therefore, by invoking Article 8.1(b) of the *ICBN*, Sherff's and Mesfin's choice of specimens of the paratype collection *Schimper 105* as lectotype is here rejected in favour of a duplicate of *Schimper 285*. According to Sherff (1937:402) a specimen of *Schimper 285* was formerly housed at B, but in the absence of any indication by Vatke that this, or any other, was the specimen on which his description is based, all the duplicates of this

collection must have equal status and so are here considered cotypes[2]. None of the specimens of this number at BM, PRE, and Z bear Vatke's handwriting, but all are undoubtedly from the same collection and each matches Vatke's brief varietal description. There is no doubt, however, that the best specimen is that at Z. This sheet bears part of a plant with numerous more or less intact leaves, and capitula at various stages of development.

Bidens bequaertii De Wild., Repert. Spec. Nov. Regni Veg. 13:204. 1914. TYPE: ZAIRE. Katanga, Elisabethville, 19 Mar. 1912, *J. Bequaert 270* (LECTOTYPE NOV. [here selected]: BR; Isolectotype: BR).

In his protologue of *Bidens bequaertii*, De Wildemann cited the two collections *Bequaert 270* and *A. Corbisier (H.A. Homblé) 605*. He did not indicate where the specimens that he had studied were housed, but as the only sheets of these numbers to have been located are at BR, where De Wildemann worked, these specimens may be taken to be syntypes. Sherff (1937) selected as the type the two sheets of the first cited collection, *Bequaert 270*. As it has not been possible to ascertain whether these specimens are part of the same individual, this designation must be considered contrary to the definition of a lectotype as employed by Article 7.5 of the *ICBN*, and consequently this choice is here rejected. The specimen chosen as the new lectotype of *B. bequaertii* is that attached to the sheet which has affixed to it De Wildemann's manuscript copy of his original description. This specimen closely matches his description, and was clearly the main element used by him in its construction. It possesses a branched stem bearing many lobed leaves and numerous capitula with mature fruit.

Bidens crocea Welw. *ex* O. Hoffm., Bol. Soc. Brot. 10:177. 1892. TYPE: ANGOLA. Huilla District, Lake Ivantala, Feb. 1860, *F.M.J. Welwitsch 3964* (LECTOTYPE NOV. [here selected]: BM; Isolectotypes: BM,BR, C,COI,G,K,LISU,M,P).

The two collections *Welwitsch 3964* and *J.M. Antunes* [*s.n.*], both collected in the Huilla District of Angola, were cited by Hoffmann for *Bidens crocea*, but without indication of where specimens of these numbers were housed. Sherff (1937) selected the sheet of the former at B as the type, but as this is now apparently destroyed, a new lectotype is required. Interestingly, Sherff did not cite any collections by Antunes for this species, but he did include a specimen of *E. Dekindt 861* from B, now apparently destroyed, also collected in Huilla. A sheet of *B. crocea* at LISC, also possessing the number 861, bears a hand written note indicating that it was collected by either Antunes or Dekindt. It

[2]A cotype is here defined as any duplicate of the type collection when no holotype was designated (see Frizzell 1933).

is possible, therefore, bearing in mind Sherff's meticulous citation of the specimens he studied, that the Dekindt number at B and the specimen at LISC are part of the original material of *B. crocea*. Indeed, the well preserved specimen at LISC closely matches Hoffmann's description. However, the existence of numerous duplicates of the other syntype collection avoids the necessity of choosing this specimen as the new lectotype. The two sheets of *Welwitsch 3964* at BM are of especially high quality. One of these, that which has attached a copy of Welwitsch's manuscript description of *B. crocea*, bears a specimen possessing all the important diagnostic characters of the species and thus is chosen as the new lectotype.

Bidens diversa Sherff, Bot. Gaz. 76:159. 1923. TYPE: ANGOLA. Huilla, Lubango, Tundavala, at 12 km, source of the Inhames, 30 Apr. 1971, *A. Borges 167* (NEOTYPE [here selected]: LISC; Isoneotypes: M,P, PRE,SRGH).

Sherff cited for this species the two sheets of *J.M. Antunes 315*, collected in Mounyino, Angola, in March 1901, both formerly at B and now apparently destroyed. As no duplicates of this collection have been located, a neotype is here selected in accordance with Article 7.4 of the *ICBN*. The sheet of *Borges 167* at LISC is chosen to serve as the neotype because of the close similarity of this specimen to Sherff's original description of *Bidens diversa*. Indeed, all the sheets of this new type collection possess the important diagnostic characters of the fruit and florets which distinguish this species from the closely allied *B. acuticaulis* Sherff.

Bidens flabellata O. Hoffm. *in* Warb., *Kunene-Sambesi Exped.* 419, t. 11G. 1903. TYPE: ANGOLA. at Kuebe near Manonge, 22 Apr. 1900, *H. Baum 847* (LECTOTYPE NOV. [here selected]: G; Isolectotypes: BM,BR,K,W).

Hoffmann cited the single collection *Baum 847* for this species, without designating a type specimen. As all the duplicates of this collection bear his handwriting, and clearly were seen by him, it is unlikely that he used only one specimen to describe this taxon. It follows, therefore, that he has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be designated. Sherff selected the sheet of this number at B as the type, but as this specimen is now apparently destroyed, a new lectotype is chosen here. The variation shown by *Baum 847* is illustrated by the shape and size of the leaves on the five duplicates seen. Hoffmann described this variation as "foliis... orbicularibus..., praeter basin integerrimam grosse crenatis vel flabellatim multilobatis, segmentis obtusis". The original description, however, is accompanied by a figure which can be seen to possess only the former type of leaf shape. In my choice of lectotype,

therefore, I have paid special attention to this diagram as most closely representing Hoffmann's concept of the species. In this regard I have chosen the specimen at G as the new lectotype due to the close resemblance between this specimen and Hoffmann's figure.

Bidens kivuensis Sherff, Bot. Gaz. 96:145. 1934. TYPE: ZAIRE. Mulungu, May 1932, *J. Lebrun 5467* (LECTOTYPE [here selected]: BR; Isolectotypes: BR,F).

In his original description of *Bidens kivuensis*, Sherff cited the type collection, *Lebrun 5467*, as "1st and 2nd type sheets, Herb. Bruss.: 3rd type sheet, Herb. Field Mus." As no holotype was indicated, a lectotype is here selected in accordance with Article 7.4 of the *ICBN*. These three sheets closely match Sherff's original description and were clearly all used in its construction. I have decided to choose the "1st type sheet" as the lectotype, however, because this specimen is in a slightly better state of preservation than those attached to the other two sheets.

Bidens kotschyi Schultz-Bip. *in* Walp., *Repert. Bot. Syst.* 6:168. 1846. TYPE: SUDAN. Nubia, Mt. Arasch-Cool, 30 Sep. 1839, *K.G.T. Kotschy 79* (LECTOTYPE [here selected]: P; Isolectotypes: G[4 sheets],K[2 sheets], L,M[2 sheets],MO,S,STU,UPS,W,WAG,WU).

Schultz-Bipontinus' original description of *Bidens kotschyi* omits a direct citation of the specimens used by him to describe this species. The protologue does, however, include the sentence "Crescit in Nubia ad stagna pluvialia in radice orientali montis Arasch-Cool et in paludosis Cordofanis", which was clearly obtained by Schultz-Bipontinus from the sheets used by him in its construction. At P are specimens of two widely distributed *Kotschy* collections, numbers *79* and *91*, both formerly in Schultz-Bipontinus' own herbarium and which have been determined by him as *B. kotschyi*. The printed label on *Kotschy 79* reads "Kotschyi iter Nubicum. Ad stagna pluvialia in radice orientali montis Arasch-Cool", while that of *Kotschy 91* reads "Cordofan: in paludosis". No other Kotschy collections, at P or elsewhere, possess labels with similar geographic and habitat information. Clearly, therefore, specimens of these two numbers alone were used by Schultz-Bipontinus in the construction of his original description. Indeed, specimens of both these collections closely match this description. Sherff (1937:369) stated that *Kotschy 79* was the type collection of *B. kotschyi*, and cited eleven sheets from seven herbaria but without indicating which of these should be taken as the type. I consider this lectotypification to be ineffective because it is contrary to the definition of a lectotype employed by Article 7.5 of the *ICBN*. Mesfin (1984a) has subsequently designated the P specimen of this number as the holotype.

From this act, it is clear that he was unaware of the equal status of the collections *Kotschy 79* and *91*, and on these grounds alone this designation must be considered ineffective. It has been strongly put to me, however, that by one interpretation of Article 8.3 of the *ICBN*, the designation of a specimen as a holotype should be considered an effective lectotypification. Article 8.3 says, "For purposes of priority under Art. 8.1, designation of a type is achieved only if the type is definitely accepted as such by the typifying author, and if the type element is clearly indicated by direct citation including the term 'type' or an equivalent." As Article 8.1 is referring to the designation of lectotypes (and neotypes), the first two usages of the word type in this sentence can be replaced by lectotype (or neotype) without any alteration of meaning. Clearly Mesfin has not "definitely accepted" the P specimen of *Kotschy 79* as the lectotype, and thus this act of typification must be considered ineffective. A new lectotype, therefore, is required for *B. kotschyi*. Both the sheets at P bear single specimens possessing mature capitula and many of the exceedingly distinctive leaves known to me only from these two collections. The specimen of *Kotschy 79*, however, has been selected to serve as the lectotype because of its decidedly superior state of preservation.

Bidens leptolepis Sherff, Bot. Gaz., 76:85, t. 9, f. a-g. 1923. TYPE: ZAIRE. Mt. Kundelungu, 10 May 1908, *T. Kassner 2725* (HOLOTYPE: B†; LECTOTYPE [here selected]: Z; Isolectotypes: BM,K, P).

In his protologue of *Bidens leptolepis*, Sherff cited as the type the sheet of *Kassner 2725* at B, now apparently destroyed. Therefore, in accordance with Article 7.4 of the *ICBN*, a lectotype is here selected. There is little to choose between the isotypes at BM, K, P, and Z. The latter specimen has been selected to serve as the lectotype, however, because it possesses a number of well preserved capitula showing the very darkly coloured ray florets which Sherff (1937) considered the key difference in distinguishing between this species and *B. urceolata* De Wild.

Bidens palustris Sherff, Bot. Gaz. 76:148. 1923. TYPE: ZAIRE. Kundelungu, 13 Mar. 1908, *T. Kassner 2599* (HOLOTYPE: B†; LECTOTYPE [here selected]: K; Isolectotypes: BM,BR,HBG,P,Z).

Sherff cited the sheet of *Kassner 2599* at B, now apparently destroyed, as the type of *Bidens palustris*. The isotypes, housed at BM, BR, HBG, K, P, and Z, are mostly of fairly poor quality. The specimen at BM, for example, has mostly insect damaged capitula, whilst that at Z has had all its heads removed. By contrast, the specimen on the sheet at K bears two well preserved capitula, one at anthesis and a second possessing many mature fruit, and so is here selected as the lectotype.

Bidens paupercula Sherff, Bot. Gaz. 76:158, t. 12, f. a-g. 1923. TYPE: TANZANIA. Kyimbila, 22 Jul. 1912, *A.F. Stolz 1442* (HOLOTYPE: B[2 sheets]†; LECTOTYPE [here selected]: M; Isolectotypes: B,C,G,K,L,S, STU,W,WAG[2 sheets],Z[2 sheets]).

In his protologue of *Bidens paupercula*, Sherff cited as the type two sheets of *Stolz 1442* at B. A specimen of this number is extant at B, but an attached printed label shows that this sheet was only acquired from the herbarium of Rudolf Gross in 1946, long after Sherff had described *B. paupercula*, and so it is not considered to be part of the holotype. As both of the type sheets are apparently destroyed, a lectotype is here selected in accordance with Article 7.4 of the *ICBN*. Numerous duplicates of *Stolz 1442* are also housed elsewhere. Four of these (at C, G, M, and W) were cited by Sherff, in addition to the type, in his monograph of *Bidens* (1937). It is therefore considered that the lectotype should be chosen from among these specimens which clearly correspond with Sherff's concept of this taxon. These specimens are of variable quality although all match Sherff's original description. The best, however, is that at M which is here selected to serve as the lectotype.

Bidens praecox Sherff, Bot. Gaz. 92:450. 1931. TYPE: TANZANIA. Lindi District, Mayanga, 15 May 1903, *W.C.O. Busse 2523* (HOLOTYPE: B†; LECTOTYPE [here selected]: EA).

Bidens rubicundula Sherff, Amer. J. Bot. 41:762. 1954. TYPE: ZAMBIA. Chizera, 11 Jun. 1953, *D.B. Fanshawe F64* (LECTOTYPE [here selected]: K; Isolectotypes: BR,F,K,SRGH).

Sherff cited "two type sheets" at K and an "isotype" at F of *Fanshawe F64* for this species. Clearly he considered the specimens at K to constitute the holotype. These two sheets bear a number of specimens, however, and in accordance with Article 7.3 of the *ICBN* this designation is contrary to the definition of a holotype and must be considered ineffective. A lectotype is thus required and, following Article 7.5, this must be chosen from among the specimens at K. The "1st type sheet" bears parts of perhaps three plants possessing immature and flowering capitula, but lacking mature fruit. The solitary plant on the "2nd type sheet" also bears flowering capitula, but in addition it possesses a number of fruiting capitula bearing extremely mature cypselas. As these and other characters of the mature capitulum are of critical importance in distinguishing between this species and the closely related *Bidens urceolata* De Wild., this sheet is here selected as the lectotype.

Bidens rupestris Sherff, Bot. Gaz. 76:144. 1923. TYPE: TANZANIA. Mt. Meru, 27 Nov. 1901, *C. Uhlig 750* (HOLOTYPE: B†; LECTOTYPE [here selected]: EA).

Bidens schlechteri Sherff, Bot. Gaz. 76:146. 1923. TYPE: SOUTH AFRICA. Transvaal, Houtboschberg, 30 Mar. 1894, *F.R.R. Schlechter 4745* (LECTOTYPE NOV. [here selected]: G; Isolectotypes: C,K).

Bidens schlechteri was described by Sherff from two sheets of *Schlechter 4745* formerly at B. He cited these specimens as "type in Herb. Berl., two sheets". Later, however, Sherff (1937) treated one of these sheets as the "type", and the other as the "cotype". Therefore, in the absence of any of this material it is probably best to consider that Sherff did not originally designate a holotype, but later chose a lectotype from between these two sheets. With the loss of these specimens it is necessary to select a new lectotype. Of the three duplicates, none of which were cited by Sherff (1937), those at C and K have well preserved leaves, but only a few badly damaged capitula. The specimen at G, however, although only possessing poor quality foliage, has a number of capitula at various stages of development with characters closely matching those of Sherff's original description. Because the characters of the capitulum were considered by Sherff (1937) to be of great import in distinguishing between this species and the closely related *B. taylorii* (S. Moore) Sherff and *B. kivuensis* Sherff, this specimen is here selected as the new lectotype.

Bidens setigera (Schultz-Bip.) Sherff var. *lobata* Sherff, Bot. Gaz. 91:311. 1931. TYPE: Cultivated in garden of J. Veitch and Sons, 1908, from material collected in Kenya by *Capt. Diespecker* (LECTOTYPE [here selected]: K; Isolectotype: K).

Sherff cited the two *Diespecker* sheets at K, labelled "1st" and "2nd" type sheets respectively, for *Bidens setigera* var. *lobata*. As these each bear one specimen, not obviously both from the same individual, it is clear that Sherff has not designated a holotype as defined by Article 7.3 of the *ICBN*, and thus the selection of a lectotype is required. The accompanying description uses only foliar characters, obtained almost exclusively from the "1st" type sheet, to distinguish between this variety and var. *setigera*. In addition, Sherff noted that "The difference in general aspect due to the different amounts of foliar dissection is great, but such a difference...does not appear to justify specific segregation." Therefore, I have decided to choose as the lectotype the "1st" type sheet because this specimen possesses numerous leaves encapsulating the entire range of the varietal description, and is clearly that on which Sherff's concept of this variety is based. The specimen attached to the "2nd" type sheet, by contrast, bears far fewer leaves of decidedly poorer quality.

Bidens somaliensis Sherff, Bot. Gaz. 90:395. 1930. TYPE: ETHIOPIA. from Biddum to Volghe, 15 Sep. 1893, *D. Riva & E. Ruspoli 85(1306)* (LECTOTYPE [here selected]: FT; Isolectotype: FT).

Sherff cited for *Bidens somaliensis*, the two sheets of *Riva & Ruspoli 85(1906)* at FT. As it is by no means clear that the specimens attached to these sheets are part of the same individual, and therefore do not correspond with the definition of a holotype as employed by Article 7.3 of the *ICBN*, it is thought desirable to select a lectotype from between them. The specimen on the "1st" sheet is here selected to serve as the lectotype because it bears many capitula at various stages of development, from buds to mature fruiting heads, as well as a number of well preserved leaves, and was clearly the main element used by Sherff in the construction of his description. The other sheet, by contrast, possesses only a few capitula, the most mature of which is just at anthesis.

Bidens steppia (Steetz) Sherff var. *leptocarpa* Sherff, Bot. Gaz. 90:392. 1930. TYPE: TANZANIA. Kyimbila, Kaningwe, 26 May 1911, *A.F. Stolz 729* (HOLOTYPE: B†; LECTOTYPE [here selected]: G; Isolectotypes: B,C,G,K,LE,LU,M,S,STU,W,WAG[2 sheets],Z[2 sheets]).

Sherff cited as the type of this name a sheet of *Stolz 729* at B, now apparently destroyed. The loss of this sheet requires the selection of a lectotype. A specimen of this number is extant at B but, as in the case of *Bidens paupercula* Sherff, this is not considered to be the holotype because it was only acquired from the herbarium of Rudolf Gross in 1946. In his protologue Sherff also cited two "cotypes" (*i.e.*, isotypes) at G. As these sheets are part of the originally designated type material on which the name *B. steppia* var. *leptocarpa* is based, the lectotype must be selected from between them in accordance with Article 7.5 of the *ICBN*. Sherff distinguished the eight varieties of *B. steppia* by employing characters of the cypselas, as well as in addition occasionally using other capitular characters. In the case of var. *leptocarpa*, Sherff (1937) separated this variety from vars. *steppia* and *elskensii* Sherff by the length of the cypselas and outer phyllaries, and from var. *ambacensis* (Hiern) Sherff by the nature of the cypselial aristae. Therefore, because of the importance given to these characters by Sherff in defining his varietal limits, I have decided to choose as the lectotype the specimen possessing the greater number of fruiting capitula and mature cypselas. This is the sheet bearing Stolz's "Flora Africae Oriental." herbarium label. The capitula of this specimen, unlike those on the other sheet, are not insect damaged, and also more closely match Sherff's detailed original description.

Bidens straminoides Sherff, Amer. J. Bot. 22:706. 1935. TYPE: RWANDA. Mt. Bohanga, *s.a.*, *H.F.A. Scaetta 2272* (LECTOTYPE [here selected]: BR; Isolectotype: BR).

Sherff cited the two sheets of *Scaetta 2272* at BR for *Bidens straminoides*. As this collection clearly consists of two specimens, one on each sheet, I do

not consider that he has designated a holotype, as defined by Article 7.3 of the *ICBN*, and thus the selection of a lectotype is necessitated. These specimens are of exceedingly poor quality and should never have been made the type of anything. They possess a few damaged fruiting capitula and withered leaves, and were clearly at a very advanced stage of development at the time of their collection. The specimen on the first sheet, which both Mesfin and Lisowski have determined as *B. grantii* (Oliver) Sherff, possesses parts of three leaves and one capitulum completely lacking fruit. Fortunately, the specimen on the second sheet, apart from bearing a number of leaves, possesses two complete capitula with numerous mature cypselas. This sheet is thus reluctantly selected to serve as the lectotype.

Coreopsis L.

Coreopsis abyssinica Schultz-Bip. var. *bipinnato-partita* Chiov., Annuario Reale Ist. Bot. Roma 8:185. 1904. TYPE: ETHIOPIA. Eritrea, Ghinda, Donkollo, 14 May 1892, *G.A. Schweinfurth & D. Riva 2119* (LECTOTYPE [here selected]: FT; Isolectotypes: G,K,P,Z).

Chiovenda cited seventeen collections under his brief description of this variety. With the exception of *Schweinfurth & Riva 2119* and *A. Pappi 4101*, all are unicate specimens housed at FT. Duplicates of *Schweinfurth & Riva 2119* are located at FT, G, K, P, and Z, while sheets of *Pappi 4101* are at FT and RO. Mesfin (1984a) transferred this variety to the rank of subspecies under *Bidens setigera* (Schultz-Bip.) Sherff. Within this new taxon he included four of Chiovenda's syntype collections, namely *A. Terracciano & Pappi 1165, G. Scotti s.n., Pappi 4101*, and *Schweinfurth & Riva 2119*, the others being included in either *B. setigera* ssp. *setigera* or *B. camporum* (Hutch.) Mesfin. He claimed that *Schweinfurth & Riva 2119* was the "original collection", and designated the specimen of this number at FT as the holotype. This claim, however, cannot be substantiated by an analysis of Chiovenda's protologue which shows that all the collections are given equal status. Indeed, an examination of the original material shows that Chiovenda saw all the specimens at FT as well as the sheet of *Pappi 4101* at RO. Therefore Mesfin's first claim must be rejected. His designation of the FT sheet of *Schweinfurth & Riva 2119* as the holotype is, of course, also incorrect. It is possible, however, that this designation can be considered an effective lectotypification by reference to Article 8.3 of the *ICBN*. I refer the reader to the discussion under *B. kotschyi* Schultz-Bip. for an explanation of why I consider this unacceptable. In an attempt to maintain current usage of the name *C. abyssinica* var. *bipinnato-partita* (Rec. 7B.5 of the *ICBN*), I have decided to choose as the lectotype a specimen of one of the four collections included by Mesfin in *B. setigera* ssp. *bipinnato-partita* (Chiov.) Mesfin. All the specimens in question

match Chiovenda's description, but because of the existence of the duplicates of *Schweinfurth & Riva 2119*, I have selected the specimen of this collection at FT as the lectotype.

Coreopsis badia Sherff, Bot. Gaz. 76:90. 1923. TYPE: TOGO. 1908-09, *G. de Gironcourt 256* (HOLOTYPE: B†; LECTOTYPE [here selected]: P).

Coreopsis baumii O. Hoffm. *in* Warb., *Kunene-Sambesi Exped.* 419. 1903. TYPE: ANGOLA. Mambunda region, between Kuma and Kutsi, *H. Baum 883* (LECTOTYPE NOV. [here selected]: W; Isolectotypes: BM, COI,G,K,M).

Hoffmann cited for *Coreopsis baumii*, the collection *Baum 883*, without designating a specimen as the type. As all the extant duplicates of this collection possess his handwriting and clearly were seen by him before their distribution from B, it is unlikely that he used only one specimen to describe this taxon. It follows, therefore, that he has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be selected. The sheet of this number at B was designated the "type" by Sherff (1937), but as this specimen is now apparently destroyed, a new lectotype is required. There is little to choose between those duplicates that I have seen. The sheet at W, however, is here selected as the new lectotype because it most closely matches Hoffmann's protologue. This specimen possesses a solitary branched stem with many leaves in good condition, four mature capitula, and the most mature fruits of any of the six cotypes.

Coreopsis crataegifolia O. Hoffm., Bot. Jahrb. Syst. 30:431. 1901. TYPE: TANZANIA. Livingstone Mts., Yawulanda Mt., 18 Apr. 1899, *W. Goetze 851* (LECTOTYPE NOV. [here selected]: BM; Isolectotype: BR).

In his protologue of *Coreopsis crataegifolia*, Hoffmann cited the collection *Goetze 851*, without indicating which specimen was intended to be taken as the type. Both of the extant duplicates at BM and BR bear his handwriting, and so clearly were seen by him before their distribution from B. Therefore, as it is most likely that these sheets were used in the construction of the description, it is apparent that Hoffmann has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be designated. Sherff (1937) cited the sheet at B as the type. This specimen is now apparently destroyed and consequently a new lectotype is required. At least two duplicates are in existence, one each at BM and BR. Both are clearly Hoffmann's taxon, but the former is chosen as the new lectotype because it possesses two branches, each with well preserved leaves and flowering capitula. The BR specimen, on the other hand, is a solitary broken branch with one damaged capitulum and many senescent leaves.

Coreopsis exaristata O. Hoffm. *in* Engl., *Pflanzenw. Ost-Afrikas*, C:414. 1895. TYPE: TANZANIA. Usambara, *s.a.*, *C.H.E.W. Holst 5002* (LECTOTYPE NOV. [here selected]: WU; Isolectotype: B).

Hoffmann cited the three *Holst* nos. *102, 207*, and *5002* for *Coreopsis exaristata*, without reference to where specimens of these numbers were housed. Therefore, these three collections are here treated as forming a syntype collection consisting of all the duplicate specimens. Sherff (1937) mechanically selected a sheet of the first cited collection as the type, *i.e.*, no. *102* at B, and this choice is rejected in accordance with Article 8.1 of the *ICBN*. No duplicates of *Holst 102* have been located, but a sheet of no. *207* is at BM, whilst specimens of no. *5002* are at B and WU. None of these sheets bears any indication that they were seen by Hoffmann. The specimen of *Holst 207* is a mere scrap and wholly unworthy of lectotypification. The sheets of *Holst 5002*, on the other hand, bear large leafy specimens closely resembling Hoffmann's original description. The specimen at WU is selected as the new lectotype,

Coreopsis holstii O. Hoffm. *in* Engl., *Pflanzenw. Ost-Afrikas*, C:415. 1895. TYPE: TANZANIA. T3, Tanga Region, Lushoto Distr., West Usambara Mts., Shagayu F. R., summit 2.5 km ENE of Shagayu Sawmill, 14 Mar. 1984, *A. Borhidi, Sebsebe Demissew, M. Hedrén, S.T. Iversen, W.R. Mziray, & T. Pócs 84873* (NEOTYPE [here selected]: MO; Isoneotypes: ETH n.v.,K,UPS).

Hoffmann cited for *Coreopsis holstii* the collection *C.H.E.W. Holst 76*, collected in the Usambara region of Tanzania in October 1891, again without reference to where specimens were housed. According to Sherff (1923) a sheet of this collection bearing three flowering specimens was at B. Unfortunately, this sheet is now apparently destroyed and no duplicates of this collection have been located. As I consider this taxon to be a good species, as *Bidens holstii* (O. Hoffm.) Sherff, a neotype is here selected in accordance with Article 7.4 of the *ICBN*. A small number of specimens of this species have been collected from the type locality. One of these, here selected as the neotype, is the MO specimen of *Borhidi et al. 84873*. This specimen, the best of all the duplicates of this collection, closely matches Hoffmann's original description of this species and Sherff's figure (1937) drawn from the type specimen. It possesses numerous capitula at anthesis and in fruit, as well as many of the exceedingly characteristic leaves.

Coreopsis kilimandscharica O. Hoffm., Bot. Jahrb. Syst. 20:234. 1894. TYPE: TANZANIA. Kilimanjaro, Uschiri, 14 Jun. 1893, *G.L.A. Volkens 398* (LECTOTYPE NOV. [here selected]: BM; Isolectotype: G).

Hoffmann cited for *Coreopsis kilimandscharica*, the three collections *W.L. Abbott s.n.* and *Volkens 398* and *537*, without reference to where specimens of these numbers were housed. Sherff (1937) selected the specimen of *Abbott s.n.* at B as the type because this "was the first one cited by Hoffmann." Again this is a mechanical method of lectotype selection and, by invoking Article 8.1 of the *ICBN*, this choice is here rejected. Specimens of all three collections were formerly at B (Sherff, 1937), but these are now apparently destroyed. Fortunately, at least one duplicate of each collection is extant elsewhere. The only sheet of *Abbott s.n.* is at US. This is a particularly poor specimen, hence the rejection of Sherff's choice of lectotype. The best specimens of the syntype collection are the sheets of *Volkens 398* at BM and G. These closely match Hoffmann's original description of this taxon. The BM specimen is chosen as the new lectotype, however, because of the superior quality of its flowering capitula.

Coreopsis leptoglossa Sherff, Bot. Gaz. 76:88. 1923. TYPE: ZAIRE. Lofuku River, 25 May 1908, *T. Kassner 2871* (HOLOTYPE: B†; LECTOTYPE [here selected]: Z[*p.p.min.*]; excl. Isolectotypes: BM,K,P,Z[*p.p.maj.*]).

Sherff cited for *Coreopsis leptoglossa*, the sheet of *Kassner 2871* at B. As this is now apparently destroyed, a lectotype is here designated in accordance with Article 7.4 of the *ICBN*. According to Sherff's original description this plant possessed "Folia... bipinnata, segmentis linearibus, plerumque circ. 1 mm., rarius 1.5-2 mm. latis... Involucri bracteae basi dense aliter leviter hispidae..., interioribus lanceolatis". An examination of the isotypes at BM, K, P, and Z clearly shows that this number is a mixed collection. Of all the duplicates seen only one of the two specimens on the sheet at Z fits this description. The other specimens have entire to deeply lobed or pinnatisect leaves with segments rarely less than 5 mm wide, outer phyllaries mostly densely hispid throughout, and inner phyllaries more or less oblong. Therefore, the right hand specimen on the sheet at Z, although a rather poor specimen with only one immature head, is here selected as the lectotype.

Coreopsis lineata Klatt, Ann. K. K. Naturhist. Hofmus. 7:103. 1892. TYPE: ANGOLA. Pungo-Andongo, Jan.-Apr. 1879, *A. von Mechow 131* (LECTOTYPE [here selected]: Z; Isolectotype: GH).

Klatt cited the collection *Mechow 131* for *Coreopsis lineata*, without designating a specimen as the type. It is by no means clear which of the duplicates were used by Klatt in the construction of his protologue. As both the duplicates at GH and Z bear annotations in his hand, however, it is apparent that they were seen by him, and were probably used, at least in part, to describe this taxon. Therefore, Klatt cannot be considered to have complied with the definition of a holotype as provided by Article 7.3 of the *ICBN*, and

in accordance with Article 7.4, a lectotype is here selected. Sherff (1937:600) cited sheets at B and GH for this name, but did not designate either of these as the type. As the sheet at B is now apparently destroyed, the lectotype is here chosen from between the specimens at GH and Z. The latter specimen is here selected as the lectotype because it possesses two flowering capitula with many fairly mature fruit, and a number of leaves which closely match Klatt's original description. The specimen at GH, on the other hand, has only one capitulum at anthesis, and a few damaged leaves.

Coreopsis lupulina O. Hoffm., Bot. Jahrb. Syst. 30:432. 1901. TYPE: TANZANIA. Usafua, Beya Mts., 27 Jun. 1899, *W. Goetze 1069* (LECTOTYPE NOV. [here selected]: P; Isolectotypes: BM,BR,K,L).

Hoffmann cited for *Coreopsis lupulina*, the collection *Goetze 1069*, without designating a specimen as the type. As all the extant duplicates of this collection possess his handwriting and clearly were seen by him before their distribution from B, it is unlikely that he used only one specimen to describe this taxon. It follows, therefore, that he has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be selected. Sherff (1936) cited as the "type specimen" the two sheets of this number at B. As these are now both apparently destroyed a new lectotype is required. Duplicates of *Goetze 1069* are extant at BM, BR, K, L, and P. Of these, the sheet at P is here selected to serve as the new lectotype. The specimen on this sheet is the apex of a branch possessing many mature leaves and nine capitula at various stages of development, and shows all the important diagnostic characters attributed to this taxon by Hoffmann.

Coreopsis ochracea O. Hoffm., Bot. Jahrb. Syst. 30:431. 1901. TYPE: TANZANIA. Uhehe, Bweni, 11 Mar. 1899, *W. Goetze 731* (LECTOTYPE NOV. [here selected]: BM).

Hoffmann based this name on the collection *Goetze 731*, but failed to designate a specimen as the type. The only extant duplicate, at BM, bears Hoffmann's handwriting, and thus clearly was seen by him before its distribution from B. Sherff (1925) designated a sheet of this number at B as the type. It is likely that both this specimen and the one at BM were used by Hoffmann in the construction of his description. Therefore it follows that Hoffmann has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be designated. The apparent loss of the sheet at B requires the selection of the specimen at BM as the new lectotype.

Coreopsis pinnatipartita O. Hoffm., Bot. Jahrb. Syst. 30:432. 1901. TYPE: TANZANIA. Usafua, Poroto Mt., 17 Jun. 1899, *W. Goetze 1041* (LECTOTYPE NOV. [here selected]: P; Isolectotypes: BM,K,L,Z).

Hoffmann cited the two collections, *Goetze 1041* and *J. Buchanan 380*, in his protologue of *Coreopsis pinnatipartita*. The former was cited in large print immediately following the Latin and German descriptions. The latter, however, was cited in a smaller type face in some notes at the end of the protologue. The first sentence of this reads: "Ein von Buchanan im Jahre 1891 im Nyassaland gesammeltes Exemplar (n. 380) gehört offenbar zu derselben Art." This is followed by a perfunctory description in German. This evidence alone would suggest that Hoffmann based his concept of *C. pinnatipartita* on the collection *Goetze 1041*, and that *Buchanan 380* was considered by him to be just another example of this species. In addition, examination of the duplicates of both collections clearly shows that the species description was based solely on the specimens of *Goetze 1041*. For this reason I consider that *Goetze 1041* should be taken as the type collection, with *Buchanan 380* treated as a paratype collection. No indication was made by Hoffmann as to where specimens of *Goetze 1041* were housed. As all the duplicates at BM, K, L, P, and Z bear his handwriting, and were clearly, therefore, seen by him before their distribution from B, it is unlikely that only one specimen was used by him to describe this taxon. It follows, therefore, that he has not complied with the definition of a holotype as employed by Article 7.3 of the *ICBN*, and in accordance with Article 7.4 a lectotype may be selected. Sherff (1936) cited the two sheets of *Goetze 1041* at B as the type, but as these are both now apparently destroyed a new lectotype is required. Wild (1967) selected the K sheet of the paratype collection *Buchanan 380* as the neotype. This choice is rejected, however, because the existence of duplicates of *Goetze 1041* deem this selection ineffective (Article 8.1[a] of the *ICBN*). The sheet at P is here selected to serve as the new lectotype because of the high quality of its leaves and capitula, some of which bear fairly mature fruit.

Coreopsis scabrifolia Sherff, Bot. Gaz. 76:86. 1923. TYPE: ZAIRE. Kundelungu, 15 May 1908, *T. Kassner 2776* (HOLOTYPE: B†; LECTOTYPE [here selected]: BM; Isolectotypes: BM,K,P,Z).

When Sherff described *Coreopsis scabrifolia* from the collection *Kassner 2776*, in addition to the holotype at B, he cited "two co-type sheets" at BM. As the B sheet of this number is now apparently destroyed, I have selected as the lectotype one of these two sheets in accordance with Article 7.5 of the *ICBN*. The sheet chosen is that bearing Kassner's collecting label. This specimen possesses many capitula at various stages of development, and shows more clearly than any of the other duplicates the dimorphic leaf shape exhibited by this collection and described by Sherff.

Coreopsis steppia Steetz *in* Peters, *Naturw. Reise Mossambique* 6:496. 1864. TYPE: MOZAMBIQUE. Mocuba, Lugela District, Namagra, 1946-7, *H.G. Faulkner Kew 10* (NEOTYPE [here selected]: K; Isoneotypes: BM,BR,COI,EA,FT,G(2 sheets),K(2 sheets),P,PRE,S,SRGH).

Steetz cited for *Coreopsis steppia* the solitary specimen, mounted on two sheets, of *W.C.H. Peters 57* at B, collected from Rios de Sena, Mozambique, between 1842 and 1848. Because I consider *C. steppia* to be a good species, as *Bidens steppia* (Steetz) Sherff, the apparent loss of the Peters specimen necessitates the selection of a neotype in accordance with Article 7.4 of the *ICBN*. In choosing a neotype I have attempted to find a collection from near the type locality, which closely matches Steetz's long and detailed diagnosis and description, and which is also well distributed throughout many of the world's major herbaria. A collection which amply fulfills these requirements is *Faulkner Kew 10*. Many of the specimens of this number would make perfectly serviceable neotypes. One of the best, however, is that at K labelled "Sheet 1", which is here selected. This plant possesses most of the characters used by Steetz in his original description, including the diagnostically important characters of the mature fruit.

Guizotia Cass.

Guizotia bidentoides Oliver & Hiern *in* Oliver, *Fl. Trop. Afr.* 3:386. 1877. TYPE: MALAWI. 3 miles from river Shire, Aug.-Sep. 1861, *C.J. Meller s.n.* (LECTOTYPE [here selected]: K).

Guizotia bidentoides was described by Oliver & Hiern from a sheet at K cited in their protologue as "Manganja Hills, 500-3,000 ft. alt., *Kirk*!". The sheet in question, however, bears three separate gatherings. The first, collected by Meller, bears a printed "Livingstone's Zambesi Expedition" label saying "About Lat. 16 South, Long. 35E. Aug. & Sept. 1861", with the additional hand written note "From a hill 500ft - 3 miles from river Shire". The second, also collected by Meller, bears the printed label "Manganja Hills. Sept. to Nov. 1861". The third has attached a hand written note by J. Kirk saying "Karizakwwo, Entr. to Bangue Pass 3000ft." Clearly, therefore, it can be seen that all three collections were used to construct the protologue. The Kirk specimen cannot be considered to be the holotype because, by the definition employed in Article 7.3 of the *ICBN*, the holotype is "the one specimen... used by the author or designated by him as the nomenclatural type." It is clear from the above that Oliver & Hiern attributed the whole sheet to Kirk, instead of just the small part actually collected by him. Thus, Oliver & Hiern cannot be considered to have designated *one* specimen as the holotype, and hence the need for the selection of a lectotype. It is also clear that all three plants were

used in the construction of the description. Oliver's notes on the sheet refer mostly to the Kirk specimen and Meller specimen from the Manganja Hills. Unfortunately, both these collections are badly damaged. The measurement of leaf size in the published description, however, is clearly taken from the other Meller collection which is here selected as the lectotype. This specimen, which corresponds closely with Oliver & Hiern's original description, is the apical portion of a branch bearing a number of well preserved leaves and capitula.

Microlecane (Schultz-Bip.) Benth. & Hook. *f.*

Microlecane carinata Hutch., Bull. Misc. Inform. Kew 1916:41. 1916. TYPE: ETHIOPIA. Gondar and vicinity, *s.a.*, *R.E. Massey 74* (LECTOTYPE [here selected]: K).

Hutchinson published his description of *Microlecane carinata* in 1916 citing the three syntypes *Massey 74*, *G.H.W. Schimper 1386*, and *J.A. Grant s.n.* There are sheets of all these numbers at K bearing Hutchinson's handwriting. Previously, Hoffmann (1906) had cited the collections *Schimper 1386* and *F.G. Rohlfs & A. Stecker s.n.* for his *Coreopsis schimperi*. Mesfin (1984b) has subsequently claimed that because of the inclusion of "type material of another 'name', *M. carinata* Hutch. is an illegitimate name according to article 63 of the International Code of Botanical Nomenclature." However, Article 63.1 clearly states that in order for a name to be illegitimate it must include "all syntypes" of another name, instead of, as in this case, only one specimen of the syntype collection. Thus it can be seen that *M. carinata* is a legitimate name. The three syntypes of this name are well preserved specimens, possessing capitula with mature fruit, and were apparently used fairly equally by Hutchinson in the construction of his diagnosis and description. The selection of the lectotype, however, has been determined by factors governed by articles of the *ICBN*. The specimen of *Schimper 1386* at K has been designated the new lectotype of *C. schimperi* O. Hoffm. by Mesfin (1984a), and so is excluded from selection by Article 63.1. The specimen of *Grant s.n.* has been included in *B. negriana* (Sherff) Cuf. by Mesfin (1984a), and so in order to preserve the current usage of the name *M. carinata* is not here considered a candidate for lectotypification (Rec. 7B.5). Thus the only specimen available for selection as the lectotype is *Massey 74*, which is here chosen.

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BIBLIOGRAPHY

Frizzell, D.L. 1933. Terminology of types. Amer. Midl. Naturalist 14:637-668.

Greuter, W., H.M. Burdet, W.G. Chaloner, V. Demoulin, R. Grolle, D.L. Hawksworth, D.H. Nicolson, P.C. Silva, F.A. Stafleu, E.G. Voss, & J. McNeill. 1988. *International Code of Botanical Nomenclature*, adopted by the Fourteenth International Botanical Congress, Berlin, July-August 1987. Regnum Veg. 118. 328 pp.

Hoffmann, O. 1906. Compositae africanae. IV. Bot. Jahrb. Syst. 38:196-211.

Mesfin Tadesse. 1984a. The genus *Bidens* (Compositae) in NE tropical Africa. Symb. Bot. Upsal. 24(1):138pp.

Mesfin Tadesse. 1984b. *Microlecane* (Sch. Bip.) Benth.: a congener of *Bidens* (Compositae - Heliantheae). Nordic J. Bot. 4:737-746.

Schultz-Bipontinus, C.H. 1846. Compositae. *In* W.G. Walpers, *Repertorium Botanices Systematicae* 6:88-367. Leipzig, Germany.

Sherff, E.E. 1915. Studies in the genus *Bidens*. II. Bot. Gaz. 59:301-316.

Sherff, E.E. 1923. New or otherwise noteworthy Compositae. Bot. Gaz. 76:78-94.

Sherff, E.E. 1925. New or otherwise noteworthy Compositae. II. Bot. Gaz. 80:367-389.

Sherff, E.E. 1931. New or otherwise noteworthy Compositae. VI. Bot. Gaz. 91:308-319.

Sherff, E.E. 1936. Revision of the genus *Coreopsis*. Field Mus. Nat. Hist., Bot. Ser. 11:277-475.

Sherff, E.E. 1937. The genus *Bidens*. Field Mus. Nat. Hist., Bot. Ser. 16:1-709.

Wild, H. 1967. The Compositae of the Flora Zambesiaca area, 1. Kirkia 6:1-62.

Phytologia (August 1992) 73(2):98-116.

EIGHT NEW TAXA OF *DROSERA* FROM AUSTRALIA

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ABSTRACT

Six new species and two new subspecies of *Drosera* (Droseraceae) are described. **Drosera citrina**, **D. lasiantha**, **D. nivea**, **D. silvicola**, and **D. stelliflora** are pygmy droseras from southwestern Australia; **D. bicolor** and **D. macrophylla** subsp. **monantha** are tuberous droseras from southwestern Australia. **Drosera whittakeri** subsp. **aberrans** is a tuberous species from South Australia and Victoria. Features that distinguish these taxa from nearest relatives are presented, along with other data.

KEY WORDS: Australia, *Drosera*, Droseraceae, South Australia, Victoria, Western Australia

INTRODUCTION

Since the publication of the first two volumes of *Carnivorous Plants of Australia* (Lowrie 1987, 1989), many new *Drosera* taxa have been discovered. Most of these have been reported by Lowrie & Carlquist (1990), Lowrie & Marchant (1992), and Marchant & Lowrie (1992). In the present paper, an additional eight taxa are described.

The southwest of Western Australia is remarkable for the large number of droseras found there. With the current additions, 104 *Drosera* taxa are known from this area; of these, 73 are recognized at the species level. The reasons for this high level of speciation in the region may relate primarily to edaphic factors, and the insular way in which soil types suitable for *Drosera* are distributed. Some of the species are known to be restricted to special soil conditions. For example, *D. parvula* Planchon is found only in deep white sand,

whereas *D. citrina* Lowrie & Carlquist is known only from yellow sand. *Drosera barbigera* Planchon grows in a mix of laterite and silica sand on hilltops; when this species grows on flat ground, investigation generally shows that the area is a remnant of an eroded hilltop, a barely perceptible rise.

Drosera localities for the world at large can be characterized as acidic. The silica sands in which *Drosera* occurs in Australia are likely acidic to various degrees, and the soil texture and topography (valley vs. hill) may dictate different degrees of water availability that also govern the range of *Drosera* taxa. Rainfall in southwestern Australia decreases markedly from the southwestern tip of the continent toward the interior, the north, and the east.

Western Australia's first resident botanist, James Drummond (1784-1863), explored and collected extensively for most of his life in the southwest of Western Australia. He observed that plants in this region seemed restricted to limited areas, as he stated in an 1844 letter to W.J. Hooker in Kew: "When we consider the great numbers of species known to grow in only one spot, and these spots exhibiting no very remarkable conditions of land or aspect, etc., it is impossible to calculate the amount of novelty which might reward the researches of a naturalist." The genetic and cytological patterns underlying the species of *Drosera* need elucidation.

NEW SPECIES AND SUBSPECIES

The new species are presented first. For convenience of comparisons, the first five species presented are pygmy droseras, followed by the new tuberous species. New tuberous subspecies conclude the paper.

Drosera citrina A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. In deep yellow sand between low shrubs on Brand Highway, 24 km S of Regan's Ford, Western Australia, 9 October 1983, *Allen Lowrie 83/011* (PERTH); Isotype: RSA.

Herba perennis 1.5 cm in diametro, folia rosulata. Caulis 1 cm longi, stipularum foliolorum dense vestitus. Lamina late elliptica, 1.5 cm longa, 1.2 mm lata, cupulata. Petiola anguste lanceolata, 5 mm longa, ad basi 1 mm lata, ad apice 0.3 mm. Gemma stipularum ovoidea-globosa, 4.5 mm longa, 5.5 mm in diametro, mucronasta. Stipula trilobata, 4.5 mm longa, 3 mm lata, lobus centralis in 3 segmenti divisus, segmenti setosi; lobi laterales serrato-marginati, apex bisetosum. Inflorescentia racemosa. Scapi 1-2, 4 cm longi, minute glandulosi, ad apicem dense glandulosi. Flores ca. 12 per scapi. Pedicelli 2.5-3.0 mm longi, glandulosi, in fructibus semi-erecti, ebracteolati vel ad apicem inflorescentiae bracteolati, bracteolae 2.5 mm longae. Sepala ovata, 2 mm longa, 1.2 mm lata,

sparse glandulosa, margine integra sed ad apicem serrata. Petala lutea, e basi alba, obovata, 5 mm longa, 3.5 mm lata. Ovarium turbinatum, 0.6 mm longa, 1 mm in diametro. Styli 3(-4), alba, filiformes, patentia, 3.0-4.5 mm longi, e basi 0.15 mm in diametro, acuminati. Fructus ignotus.

Fibrous rooted perennial herb, forming a compact rosette 1.5 cm in diameter. Stem to 1 cm long, covered with the remains of the previous season's leaves and stipules. Lamina broadly elliptic, 1.5 mm long, 1.2 mm wide, deeply cupped. Petiole narrowly lanceolate in outline, 5 mm long, 1 mm wide near the base, tapering to 0.3 mm wide at the apex. Stipular bud broadly ovoid, globelike with a small pointed projection at the apex, 4.5 mm long, 5.5 mm in diameter. Stipules trilobed, 4.5 mm long, 3 mm wide, the central lobe divided into three segments, each segment narrowing to setae; upper outer margins of lateral lobes serrate, apex with two short setae, one seta equaling in length the central lobe present on the inner margin. Inflorescence a raceme. Scapes one or two, to 4 cm long, covered with minute glandular hairs, densely glandular near apex. Flowers 12 or more per inflorescence. Pedicels 2.5-3.0 mm long, glandular, semierect in fruit, bracteoles mostly absent; when present, at the apex of the inflorescence and 2.5 mm long. Sepals ovate, 2 mm long, 1.2 mm wide, surface sparsely covered with glandular hairs, margins entire except for the serrate apex. Petals lemon yellow, white at base, obovate, 5 mm long, 3.5 mm wide. Ovary at anthesis turbinate, 0.6 mm long, 1 mm in diameter. Styles three, sometimes four, style (including stigma) white, filiform, spreading horizontally, 3.0-4.5 mm long. 0.15 mm in diameter at the base but tapering toward the apex. Fruit and seeds unknown.

Drosera citrina (Fig. 1) belongs to subgenus *Rorella* (DC.) Diels section *Lamprolepis* Planchon. *Drosera nivea* Lowrie & Carlquist is considered to be the closest relative (see discussion below under that species). *Drosera citrina* may be mistaken for fruiting or nonflowering specimens of *D. pycnoblasta* Diels, a species with a smooth globelike stipular bud. *Drosera pycnoblasta* differs from *D. citrina* by having no pointed projection at the apex of its stipular bud and by having trilobed stipules with entire margins.

Drosera citrina is illustrated in the first printing of *Carnivorous Plants of Australia*, Vol. 2 (Lowrie 1989, pp. 154-157) as *D. rechingeri* Strid; this will be corrected in subsequent printings. For "Drosera coolamon," a *nomen nudum* in Lowrie (1989, pp. 38-41), the earlier name *D. rechingeri* should have been used.

Drosera lasiantha A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. In loamy laterite soils on open areas with dwarf jarrah (*Eucalyptus marginata*) woodland on the higher scree slopes, top of crest, west end of the Porongorup Range, Porongorups, Western Australia, 25 November 1991, *Allen Lowrie 523* (PERTH); Isotype: RSA.

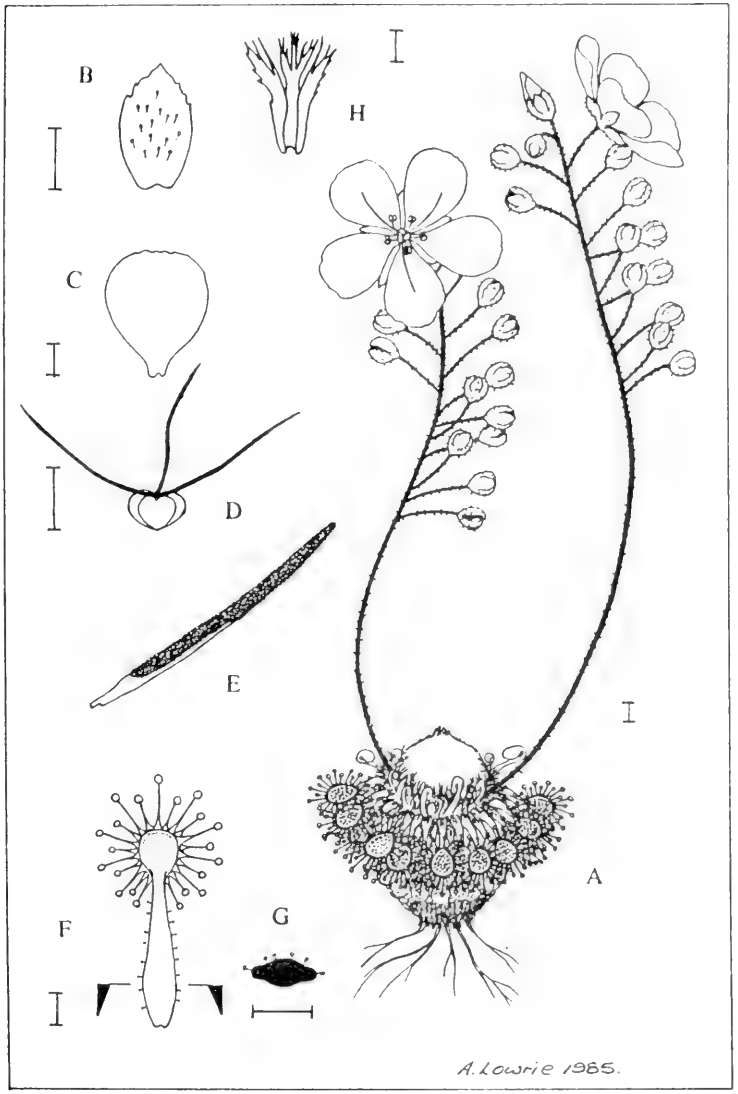

Figure 1. *Drosera citrina.* A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Stigmatic portion of style, enlarged. F. Leaf. G. Section of petiole. H. Stipule. Scales = 1 mm.

Herba perennis, folia rosulata, infima deflexa. Caulis ad 4 cm longi, stipularum petiolorumque rudimentis dense vestitus. Lamina elliptica, 3 mm longa, 2 mm lata, petioli 7.5 mm longi, e basi 1 mm lati. Gemma 4 mm longa, 2.5 mm lata. Stipulae scariosae, trilobatae, subdivisi, ad apicem trisetosae, margine serrata. Inflorescentia racemiformis, 2 cm longa. Scapi 1-4, dense glandulosi et lanati. Flores ca. 12. Pedicelli 1.3 mm longi, semi-patenti, ebracteolati. Sepala elliptico-ovata, 4 mm longa, 1.3-2.0 mm lata, margine serrata, albolanata. Petala atrorosea, obovata, 6.5 mm longa, 5.5 mm lata. Ovarium turbinatum, 0.8 mm longum, 1 mm in diametro ad anthesim. Styli 3, albi, semi-erecti, 0.7 mm longi. Stigma rosea, clavata, e basi falcata, 1 mm longa. Capsula ignota.

Rosette perennial forming a compact convex rosette 1.5 cm in diameter, leaves reflexed. Stem 4 cm long, covered with the withered remains of the previous season's growth and supported below on prop roots. Active insect trapping leaves about 10 in number. Lamina elliptic, 3 mm long, 2 mm wide. Petiole 7.5 mm long, 1 mm wide at the base, narrowed to 0.5 mm at the apex. Stipule bud ovoid, 4 mm long, 2.5 mm wide, setose. Stipules three lobed, 7 mm long, 4 mm wide, the central lobe divided into three segments, each segment in turn divided into more segments narrowing to setae, lateral lobes serrate on the outer margin with the apex divided into three short setae; on the outer margin two setae are present. Inflorescence a raceme to 2 cm tall. Scapes 1-4, densely covered with short glandular hairs and white nonglandular woolly hairs. Flowers about 12 in number. Pedicels 1.3 mm long, semierect in fruit, bracteoles absent. Sepals narrowly ovate, 4 mm long, 1.3-2.0 mm wide, margins irregularly serrate, surface covered with white, nonglandular long woolly hairs. Petals dark pink, obovate, 6.5 mm long, 5.5 mm wide. Ovary turbinate, 0.8 mm long, 1 mm in diameter at anthesis. Styles three, white, semierect, 0.7 mm long. Stigmas pale to dark pink, clavate, falcate near the base, 1 mm long.

Drosera lasiantha (Fig. 2) belongs in subgenus *Rorella* section *Lamprolepis*. *Drosera scorpioides* Planchon and *D. dichrosepala* Turcz. are considered the closest relatives of *D. lasiantha*, but differ from it in the features cited below. It is locally abundant, and the population extends into Porongorups National Park, where it is safe from agriculture.

Scapes glandular, petals elliptic. ..... *D. dichrosepala*

Scapes glandular, but also with woolly hairs, petals pandurate or obovate.

Lamina 5-7 mm long, 1.5 mm wide, inflorescence to 5 cm tall, the scape covered with long, curly, terete stalked glands that form a woolly covering; petals pandurate. ..... *D. scorpioides*

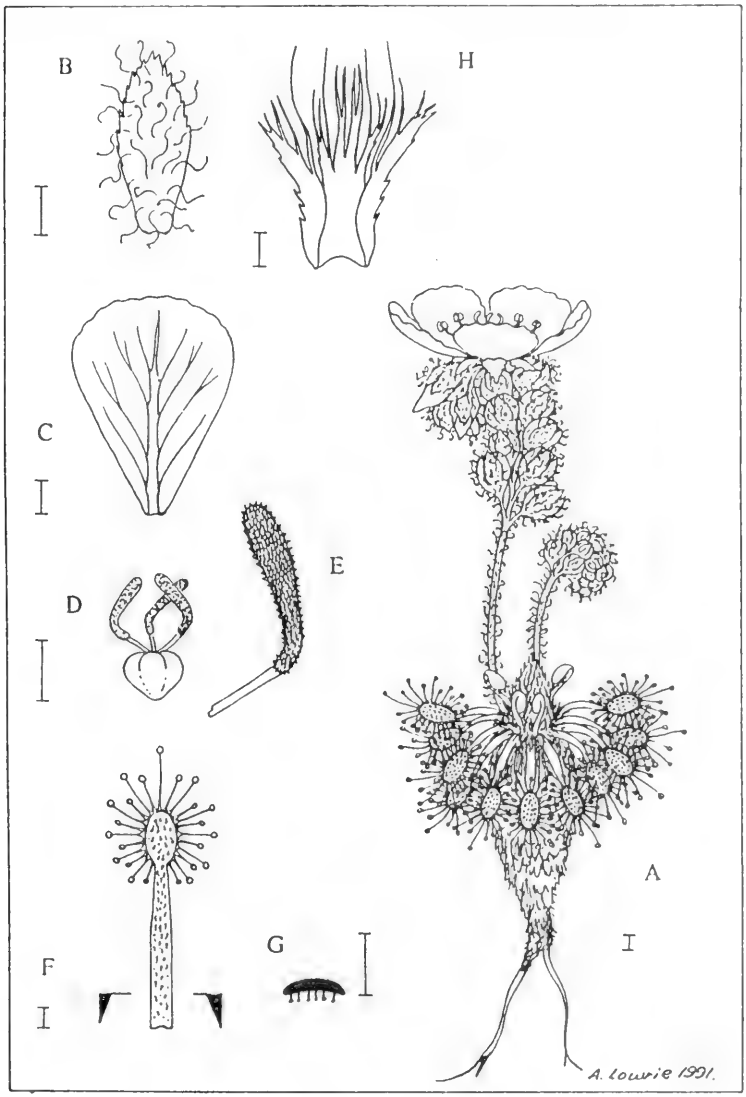

Figure 2. *Drosera lasiantha.* A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Style and stigma, enlarged. F. Leaf. G. Section of petiole. H. Stipule. Scales = 1 mm.

Lamina 3 mm long, 2 mm wide, inflorescence to 2 cm tall, covered with short glandular hairs as well as long, white, woolly terete nonglandular hairs; petals obovate. ..... *D. lasiantha*

Drosera nivea A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. Under and between low shrubs in pale yellow sand plains beside the Midlands Road, 37.3 km southeast of Carnamah, ca. 10 km SE of Coorow township, Western Australia, 22 September 1990, *Allen Lowrie 278* (PERTH); Isotype: RSA.

Caulis ad 1.5 cm longus, ramosi 1-3, stipularum petiolarumque rudimentis cinerascentibus dense vestitus, hinc inde fibram radicalem demittens. Lamina elliptica, 1.4 mm longa, 1 mm lata, hemiglobosa. Petioli 4 mm longi, e basi 0.5 mm lati. Gemma ovoidea, 3.5 mm longa, 3 mm lata. Stipulae gemmae trilobatae, 4 mm longae, 1.5 mm latae, lobus centralis in 3 segmenti divisus, margine serrata, apex setosus; lobi lateralia serrati, 2 setae instructi. Inflorescentia racemiformis. Scapus unicus, ad 3 cm alti, sparse glandulosi. Flores 5-10. Pedicelli 1.5-2.0 mm longi, glandulosi, semierecti in fructibus, bracteolae 1.5 mm longae. Sepala ovata, 2 mm longi, 1.4 mm lata, integra, sed ad apicem serrata, e basi glandulosa. Petala alba, obovata, 4.5 mm longa, 3 mm lata. Ovarium ad anthesim subglobosum, 0.5 mm longum, 0.7 mm latum. Styli 4-5, rubri, patentia, 0.5 mm longi, 0.1 mm in diametro, acuminati. Capsula ignota.

Fibrous rooted perennial herb forming a compact convex rosette 1.3 cm in diameter. Stem to 1.5 cm long, covered with remains of the previous season's leaves and stipules, often with 3 rosettes crowded at the ends of a stem. Active insect trapping leaves about 20 in number. Lamina elliptic, 1.4 mm long, 1 mm wide, deeply cupped. Petiole 4 mm long, 0.5 mm wide near the base, tapering to 0.2 mm wide at the apex. Stipule bud ovoid, 4.0 mm long, 3.0 mm wide, setae included. Stipules trilobed, 4 mm long, 2.5 mm wide, the central lobe divided into three segments, each segment narrowing to setae; lateral lobes upper outer margins serrate, apex with two short setae, on the inner margin two setae are present, each exceeding the length of the central lobe. Inflorescence a raceme. Scape single, to 3 cm long, sparsely covered with glandular hairs. Flowers 5 to 10 in number. Pedicels 1.5-2.0 mm long, glandular, semierect in fruit, bracteoles 1.5 mm long. Sepals ovate, 2 mm long, 1.4 mm wide, margins entire, but apex irregularly serrate, surfaces covered with a few glandular hairs near the base. Petals white, obovate, 4.5 mm long, 3 mm wide. Ovary at anthesis subglobose, 0.5 mm long, 0.7 mm in diameter. Styles 4-5, red, spreading horizontally, 0.5 mm long, 0.1 mm in diameter. Stigmas white, 3.5 mm long, filiform, acuminate.

Drosera nivea (Fig. 3) belongs to subgenus *Rorella* section *Lamprolepis*. *Drosera citrina* (see above) is considered the closest relative of *D. nivea*, but differs from it in the features presented in the key below.

Flowers lemon yellow, scapes with 12 or more flowers, pedicels 2.5-3.0 mm long. ..... *D. citrina*

Flowers white, scapes 5-10 flowered, pedicels 1.5-2.0 mm long. .... *D. nivea*

Drosera silvicola A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. In laterite gravel soils in open jarrah forest, 7 km S of North Bannister on the Albany Highway, Western Australia, 11 November 1991, *Allen Lowrie 513* (PERTH); Isotype: RSA.

Herba perennis rosulata, rosula foliorum 3 cm in diametro. Caulis ad 3 cm longus, stipularum petiolorumque rudimentibus dense vestitus. Folia erecta vel semipatentia. Lamina anguste elliptica, 5.5 mm longa, 1 mm lata. Petioli 9 mm longi, e basi 0.8 mm lata, ad apicem 0.4 mm lata, canaliculata. Gemma ovoidea 8 mm longa, 4 mm in diametro, setae inclusae. Gemmae stipulae trilobatae, 8 mm longae, 7 mm latae, lobus centralis in 3 segmenti subdivisus, segmentus centralis serratus, apex bisetosus, segmenti lateralia serrati, bisetosae. Inflorescentia racemiformis. Scapus unicus, e basi manifeste curvatus, glandulosus. Flores ca. 20. Pedicelli 1.5 mm longi, in fructibus semierecti: bracteolae 1.5 mm longae glandulosae. Sepala ovata, 1.8 mm longa, 1.0-1.3 mm lata, ad apicem serrata, glandulosa. Petala rosea, e basi atrorosea, cuneata, 7 mm longa, 0.8 mm lata, ad apicem subdentata. Ovarium subglobosum, ad anthesim 0.5 mm longum, 0.8 mm in diametro. Styli 3, rubri, patentia, albohyalini, acuminati, 1.5 mm longi. Capsula ignota.

Perennial herb forming an open rosette of erect and semierect leaves, rosette to 3 cm in diameter. Stem to 3 cm long, covered with remnants of the previous season's leaves and stipules, prop roots below. Lamina narrowly elliptic, 5.5 mm long, 1 mm wide; petiole 9 mm long, 0.8 mm wide at base, 0.4 mm wide at apex, channeled on the abaxial surface along its length. Stipule bud ovoid, 8 mm long, 4 mm in diameter, setae included. Stipules trilobed, 8 mm long, the central lobe subdivided into three segments; the central segment serrate on the outer margins, the apex narrowing to three setae, the lateral segments serrate on the outer margins with the apex narrowing to two setae (lowermost on the inside margin a longer seta is present, exceeding the length of the central segment); lateral lobes serrate on the outer lower margins with the apex divided into two short setae; on the inner margin two setae are present, both

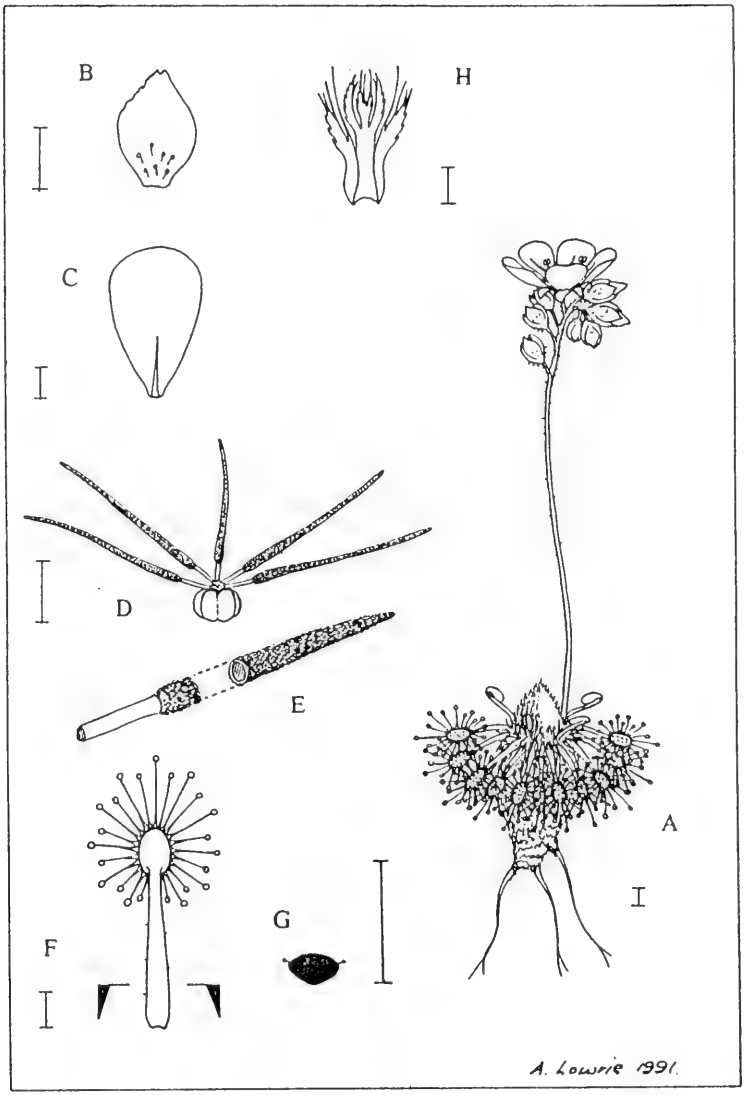

Figure 3. *Drosera nivea*. A. Habit of plant in flower. B. Sepal, C. Petal. D. Ovary with styles. E. Enlarged portion of style and stigma. F. Leaf. G. Section of petiole. H. Stipule. Scales = 1 mm.

almost equaling the length of the longest setae of the central lobe. Inflorescence a raceme, to 8 cm long. Scape single, notably curved at base, covered by short studlike glands increasing in density upwardly; flowers about 20 in number. Pedicels 1.5 mm long, semierect in fruit, bracteoles 2.5 mm long, glandular. Sepals ovate, 2.8 mm long, 1.0-1.3 mm wide, the apex serrate, margins and surface covered by short studlike glands. Petals pink, reddish at the base, cuneate, 7 mm long, 5 mm wide, apex irregularly dentate. Ovary subglobose, 0.5 mm long, 0.8 mm in diameter at anthesis. Styles 3, red, spreading horizontally, 0.5 mm long. Stigmas spreading horizontally, translucent-white, tapering toward the apex, 1.5 mm long. Capsule unknown.

Drosera silvicola (Fig. 4) is known only from the type locality but is common in this area within a two km radius. It belongs in subgenus *Rorella*, section *Lamprolepis*. The species considered closest to *D. silvicola* is *D. barbigera* Planchon; the two species may be differentiated according to the characters given in the couplet below.

Scapes covered with long lanate terete stalked glands; corollas red or bright orange, black in throat; style and stigmas black. ..... *D. barbigera*

Scapes bearing short studlike glands; corollas pink, red in throat; styles red, stigmas translucent-white. ..... *D. silvicola*

Drosera stelliflora A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. In laterite soils, sometimes with a little silica sand, along creek line at the motorcross track, east end of North Jindong Road, south of Busselton, Western Australia, 24 November 1990, *Allen Lowrie 204* (PERTH); Isotype: RSA.

Caulis ad 2 cm longus stipularum petiolorumque rudimentis dense vestitus, hinc inde fibram demittens, folia rosulata. Lamina elliptica, 2.5 mm longa, 1.3 mm lata. Petioli 10 mm lata, e basi 1 mm lata, ad apicem 0.5 mm lata. Gemma ovoidea, 6 mm longa, 4 mm in diametro. Stipulae gemmae trilobata, 6 mm longae, 6 mm latae; lobus centralis in 4 segmenti divisus, 2 centralia bisetosi, 2 lateralia trisetosi; lobi lateralia integra, apex bisetosus, margine trisetosus. Inflorescentia racemiformis. Scapi 1-4, subglabri. Flores ca. 40. Pedicelli 1.5 mm longi, semierecti in fructibus, bracteolae subulatae, 2 mm longae, glabrae. Sepala ovata, subcrenata, 1.2 mm longa, 0.6 mm lata, glabra. Petala alba, lanceolata, 2 mm longa, 0.6 mm lata. Ovarium globosum, ad anthesim 0.4 mm in diametro. Styli 3, patentia, 0.3 mm longi. Stigma clavato-falcata, 0.3 mm longa. Capsula ignota.

Fibrous rooted perennial herb forming a hemispherical rosette of horizontal and semierect leaves to 2.5 cm in diameter. Stem to 2.5 cm long, covered

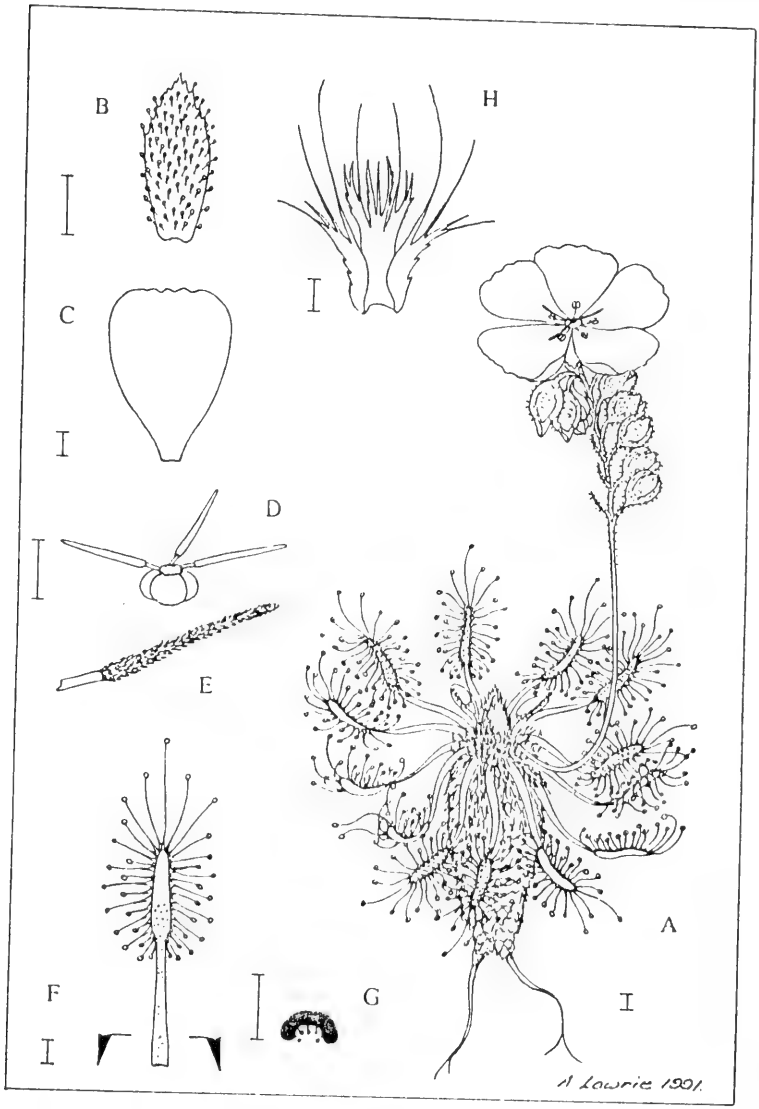

Figure 4. *Drosera silvicola*. A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Enlarged portion of style and stigma. F. Leaf. G. Section of petiole. H. Stipule. Scales = 1 mm.

with the remains of the previous season's leaves and stipules. Active insect trapping leaves about 20 in number, the older leaves reflexed. Lamina elliptic, 2.5 mm long, 1.3 mm wide. Petioles 10 mm long, 1 mm wide at the base, 0.5 mm wide at the apex. Stipule bud ovoid, 6 mm wide, 4 mm in diameter including setae. Stipules trilobed, 6 mm long, 6 mm wide; central lobe divided into four segments, the central pair each narrowing to two setae with the lateral pair narrowing to three setae; lateral lobes with outer margin entire, the apex with two short setae and three setae on the inner margin, the lowermost setae spurred near the base and extending 1 mm longer than the central lobe. Inflorescence a raceme, to 4 cm long. Scapes 1-4, almost glabrous, crowded (flowers 40 or more). Pedicels 1.5 mm long, semierect in fruit, bracteoles subulate, 2 mm long, glabrous. Sepals broadly ovate, margins a little irregular, 1.2 mm long. 0.9 mm wide, surface glabrous. Petals white, lanceolate, 2 mm long, 0.6 mm wide. Ovary globose, 0.4 mm in diameter at anthesis. Styles 3, spreading horizontally, curved, 0.3 mm long. Stigmas clavate-falcate, 0.3 mm long. Capsule unknown.

Drosera stelliflora (Fig. 5) belongs to subgenus *Rorella*, section *Lamprolepis*. It occurs in large colonies throughout the jarrah forests between Busselton and Margaret River, often in cleared areas. The closest relative of *D. stelliflora* is probably *D. enodes* Marchant & Lowrie; from that species, it differs in respects summarized in the couplet below.

Scapes 3-20 flowered; pedicels 4.5 mm long; stigmas obspathulate-falcate, 1.5 mm long. ..... *D. enodes*

Scapes with 40 or more flowers; pedicels 1.5 mm long; stigmas clavate-falcate, 0.3 mm long. ..... *D. stelliflora*

Drosera bicolor A. Lowrie & S. Carlquist, *spec. nov.* HOLOTYPE: AUSTRALIA. In deep white silica sand between low shrubs on heathland, on floodplain of the upper Phillips River, 2.3 km from the Hyden-Ravens- thorpe Road, Western Australia, 25 September 1990, *Allen Lowrie* (PERTH).

Bulbus parvus. Caulis parte hypogaea brevis, 6 cm longus, parte epigaea ad 11 cm longa, ferruginea. Folia basalia saepe hypogaea, lamina arcuata, 1.2 mm longa, 1.8 mm lata, petiolo 3.5-7.5 mm longo, 0.3 mm lato. Folia caulina ad anthesim solitaria, peltata, folia inferiora adpressa, petioli 1.0-1.5 mm longi, folia superiora patentia, petioli 3-7 mm longi. Lamina foliarum superiorum arcuata, 2 mm longum, 2.5 mm lata, lobi 3.5 mm longi. Inflorescentia terminalia, racemiformis. Flores 8-20. Pedicelli 4-7 mm longi. Sepala lanceolata, 3 mm longa, 1.2 mm lata, glandulosa et nigropunctata, margine serrata. Petala alba, e basi roseomaculata,

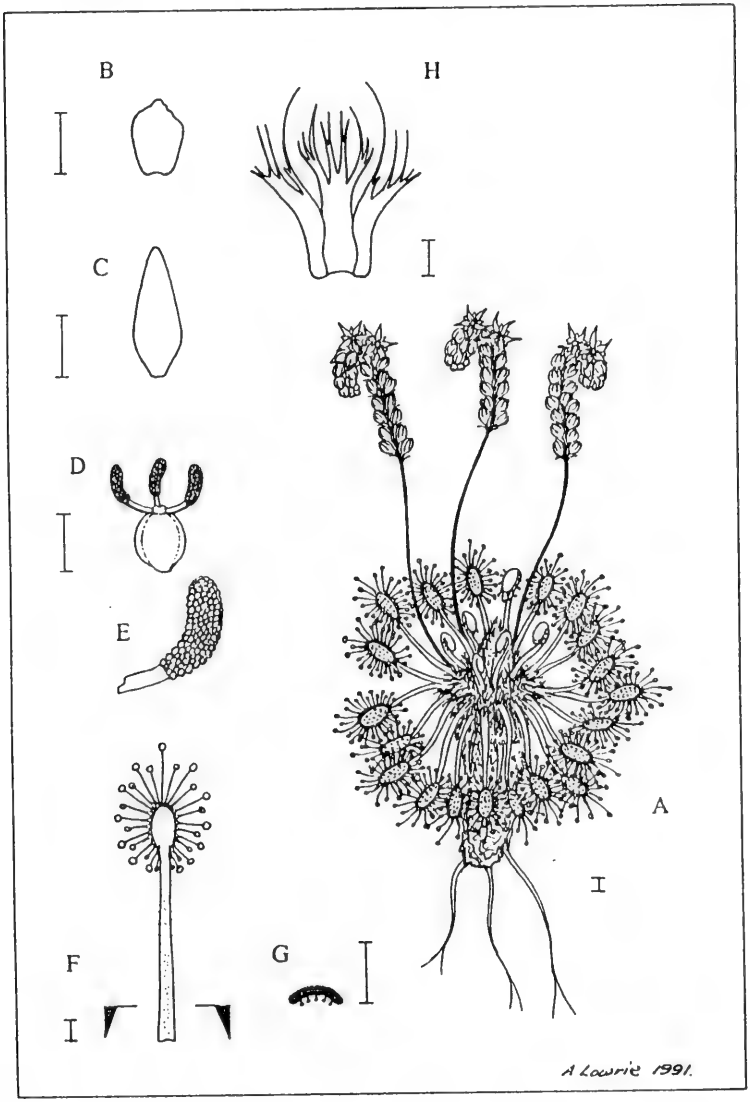

Figure 5. *Drosera stelliflora.* A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Enlarged portion of style and stigma. F. Leaf. G. Section of petiole. H. Stipule. Scales = 1 mm.

cuneata, truncata, margine erosa, 6 mm longa, 4.2 mm lata. Ovarium ellipsoideum, ad anthesim 1.2 mm longum, 1 mm in diametro. Styli 3, 0.6 mm longi, e basi elongati, ad apicem in lobi obovati stigmati divisi. Capsula ignota.

Bulb small. Underground stem 6 cm long. Aboveground stem to 11 cm long (including inflorescence), rust colored. Basal leaves crowded, often completely covered with sand grains as in *Drosera salina* Marchant & Lowrie, lamina crescentic, 1.2 mm long, 1.8 mm wide, petioles 3.5-7.5 mm long, 0.3 mm wide. Cauline leaves of the erect stem solitary at anthesis, peltate, lower petioles appressed to the stem, 1.0-1.5 mm long, upper petioles spreading, semierect, 3-7 mm long, lamina of upper stem leaves crescentic, 2 mm long, 2.5 mm wide, with lobes at the angles 3.5 mm long. Inflorescence terminal, a onesided raceme, flowers 8-20. Pedicels glandular, 4-7 mm long. Sepals lanceolate, 3 mm long, 1.2 mm wide, margins serrate with the marginal tips glandular; surface glandular, black dotted. Petals white with a reddish spot near the base, cuneate, truncate, concave and erose, 6 mm long, 4.2 mm wide. Ovary ellipsoid, 1.2 mm long, 1 mm in diameter at anthesis. Styles 3, 0.6 mm long, straplike at the base and flared outward at the apex into obovate lobes, the group of lobes recurved to form a rosette of stigmatic tips.

Drosera bicolor (Fig. 6) is presently known only from the type locality, although it may be expected in other locations along the upper reaches of the Phillips River. The area along this river system has been extensively cleared for agriculture, and therefore this species may be threatened. This species belongs to subgenus *Ergalium* DC., section *Ergalium* Planchon. Differences from the closest species are summarized in the form of a key below.

Inflorescence 1-2 flowered, erect stem flexuose. ..... *D. salina*

Inflorescence 5-20 flowered, erect stem straight.

Petioles of cauline leaves all semierect, 12 mm long; petals white. .... *D. peltata* Thunberg (W. A. plants)

Petioles of the lower cauline leaves appressed to stem, 1.0-1.5 mm long, petioles of the upper cauline leaves semierect, 4-7 mm long; petals white with a reddish spot near the base. ..... *D. bicolor*

Drosera macrophylla Lindley subsp. **monantha** A. Lowrie & S. Carlquist, *subsp. nov.* HOLOTYPE: AUSTRALIA. In loam soils that dry out to become hard in summer, near truck bay on the north side of the York-Merredin Highway near Eujinyn, ca. 5 km west of Bruce Rock, 11 August 1990, *Allen Lowrie 100* (PERTH); Isotype: RSA.

Ab *Drosera macrophylla* Lindley subsp. *macrophylla* differt: Scapi uniflori (rarii biflori).

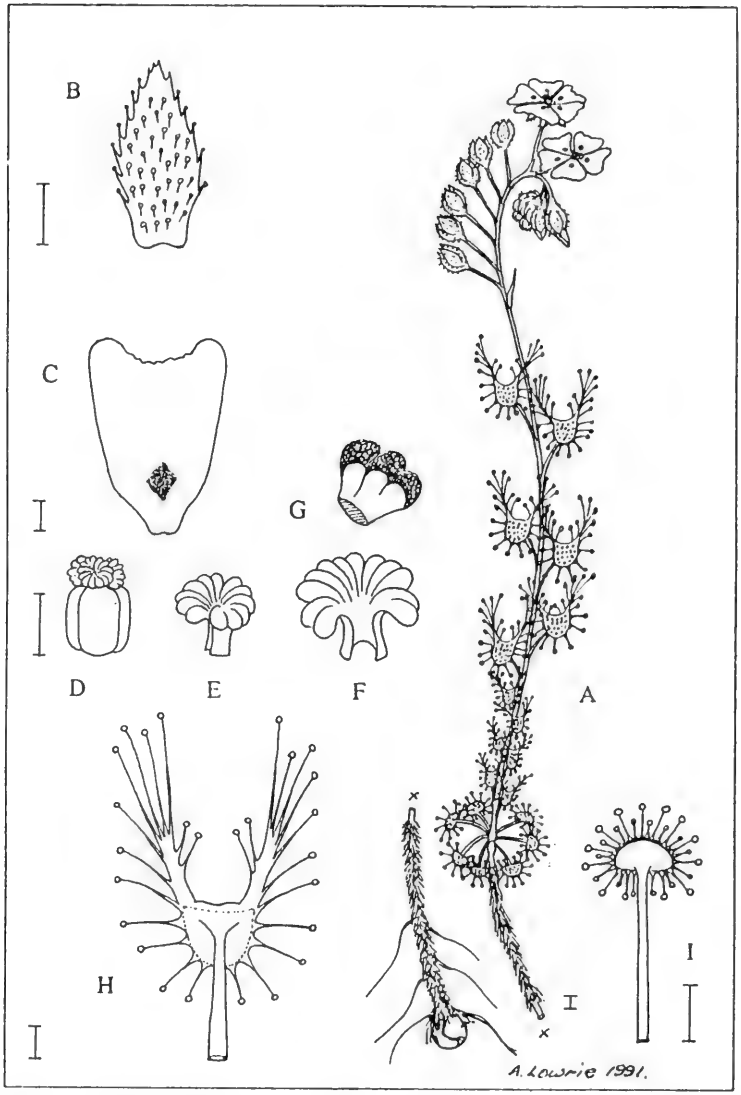

Figure 6. *Drosera bicolor*. A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Styles and stigmas. F. Style and stigmas enlarged, dissected. G. Stigmas and style segments, enlarged. H. Lamina and adjacent petiole portion of cauline leaf. I. Lamina and adjacent petiole portion of basal leaf. Scales = 1 mm.

Tuberous herb. Underground stem to 15 cm long. Leaves all in a flat rosette, sessile. Lamina obovate, 4 cm long, 2 cm wide. Scapes 20-50, 4-8 cm long, single flowered, rarely two flowered, erect in fruit. Sepals ovate 4.5 mm long, 2.2 mm wide, united at bases, margins entire, slightly serrate near apex, outer surface covered by sessile glands. Petals white, obovate, apex truncate-crenate, 9 mm long, 4.5 mm wide. Ovary globose, 2 mm in diameter at anthesis. Styles three, 1.5 mm long, each divided into segments divided repeatedly into 1-4 filiform branches toward apices, together forming a dense rounded tuft; stigmas on the rounded tips of each of these branches.

Drosera macrophylla subsp. *monantha* (Fig. 7) is common in the Bruce Rock–Merredin region. At present it does not seem to be threatened.

Drosera whittakeri Planchon subsp. **aberrans** A. Lowrie & S. Carlquist, *subsp. nov.* HOLOTYPE: AUSTRALIA. In red loam soils in mallee scrub country west and east of Sherlock, South Australia, 19 July 1991, *D.E. Murfet 1059* (PERTH); Isotype: RSA.

Ab *Drosera whittakeri* Planchon subsp. *whittakeri* differt: planta emittens adventitiis stoloninus producens tubera; laminis 15 mm longis.

Tuberous perennial, producing additional tubers by means of the long adventitious stolons, the stolons borne in the center of the basal rosette of leaves in nonflowering specimens or just below the rosette of leaves in flowering specimens, adventitious stolons prostrate on the soil surface for a short distance before growing down into the soil to produce a tuber deep enough to permit successful dormancy. Leaves all in a flat basal rosette. Lamina broadly obovate, 6.5 mm long, 7.5 mm wide. Petiole 6.5 mm long, 1.6 mm wide at the base, dilated to 4 mm wide at the lamina base. Scapes one to four, 8-14 mm tall, single flowered, prostrate in fruit. Sepals ovate, 5 mm long, 2.4 mm wide, margins entire, apex acute, serrate near the tip, outer surfaces covered with sessile glandular hairs. Petals white, 9 mm long, 7 mm wide, cuneate, apex truncate, serrate. Ovary obovoid, 1.7 mm long, 1.8 mm in diameter at anthesis. Styles 3, white, each repeatedly divided from near the base into two to three branched filiform segments; stigmas at the rounded tips of these segments.

Drosera whittakeri subsp. *aberrans* (Fig. 8) is distinguished by reproduction by means of stolons that give rise to tubers. This new subspecies is currently known throughout the mallee country east of Adelaide. It extends into Victoria, where it is common and known from the Grampians National Park S of Horsham; Gembrook E of Melbourne, Anglesea SW of Geelong; the Brisbane Ranges north of Geelong (preceding localities according to Robert Gassin, personal communication); and Skye near the Mornington Peninsula, southeast of Melbourne (*Robert Gassin 5*, 30 October 1990).

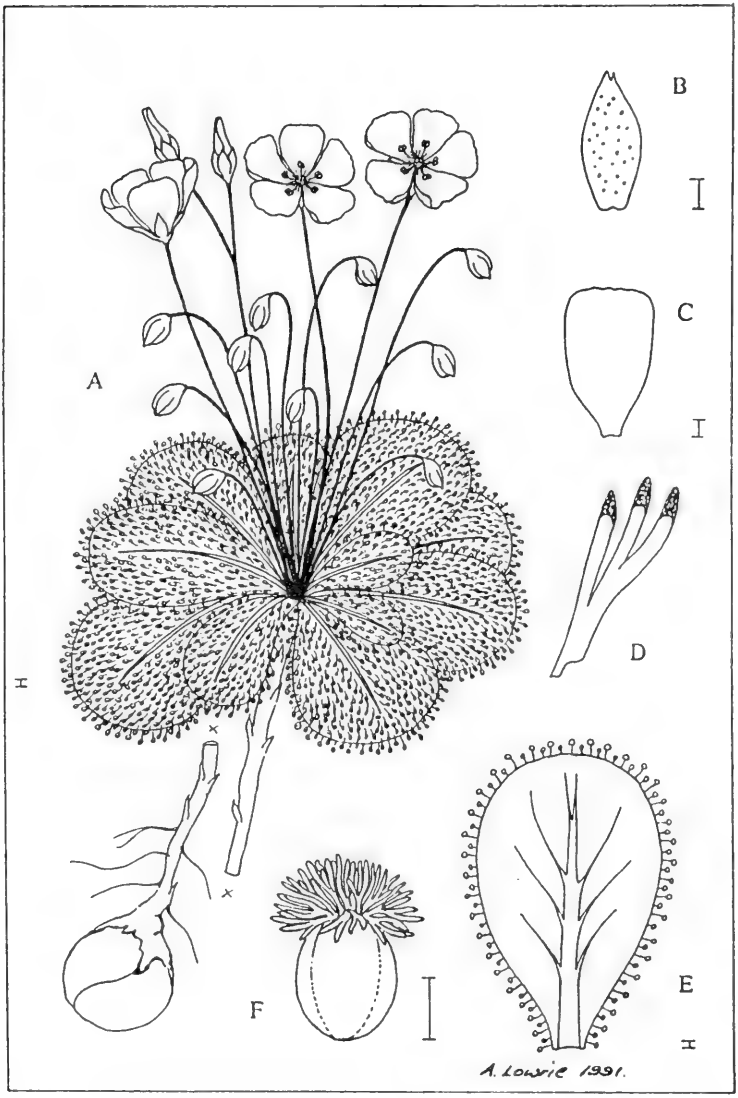

Figure 7. *Drosera macrophylla* subsp. *monantha*. A. Habit of plant in flower. B. Sepal. C. Petal. D. Style portion with stigmas. E. Lamina. F. Ovary with styles. Scales = 1 mm.

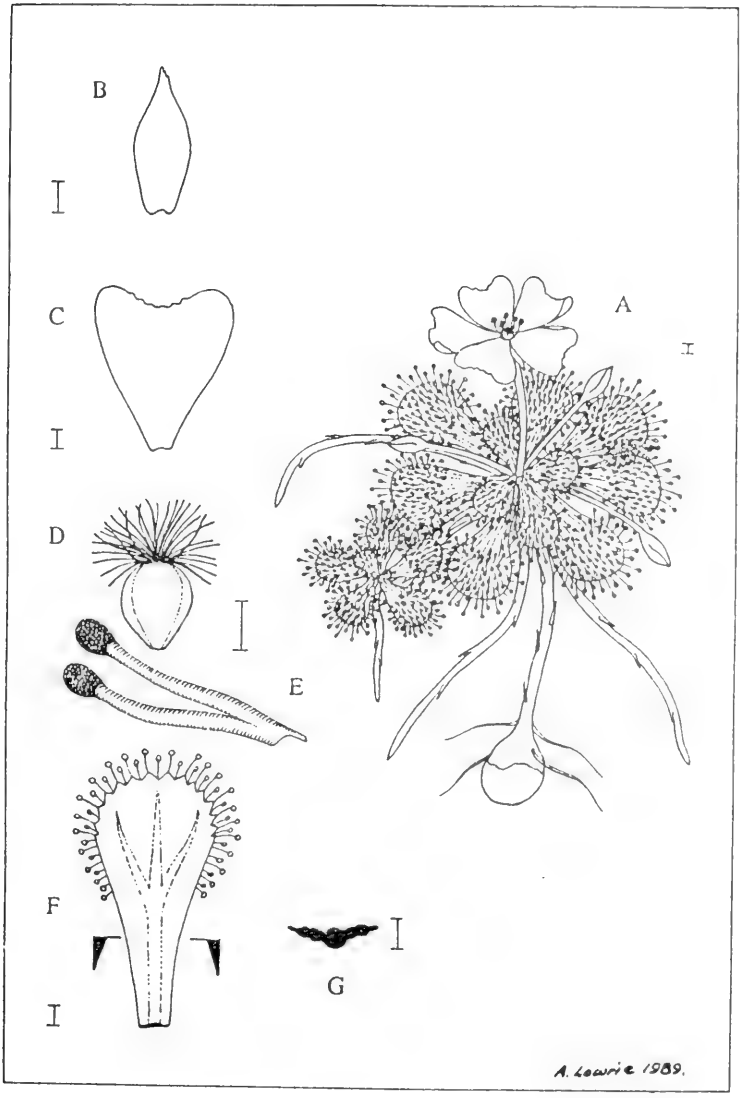

Figure 8. *Drosera whittakeri* subsp. *aberrans*. A. Habit of plant in flower. B. Sepal. C. Petal. D. Ovary with styles. E. Enlarged portion of style and stigmas. F. Leaf. G. Section of petiole. Scales = 1 mm.

LITERATURE CITED

Lowrie, A. 1987. *Carnivorous Plants of Australia*, Vol. 1. University of Western Australia Press, Nedlands, Western Australia.

Lowrie, A. 1989. *Carnivorous Plants of Australia*, Vol. 2. University of Western Australia Press, Nedlands, Western Australia.

Lowrie, A. & S. Carlquist. 1990. A new species of tuberous *Drosera* from Western Australia. Phytologia 69:160-162.

Lowrie, A. & N. Marchant. 1992. Four new *Drosera* taxa from Western Australia. Nuytsia (in press).

Marchant, N. & A. Lowrie. 1992. New names and combinations in 34 taxa of Western Australian tuberous and pygmy *Drosera*. Kew Bulletin (in press).

Phytologia (August 1992) 73(2):117-118.

NEW COMBINATIONS IN *APPENDICULA* BLUME AND *OCTARRHENA* THWAITES (ORCHIDACEAE) IN AUSTRALIA

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ABSTRACT

Embryological and morphological studies indicate that two species, *Podochilus australiensis* and *Phreatia baileyana*, have been misplaced in their respective genera. The new combinations **Appendicula australiensis** (Bailey) M. Clements et D. Jones, and **Octarrhena pusilla** (Bailey) M. Clements et D. Jones are provided to reflect the relationships of these species.

KEY WORDS: *Appendicula, Octarrhena, Podochilus, Phreatia*, Australia, Orchidaceae

INTRODUCTION

This is the first of a series of papers required to adjust the nomenclature of Australian orchids following detailed studies by the authors. Preliminary examination of the developmental embryology of species in the subtribes Podochilinae and Thelasiinae has revealed errors in the generic placement of some of the Australian taxa. Associated examination of fresh flowers of *Podochilus australiensis* (Bailey) Schltr. shows the pollinarium to consist of six pollinia. This is a characteristic of the genus *Appendicula* Blume, not of *Podochilus* Blume which has four pollinia. Parallel studies on material of *Phreatia baileyana* Schltr. shows that plants are sympodial with indeterminate growths and the flowers lack a mentum, both of which are characters of the genus *Octarrhena* Thwaites not of *Phreatia* Lindley. In light of these studies new combinations are made:

Appendicula australiensis (Bailey) M. Clements et D. Jones, *comb. nov.* BASIONYM: *Eria australiensis* Bailey, Occas. Pap. Queensl. Fl. 1:8. 1886.; *Podochilus australiensis* (Bailey) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 3:316. 1907., *syn. nov.* TYPE: AUSTRALIA. Queensland: Johnstone River, *T.L. Bancroft s.n.* (HOLOTYPE: BRI!). Illus. pl. 428 (Nicholls 1969).

Octarrhena pusilla (Bailey) M. Clements et D. Jones, *comb. nov.* BASIONYM: *Oberonia pusilla* Bailey, Votes & Proc. Legis. Ass. Qld. 4:1227. 1889. and *Rep. Bellenden Ker Exped.* 23. 1889. *Phreatia pusilla* (Bailey) Rolfe, Orchid Rev. 11:344 (1903), *non* (Blume) Lindley 1830. *Phreatia baileyana* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9:433. 1911., *syn. nov.* TYPE: AUSTRALIA. Queensland: Bellenden Ker at about 4000 ft, *F.M. Bailey s.n.* (HOLOTYPE: K!). Illus. p. 651 (Dockrill 1969).

ACKNOWLEDGMENTS

We wish to thank Surrey Jacobs, Royal Botanic Gardens, Sydney and Ben Wallace, Australian National Botanic Gardens for refereeing this paper.

REFERENCES

Dockrill, A.W. 1969. *Australian Indigenous Orchids*, vol. 1. Society For Growing Australian Plants, Sydney, Australia.

Nicholls, W.H. 1969. *Orchids of Australia.* Nelson, Melbourne, Australia.

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VARIATION IN *ERIGERON CHIANGII* (ASTERACEAE: ASTEREAE), WITH A NEW VARIETY

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ABSTRACT

Erigeron chiangii var. **lamprocaulis**, *var. nov.*, comprises a group of populations with linear leaves and the stems completely glabrous below the peduncular portions. *Erigeron chiangii* (including the new and typical variety) is restricted to Coahuila and adjacent Nuevo León, México; a distribution map of both taxa is provided. *Erigeron scoparioides*, the sister species of *E. chiangii*, is endemic to Tamaulipas.

KEY WORDS: *Erigeron*, Asteraceae, Astereae, México

In a paper formally describing *Erigeron chiangii* Nesom (Nesom 1979), I noted that several collections of atypically linear leaved plants primarily from the northern portion of its range could be distinguished from the rest of the species. After the accumulation of additional collections (TEX), reexamination of most of the original set of specimens of *E. chiangii*, and observations of populations in the field, it is apparent that two taxa can be distinguished. The difference between them is primarily in vestiture and leaf shape, and although it is not clear that they intergrade, the relationship between them is so close that they are considered here as varieties of a single species.

Erigeron chiangii Nesom var. **lamprocaulis** Nesom, *var. nov.* TYPE: MEXICO. Coahuila: Mpio. Melchior Múquiz, ca. 130 road km NW of Múquiz along Coahuila Hwy 2-A (Múquiz-Boquillas), then into Sierra La Encantada; bottom of deep, N-S trending canyon on SW side of La Encantada basin, Sierra Buenavista of the Sierra La Encantada, on SE side of road going up into mining area of the sierra; 102° 30′, 28° 34′; ca. 1650 m, 3 Jun 1992, *G. Nesom 7408* with M. Mayfield (HOLOTYPE: TEX; Isotypes: ANSM,ARIZ,ASU,CAS,CHAPA,COLO,ENCB, F,GH,MEXU,MO,NY,OBI,PATZ,RM,S,SRSC,UAT,UC,UNM,US).

Differt a *Erigeronte chiangii* Nesom typicus caulibus omnino glabris et foliis lineari-filiformibus.

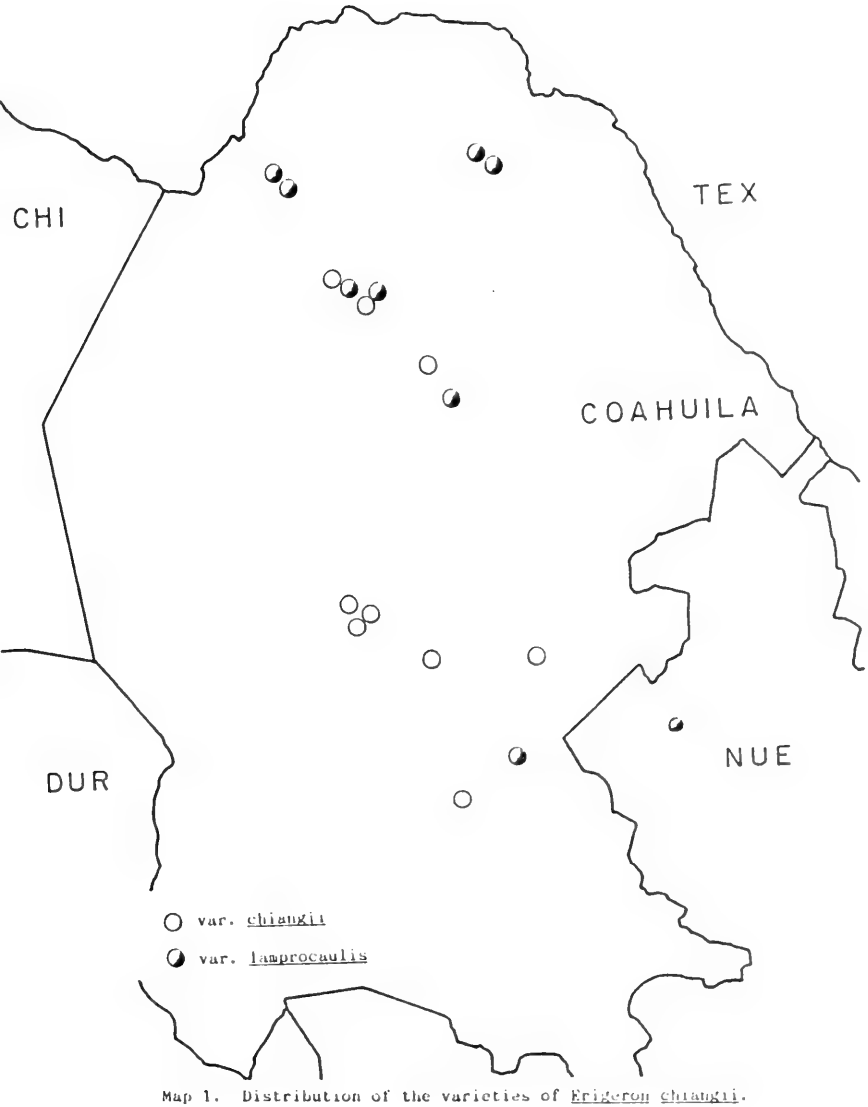
Additional collections examined: MEXICO. COAHUILA. *Sierra del Carmen*: higher elevations in the Sierra Jardín, 1 Sep 1966, *Flyr 1210* (SMU); Mina El Popo, ca. 2 km S of Cañon El Diablo, 29 Jul 1973, *Johnston et al. 11922* (LL); canyon descending E from high pass N of Sierra Jardín, 6 mi E of Rancho El Jardín, 23 May 1968, *Powell et al. 1602* - voucher for chromosome count of n=18 (TEX). *Serranias del Burro*: ca. 10 km SW of R. San Miguel at Ejido Santa Eulalia in Cañon de los Burros, NE side of Serranias del Burro, 2 Jun 1972, *Chiang et al. 7519C* (LL); ca. 1 mi N of "La Laguna," Cañon del Mulato, 8 Sep 1963, *Gould 10596* (TAES). *Sierra Santa Rosa*: Rancho Agua Dulce, E slope of the Sierra de San Manuel, 30 Jun 1936, *Wynd & Mueller 387* (MO). *Sierra de la Encantada*: ca. 140 road km NW of Múquiz, Cuesta del Plomo area, ca. 6 road km S along well-maintained road originating just SE of Coahuila Hwy 2-A (Múquiz-Boquillas) crest at Cuesta del Plomo, 102° 29′ 30″, 28° 40′ 30″, area of scattered pine-oak woodlands with *Yucca* and *Dasylirion*; ca. 1820 m, 4 Jun 1992, *G. Nesom 7461* with M. Mayfield (ANSM,MEXU,TEX). *Sierra de la Gavia*: Cañon de la Gavia, S of Rancho de la Gavia, 2-3 Aug 1973, *Johnston et al. 12035B* (LL). NUEVO LEON. Mpio. Villaldama, Sierra Gomas in Canyon El Alamo: northern exposed riparian community of *Quercus-Ostrya-Acer* with *Tilia, Cornus, Carya*, and *Abies* on higher slopes, limestone derived soil, 1100-1400 m, 15 Aug 1988, *Patterson 6694* (TEX) and 1850-2150 m, 15 Aug 1988, *Patterson 6749* (TEX).

The two varieties of *Erigeron chiangii* are distinguished by the following contrasts:

a. Stems minutely glandular near the heads, otherwise glabrous; basal leaves deciduous by flowering, cauline leaves all linear, 2-6 cm long, 0.5(-1.0) mm wide, at least the upper cauline leaves with blades glabrous except for the sparsely spreading ciliate margins; 750-1820 m; May-Aug. .... var. *lamprocaulis*

a. Stems glandular from top to base, at least the basal half also sparsely to moderately hirsute-pilose with stiff to loose nonglandular hairs, rarely with only nonglandular hairs from base to tip; basal leaves often persistent, the cauline oblanceolate on lower half of stem, (1-)2-4 cm long, 1-4 mm wide, linear-lanceolate above, the blades moderately hirsute-pilose and usually markedly glandular as well; 1300-2500 m; (Mar-)Apr-Sep (-Oct). ..... var. *chiangii*

The two varieties differ in several, apparently genetically unrelated, morphological features, but the most consistent difference is in vestiture. While plants of var. *lamprocaulis* can always be distinguished by its lack of stem hairs,



Map 1. Distribution of the varieties of Erigeron chiangii.

Map 1. Distribution of the varieties of *Erigeron chiangii*.

considerable variation in vestiture exists within var. *chiangii*, particularly on the stems, where the degree of glandularity and the density of nonglandular hairs are variable. The stem surfaces of both species are shiny, but those of var. *lamprocaulis* often appear more so because of their lack of vestiture.

Where the geographic ranges of the two taxa are known to overlap closely (in the Sierra de la Encantada; Map 1), var. *chiangii* occurs in drier, more exposed habitats (*i.e.*, cracks, crevices, and ledges of rock outcrops and in shallow, stony soil); var. *lamprocaulis* in the same area grows in deep to shallow soil in considerably more protected sites, commonly at least partially shaded ones.

B.L. Turner in 1979 first recognized the distinctiveness of *Erigeron chiangii*, but he relinquished its description to me. The type specimen he had chosen represented the element described and named here (var. *lamprocaulis*); my selection (a reselection) of the type established the concept of typical *E. chiangii*. That the two taxa were not originally distinguished taxonomically is an indication of their close similarity.

Erigeron chiangii is most closely related to *E. scoparioides* Nesom (Nesom 1989, 1992). Both species are especially unusual in the genus in their production of a rhizomatous root system without a central axis. They are further distinguished by their stems and leaves with a distinctively shiny surface texture and their narrow, entire, cauline leaves, erect buds, and strongly graduated phyllaries. *Erigeron scoparioides* is set apart in its completely eglandular vestiture of short, upwardly appressed hairs (rare or absent on the phyllaries) and its apparent complete lack of basal leaves. Although Nesom (1979, 1992) has speculated that this species pair may be related to the *E. foliosus* Nutt. group (centered primarily in California), to a strong degree they appear to be geographically and morphologically isolated from any putative relatives.

ACKNOWLEDGMENTS

I thank Dr. B.L. Turner and Mark Mayfield for their review of the manuscript.

LITERATURE CITED

Nesom, G.L. 1979. A new species of *Erigeron* (Compositae) from Coahuila. Sida 8:65-70.

———. 1989. Four new species of *Erigeron* (Compositae: Astereae) from northern México. Phytologia 66:488-495.

———. 1992. Revision of *Erigeron* sect. *Linearifolii* (Asteraceae: Astereae). Phytologia 72:157-208.

Phytologia (August 1992) 73(2):124-136.

NOMENCLATURAL NOTES FOR THE NORTH AMERICAN FLORA. XI

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ABSTRACT

Epilobium brachycarpum Presl is accepted to be the correct name in place of *E. paniculatum* Nutt. *ex* Torr. & Gray. The disposition of *Websteria confervoides* (Poir.) Hooper is discussed. The quadrinomial *Sidalcea malviflora* (DC.) A. Gray *ex* Benth. subsp. *laciniata* C.L. Hitchc. var. *laciniata* C.L. Hitchc. is recognized as two trinomials: *Sidalcea malviflora* subsp. *laciniata* C.L. Hitchc. and *Sidalcea malviflora* var. *laciniata* C.L. Hitchc. The authorship of *Amelanchier alnifolia* (Nutt.) Nutt. *ex* M. Roemer, *A. pumila* (Torr. & Gray) Nutt. *ex* M. Roemer, *Aronia arbutifolia* (L.) Pers., *Choenomeles japonica* (Thunb.) Lindl. *ex* Spach, *Malus pumila* C. Bauhin *ex* P. Mill., *M. sieboldii* (Regel) Rehder, *M. sylvestris* P. Mill., and the new Vitaceae names proposed in Gray's 1897 work is discussed. "*Senna artemisioides* (DC.) Kartesz & Gandhi" is treated as an isonym of *S. artemisioides* (DC.) Randell. One new combination is proposed: **Spiranthes confusa** (Garay) Kartesz & Gandhi.

KEY WORDS: Cyperaceae, Fabaceae, Malvaceae, Onagraceae, Orchidaceae, Rosaceae, Vitaceae, *Amelanchier, Aronia, Choenomeles, Epilobium, Malus, Senna, Sidalcea, Spiranthes, Websteria*, Bailey, Gray

INTRODUCTION

Continuing with the "NOMENCLATURAL NOTES FOR THE NORTH AMERICAN FLORA" (Kartesz & Gandhi 1989, 1990a, 1990b, 1990c, 1991a, 1991b, 1991c, 1991d, 1992a, 1992b), an eleventh note in the series is presented here toward advancing our understanding of North American plant names.

CYPERACEAE

Websteria confervoides

Scirpus confervoides Poir. is a leafless, submerged aquatic found throughout the tropics and subtropics. It has a diffuse growth habit, slender terete stems, capillary branches in pseudo-whorls, and pedicelled ascending spikelets. Each spikelet has two distichous scales, with the upper scale subtending 6-11 retrorsely barbed bristles, 3 stamens, and an ovary with two style branches. Because of its unique morphology, its taxonomic disposition has been in dispute, as discussed below.

Hooper (Kew Bull. 26:582. 1972.) transferred *Scirpus confervoides* to the genus *Websteria* S.H. Wright [*W. confervoides* (Poir.) Hooper]. Without referencing Hooper, Kern (1974, p. 505) retained Poiret's plant within *Scirpus* L. Tucker (J. Arnold Arbor. 68:388. 1987) transferred it to the genus *Eleocharis* R. Br. and proposed the combination "*E. confervoides* (Poir.) Tucker." Prior to Tucker's publication, Miquel (1856, p. 303) made the combination *E. confervoides*. Since both Miquel and Tucker independently made the same combination based on the same type, Tucker's later combination must be considered an isonym (cf. Nicolson, Taxon 24:461-466. 1975). Ironically, both Miquel's and Tucker's combinations are later homonyms of *E. confervoides* Steud. (*Syn. Pl. Glumac.* 2:82. 1854-1855.).

For the inclusion of Poiret's taxon in *Eleocharis*, Tucker derived support from a lack of leaf blades and from some embryological characters. [The embryo in *Eleocharis* is a variant of the *Fimbristylis*-type: top shaped, with basal coleoptyle, lateral rootcap, and first leaf more or less protruding from the germ pore (*fide* Kern 1974, pp. 446, 523).] Regarding the embryological character, Kern (p. 447) remarked that more than one type of embryo may occur within a genus or a single embryo type may occur in more than one genus. He stated that *S. confervoides* "has its own embryo type, similar to that of *Eleocharis*, but somewhat more differentiated." He further suggested the retention of Poiret's taxon within *Scirpus* because of its floral characters.

We disagree with both Kern's and Tucker's disposition of Poiret's taxon. We believe that inclusion of Poiret's taxon either within *Scirpus* or within *Eleocharis* is anomalous. We concur with Wright's (Bull. Torrey Bot. Club 14:135. 1887.) and Hooper's (*l.c.*) analyses that the unique morphology of Poiret's taxon deserve its disposition in the monotypic genus *Websteria* S.H. Wright.

Websteria confervoides (Poir.) Hooper, Kew Bull. 26:582. 1972. BASIONYM: *Scirpus confervoides* Poir. *in* Lam., *Encycl.* 6:755. 1804. *Eleocharis confervoides* (Poir.) Miq., *Fl. Ind. Bat.* 3:303. 1856.; Tucker, J. Arnold Arbor. 68:388. 1987., *non* Steud. 1854-1855.

FABACEAE
Senna artemisioides

Unaware of the publication of *Senna artemisioides* (Gaud. *ex* DC.) Randell (J. Adelaide Bot. Gard. 12(2):220. 1989.), we (Phytologia 72:87. 1992.) made the identical combination. Barneby (NY) brought Randell's combination to our attention.

Prior to making our combination, we searched Index Kewensis, Kew Index, and Gray Herbarium Card Index to insure that this combination did not exist. At the time of our search, the NCU Library had holdings of Kew Index for the years ending 1989; unfortunately, Randell's combination is not listed in the Kew Index for 1989 and is most likely listed in the Kew Index for 1990 (for which we do not have access to date). Nevertheless, we regret our oversight and consider our combination as an isonym of Randell's combination.

Senna artemisioides (Gaud. *ex* DC.) Randell, J. Adelaide Bot. Gard. 12(2):220. 1989.; Kartesz & Gandhi, Phytologia 72:87. 1992.

MALVACEAE
Sidalcea

Hitchcock (1957, pp. 29-30) proposed *Sidalcea malviflora* subsp. *laciniata*, under which he recognized two varieties: *S. malviflora* subsp. *laciniata* var. *laciniata* and *S. malviflora* subsp. *laciniata* var. *sancta* C.L. Hitchc. Hitchcock provided a Latin description for his subspecies and a Latin diagnosis for his var. *sancta*. He provided a diagnosis in English for var. *laciniata*. Since he intended var. *laciniata* to be the autonym of subsp. *laciniata* (he cited the same type for both ranks) and since the *International Code of Botanical Nomenclature* (*ICBN*) (Lanjouw 1956, Art. 26) mandated at that time that a) autonyms were to be cited without an author and b) that autonyms did not have taxonomic standing, Hitchcock neither provided a Latin diagnosis nor authorship details for *S. malviflora* subsp. *laciniata* var. *laciniata*. Under the present *ICBN* (Greuter 1988), autonyms exist only for species, but not for infraspecific taxa, such as subspecies and varieties. Furthermore, all names (including infraspecific ranks, but excluding autonyms of species) must have an author citation (*ICBN* Art. 46.1). Since var. *laciniata* is not an autonym of *S. malviflora*, the former name requires authorship.

According to Art. 34 Ex. 11, an author can simultaneously validate a single combination at different infraspecific ranks within a species. Example 11 illustrates that the description of "*Malvastrum bicuspidatum* subsp. *tumidum* S.R. Hill var. *tumidum*, subsp. et var. nov." (Hill, Brittonia 32:474. 1980.) simultaneously validated both *M. bicuspidatum* subsp. *tumidum* S.R. Hill and

M. bicuspidatum var. *tumidum* S.R. Hill. In his work, Hill also proposed *M. bicuspidatum* subsp. *tumidum* var. *glabrum* S.R. Hill and provided the following diagnosis: "A varietate typica foliorum lamina angustata ovato-lanceolata petiolo 8-plo usque longiori, bracteolis calycem aequantibus, schizocarpis maturis glabris aut scabrellis et in vivo apice rubris, mericarpiis minoribus ca 5.0 mm diametro differt." An analysis of the Latin description of *M. bicuspidatum* subsp. *tumidum* var. *tumidum* indicates that Hill did not compare the length of the blade with that of the petiole, nor did he compare the bracteoles with that of the calyx, or the size of the mericarps. However, he did describe the mericarps as "often tinted rose-red drying to red-brown or brown" with the vestiture restricted to the apical and cusp surfaces. Furthermore, Hill provided a single description to validate both ranks (subsp. *tumidum* and var. *tumidum*); hence, this description is not the sum of var. *tumidum* and var. *glabrum*. According to Art. 25 Ex. 1, an infraspecific taxon, for nomenclatural purposes, is regarded as the sum of its subordinate taxa. In Hill's treatment, it is evident that var. *glabrum* is taxonomically differentiated from var. *tumidum*, but for nomenclatural purposes, it is questionable whether subsp. *tumidum* can be regarded as the sum of its vars. *tumidum* and *glabrum*.

Hill's and Hitchcock's treatments are not identical. Unlike Hill's treatment, Hitchcock's Latin description of subsp. *laciniata* is explicitly a sum of its two varieties (var. *laciniata* and var. *sancta*). Evidently, Hitchcock met the requirements of Art. 25.1, but whether var. *laciniata* was validly published is questionable. In personal communications, Nicolson (US) and McVaugh (NCU) asserted that var. *laciniata* was validly published in Hitchcock's treatment. Their assertion is in accordance with Rec. 26A.1.

Sidalcea malviflora (DC.) A. Gray *ex* Benth. var. *laciniata* C.L. Hitchc., Univ. Washington Publ. Biol. 18:30. 1957.

ONAGRACEAE

Epilobium brachycarpum

For 140 years (1840-1981), the Tall Annual Willowherb was known by the name *Epilobium paniculatum* Nutt. *ex* Torr. & Gray (published in 1840). In 1981, Hoch & Raven (Taxon 30:666) stated that *E. brachycarpum* Presl (published in 1831) and *E. paniculatum* were conspecific. These authors remarked that the name *E. brachycarpum* "has been incorrectly applied to plants of the *E. ciliatum* complex in the only four treatments in which the name has been used in the last hundred years." Furthermore, these authors believed *E. paniculatum* to be an universally accepted name for the willowherb in question. Based on *ICBN* Art. 69, Hoch & Raven proposed to reject the name *E. brachycarpum*.

In anticipation of the acceptance of Hoch & Raven's proposal by the nomenclatural committee of the *ICBN*, Solomon (1982, p. 330) recognized the name *Epilobium paniculatum* and cited *E. brachycarpum* as a synonym. However, the nomenclatural committee (Taxon 33:300. 1984.) remarked that the name *E. brachycarpum* was neither widely nor persistently misused and that *ICBN* Art. 69 was not designated to cover a case such as Hoch & Raven proposed. Therefore, the committee unanimously rejected Hoch & Raven's proposal and stated that the name *E. paniculatum* must be replaced by the earlier name *E. brachycarpum*.

Without referencing the committee's rejection, Hoch (1986, p. 508) used the name *Epilobium paniculatum*, whereas Welsh *et al.* (1987, p. 441), Dorn (1988, p. 204), and Gleason & Cronquist (1991, p. 317) correctly used the name *E. brachycarpum*.

Epilobium brachycarpum Presl, *Rel. Haenk.* 2:30. 1831.

Epilobium paniculatum Nutt. *ex* Torr. & Gray, *Fl. N. Amer.* 1:490. 1840.

ORCHIDACEAE
Spiranthes confusa

Garay (1980) segregated members of *Deiregyne* Schlechter from *Spiranthes* L.C. Rich. *sens. lat.* According to Garay, *D. durangensis* (Ames & C. Schweinf.) Garay (= *S. durangensis* Ames & C. Schweinf.) does not occur in Texas. He assigned the Texas orchids, known by the preceding name, to *D. confusa* Garay and stated that *D. confusa* differs from *D. durangensis* "in having glandular pubescent sepals, a differently proportioned lip with a different callus at its base and shape of the rostellum." We concur with Garay's treatment of *D. durangensis*, but for the North American flora, we include it within *Spiranthes* sens. lat. (including *Deiregyne*), requiring the new combination proposed below.

Spiranthes confusa (Garay) Kartesz & Gandhi, *comb. nov.* BASIONYM: *Deiregyne confusa* Garay, Bot. Mus. Leafl. 28:283. Apr 1982 (Sep 1980). TYPE: MEXICO. Hidalgo: Lagoon of Metztitlán, *Gonzáles s.n., sub Nagel 2194* (AMES).

Spiranthes durangensis auct. non Ames & C. Schweinf.

ROSACEAE

Amelanchier alnifolia

Jackson (1895), Jones (1946, p. 67) and Phipps *et al.* (1990, p. 2231, no. 1) attributed the combining authorship of *Amelanchier alnifolia* to (Nutt.) Nutt. (J. Acad. Nat. Sci. Philadelphia 7:22. 1834.). In Nuttall's work, the combination *Amelanchier alnifolia* was cited without authorship. Nuttall neither provided a description nor cited a direct or an indirect reference to the basionym *Aronia alnifolia* Nutt. Since Nuttall did not meet the requirements of *ICBN* Arts. 32.1c, 32.3, and 32.4, the combination *Amelanchier alnifolia* was not validly made in Nuttall's 1834 work. To our knowledge, M. Roemer was the first to validate the preceding combination.

Amelanchier alnifolia (Nutt.) Nutt. *ex* M. Roemer, *Fam. Nat.* 3:147. 1847. BASIONYM: *Aronia alnifolia* Nutt., *Gen. N. Amer.* 1:306. 1818.

Amelanchier pumila

Jackson (1895) attributed *Amelanchier pumila* to Nutt. *ex* Torr. & Gray, whereas Phipps *et al.* (1990, p. 2232, no. 27) to Nuttall. Nuttall's manuscript name *A. pumila* was validly published in Torrey & Gray's work at varietal rank. Hence, none of these authors must be credited with authorship of the preceding binomial. To our knowledge, M. Roemer was the first to elevate Nuttall's taxon to specific rank, which he attributed to Nuttall. The full author citation is given below.

Amelanchier pumila (Torr. & Gray) Nutt. *ex* M. Roemer, *Fam. Nat.* 3:145. 1847. BASIONYM: *Amelanchier canadensis* (L.) Medik. var. *pumila* Torr. & Gray, *Fl. N. Amer.* 1:474. 1840.

Aronia arbutifolia

The name *Aronia arbutifolia* has been attributed to either Medicus (Jackson 1895) or to (L.) Ell. (Soil Conservation Service 1982, p. 140; Phipps *et al.* 1990, p. 2232, no. 1). In our study, we found that neither is correct. Medicus (1789, pp. 140, 155) cited the generic name *Aronia* and the binomial *Mespilus arbutifolia*. This does not constitute valid publication of the combination *A. arbutifolia*, since Medicus did not definitely associate the epithet *arbutifolia* with the generic name *Aronia*; hence, Medicus must not be credited with authorship of the combination (*ICBN* Art. 33, Ex. 2). Although Elliott (1821, p. 556) validly used the name *A. arbutifolia*, Persoon made this combination fourteen years prior to Elliott's work. Accordingly, Persoon is the combining author of this binomial.

Aronia arbutifolia (L.) Pers., *Syn. Pl.* 2:39. 1807. BASIONYM: *Mespilus arbutifolius* L., *Sp. Pl.* 478. 1753.

Choenomeles japonica

The combining authorship of *Choenomeles japonica* has often been attributed to Lindley (Jackson 1895; Ohwi 1965, p. 547; Phipps *et al.* 1990, p. 2233, no. 2). Although Lindley (Trans. Linn. Soc. London 13:97. 1822.) proposed the genus *Choenomeles* and cited the name *Pyrus japonica* Thunb. (as the type), this does not constitute valid publication of the combination *C. japonica*, since Lindley did not definitely associate the epithet *japonica* with the generic name *Choenomeles*; hence, Lindley must not be credited as the author of this combination (*ICBN* Art. 33, Ex. 2). To our knowledge, Spach was the first to associate the epithet *japonica* with the generic name *Choenomeles* and he attributed the combination to Lindley. The full author citation is given below.

Choenomeles japonica (Thunb.) Lindl. *ex* Spach, *Hist. Nat. Veg. Phan.* 2:159. 1834. BASIONYM: *Pyrus japonica* Thunb., *Fl. Jap.* 207. 1784.

Malus pumila

The Soil Conservation Service (1982, p. 144) attributed the name *Malus pumila* to "(L.) Mill." and assigned an * to the authorship indicating that the nomenclature was verified. However, Terrell *et al.* (1986, p. 92) and Phipps *et al.* (1990, p. 2234, no. 11) did not cite a parenthetical authorship for *M. pumila*. Our study follows.

In his treatment of *Malus*, Miller (1768) referenced Linnaeus. For *M. pumila*, Miller cited a reference to Bauhin's *M. pumila* (a pre-1753 publication). *Pyrus malus* L. var. *paradisiaca* L. (1753, p. 479) was also based on Bauhin's *M. pumila*. Although both Miller and Linnaeus referenced Bauhin, they recognized different taxonomic ranks and used different epithets. Even in the second edition of *Species Plantarum*, Linnaeus (1762, p. 686) maintained his 1753 treatment of *P. malus* var. *paradisiaca*. Since Miller did not base his *M. pumila* on the Linnaean work, the authorship of *M. pumila* must not include a parenthetical authorship, as indicated by Terrell *et al.*

Malus pumila P. Mill., *Gard. Dict.*, ed. 8. no. 3. 1768.

Pyrus malus L. var. *paradisiaca* L., *Sp. Pl.* 479. 1753.

Malus sieboldii

Jackson (1895) attributed the name *Malus sieboldii* to Dippel (1893; p. 406), but Phipps *et al.* (1990, p. 2235, no. 29) attributed it to Rehder. Since Dippel made a reference to "*Mal. Sieboldii* Rgl. in Gartenflora 1859. S. 82," some authors may believe that the reference to Regel was an indirect reference to the basionym *Pyrus sieboldii* Regel and that Dippel made the combination *M. sieboldii*. However, Dippel cited the preceding name as a synonym of *M. toringo* Sieb. Since Dippel did not accept the name *M. sieboldii*, he must not be credited with its authorship (*ICBN* Art. 34.1a). To our knowledge, Rehder was the first to validly make the combination.

Malus sieboldii (Regel) Rehder, Rev. Hort. IV. 451. 1870. BASIONYM: *Pyrus sieboldii* Regel, Ind. Sem. Hort. Petrop. 51. 1858.

Malus sylvestris

Some authors, such as Rehder (1940, p. 391), believe that the name *Malus sylvestris* P. Mill. was based on "*Pyrus malus* var. *sylvestris* L." In his treatment of the genus *Malus*, Miller (1768) indeed referenced Linnaeus. Under *P. malus* L., Linnaeus (1753, pp. 479-480) cited six epithets, of which *sylvestris* was the first. Superficially it might appear as though Linnaeus used the epithet *sylvestris* at varietal rank. Our study follows.

Of the six epithets, the last five are associated with Greek letters, whereas *sylvestris* is not. According to Stearn (1957, pp. 90, 93), if Linnaeus considered his varieties to be well marked from the species, then such varieties were given epithets and Greek letters, whereas the species proper were given no Greek letter. In several cases, species proper were given an additional epithet (but no Greek letter) to contrast them with his other varieties. Based on Stearn's analysis, we conclude that Linnaeus used the epithet *sylvestris* to distinguish the common expression of *Pyrus malus* from its other five varieties. Hence, "*P. malus sylvestris* L." was never validly published and *Malus sylvestris* must not have a parenthetical authorship.

Malus sylvestris P. Mill., *Gard. Dict.*, ed. 8. *Malus*, no. 1. 1768.

VITACEAE

Authorship of the New Vitaceae Names Proposed in Gray's *Syn. Fl. N. Amer.*

In his treatment of *Vitis*, Moore (Sida 14:351, 357, 359. 1991.) attributed *V. cinerea* (Engelm.) Millard. var. *canescens* to (Engelm.) Bailey *ex* A. Gray; *V. candicans* Engelm. *ex* A. Gray var. *coriacea* to (Shuttlew. *ex* Planchon) Bailey *ex* A. Gray; and *V. longii* Prince var. *microsperma* to (Munson) Bailey *ex* A. Gray. However, for *V. cordifolia* Michx. var. *helleri* and for *V. rupestris* Scheele var. *dissecta*, Moore (pp. 352, 361) credited Bailey with authorship. We speculate that Moore most likely distinguished between *comb. nov.* (*e.g.*, vars. *canescens, coriacea*, and *microsperma*) and *var. nov.* (*e.g.*, vars. *dissecta* and *helleri*) and that he considered Gray to be responsible for the *comb. nov.*, while Bailey to be responsible for the *var. nov.* Regarding the authorship of the new names proposed within Vitaceae (treated in Gray's work) and their bibliographies, our analysis follows.

Between 1878 and 1897, Gray's *Synoptical Flora of North America* was issued in two volumes. The second volume appeared first, followed by part 2 of the first volume, and finally number 2 of part 1 of the first volume. The preceding no. 2 was published nine years after Gray's death. Although its text was chiefly written by Gray, it included several contributions from other workers. On p. 419 of no. 2, the treatment of Vitaceae was credited to Bailey, with a footnote stating that "ordinal and technical generic characters by A. Gray." Based on this information, perhaps, the treatment of Vitaceae may be credited to both Bailey and Gray, with Bailey as the first author.

Regarding the authorship of ten new varietal names (seven *comb. nov.*, two *var. nov.*, and one *nom. nov.*) proposed within Bailey and Gray's work, eight were ascribed to Bailey, one to Eggert, and one to Gray. Excluding the name credited to Gray, the remainder (nine names), should be credited to Bailey, since he (not Gray) was responsible for them.

Bailey based *Vitis candicans* var. *coriacea* on *V. coriacea* Shuttlew. *ex* Planchon (*in* DC., *Monogr. Phan.* 5:345. 1887., *non* Miq. 1863.). Since the preceding basionym is a later homonym and thus, illegitimate, it must not be taken into consideration for purpose of priority (*ICBN* Art. 45.3). Therefore, no parenthetical authorship should be cited for var. *coriacea* and it must be treated as a *nom. nov.*, with its priority from 1897 (*ICBN* Art. 72, Note 1). Moore (*l.c.*, p. 357) noted the illegitimacy of *V. coriacea*, but failed to omit parenthetical authorship for var. *coriacea*. The correct authorship of the ten names and their bibliographies are given below.

Ampelopsis quinquefolia Michx. var. *heptaphylla* (Buckley) A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:432. 1897.

Ampelopsis quinquefolia Michx. var. *pubescens* (Schlect.) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:432. 1897.

Vitis aestivalis Michx. var. *glauca* (Munson) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:427. 1897.

Vitis aestivalis Michx. var. *bourquiniana* (Munson) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:428. 1897.

Vitis candicans Engelm. *ex* A. Gray var. *coriacea* Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:429. 1897.

Vitis cinerea (Engelm.) Millard. var. *canescens* (Engelm.) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:425. 1897.

Vitis cordifolia Michx. var. *helleri* Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:424. 1897.

Vitis longii Prince var. *microsperma* (Munson) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:423. 1897.

Vitis rupestris Scheele var. *dissecta* Eggert *ex* Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:422. 1897.

Vitis vulpina L. var. *praecox* (Engelm. *ex* Bailey) Bailey *in* A. Gray, *Syn. Fl. N. Amer.* 1[1(2)]:422. 1897.

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REFERENCES

Dippel, L. 1893. *Handb. Laubholzk.*, vol. 3. Berlin, Germany.

Dorn, R.D. 1988. *Vascular Plants of Wyoming.* Mountain West Publishing, Box 1471. Cheyenne, Wyoming.

Elliott, S. 1821. *Sketch Bot. S. Carolina*, vol. 1. Charleston, South Carolina.

Garay, L.A. 1982. A generic revision of the Spiranthinae. Bot. Mus. Leafl. 28:277-426.

Gleason, H.A. & A. Cronquist. 1991. *Man. Vasc. Pl. N.E. U.S.*, ed. 2. The New York Botanical Garden, Bronx, New York.

Greuter, W. (Ch. Ed. Comm.). 1988. *International Code of Botanical Nomenclature.* Adopted by the Fourteenth International Botanical Congress, Berlin, Jul-Aug 1987. Regnum Veg. 118.

Hitchcock, C.L. 1957. A study of the perennial species of *Sidalcea*, part I: Taxonomy. Univ. Wash. Publ. Biol., vol. 18.

Hoch, P.C. 1986. *Epilobium.* Pp. 504-509. *In*: Great Plains Flora Association, *Flora of the Great Plains.* University Press of Kansas, Lawrence, Kansas.

Jackson, B.D. 1895. *Index Kewensis*, 2 vols. University Press, Oxford, England.

Jones, G.N. 1946. American species of *Amelanchier.* Illinois Biol. Monogr. 20(2).

Kartesz, J.T. 1988. A flora of Nevada. Ph.D. Dissertation, University of Nevada, Reno, Nevada.

_____. 1992. *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland*, ed. 2. in press. Timber Press, Portland, Oregon.

_____ & K.N. Gandhi. 1989. Nomenclatural notes for the North American flora - I. Phytologia 67:461-468.

_____. 1990a. Nomenclatural notes for the North American flora - II. Phytologia 68:421-427.

_____. 1990b. Nomenclatural notes for the North American flora - III. Phytologia 69:129-137.

_____. 1990c. Nomenclatural notes for the North American flora - IV. Phytologia 69:301-312.

_____. 1991a. Nomenclatural notes for the North American flora - V. Phytologia 70:194-208.

_____. 1991b. Nomenclatural notes for the North American flora - VI. Phytologia 71:58-65.

_____. 1991c. Nomenclatural notes for the North American flora - VII. Phytologia 71:87-100.

_____. 1991d. Nomenclatural notes for the North American flora - VIII. Phytologia 71:269-280.

_____. 1991e. Varietal autonyms of nontypical subspecies - validly published combinations under today's Code. Taxon 40:308-310.

_____. 1992a. Nomenclatural notes for the North American flora - IX. Phytologia 72:17-30.

_____. 1992b. Nomenclatural notes for the North American flora - X. Phytologia 72:80-92.

Kern, J.H. 1974. *Flora of Malesiana.* I. 7(3). Cyperaceae. Noordhoff International Publishing, Leyden, The Netherlands.

Lanjouw J. (Ch. Ed. Comm.). 1956. *International Code of Botanical Nomenclature.* Adopted by the Eighth International Congress, Paris, July 1954. Regnum Veg., vol. 8.

Linnaeus, C. 1753. *Sp. Pl.*, ed. 1, 2 vols. Stockholm, Sweden. Facsimile edition issued in 1957-1959 by Ray Society, London, Great Britain.

_____. 1762-63. *Sp. Pl.*, ed. 2, 2 vols. Stockholm, Sweden.

Medicus, F.K. 1789. *Phil. Bot.*, vol. 1. Mannheim, Germany.

Miller, P. 1768. *Gard. Dict.*, ed. 8. London, Great Britain.

Miquel, F.A.W. 1856. *Fl. Ned. Ind.*, vol. 3. Leipzig, Germany.

Ohwi, J. 1965. *Flora of Japan.* Smithsonian Institution, Washington, DC.

Phipps, J.B., K.B. Robertson, P.G. Smith, & J.R. Rohrer. 1990. A checklist of the subfamily Maloideae (Rosaceae). Canad. J. Bot. 68:2209-2269.

Rehder, A. 1940. *Manual of Cultivated Trees and Shrubs*, ed. 2. The Macmillan Company, New York, New York.

Soil Conservation Service. 1982. *National List Scientific Plant Names*, vol. 1. U.S.D.A., SCS-TP 159. Government Printing Office, Washington, DC.

Solomon, J.C. 1982. The systematics and evolution of *Epilobium* (Onagraceae) in South America. Ann. Missouri Bot. Gard. 69:239-335.

Stearn, W.T. 1957. *An Introduction to the Species Plantarum and Cognate Botanical Works of Carl Linnaeus.* Facsimile edition of Species Plantarum, ed. 1, issued by Ray Society, London, Great Britain.

Terrell, E.E., S.R. Hill, J.H. Wiersema, & W.E. Rice. 1986. *Checklist of Names of 3,000 Vascular Plants of Economic Importance.* Agric. Handb. No. 505, U.S.D.A., Washington, DC.

Welsh, S.L., N.D. Atwood, S. Goodrich, & L.C. Higgins. 1987. *Utah Flora.* Great Basin Naturalist Mem., no. 9.

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A NEW SPECIES OF *CASTILLEJA* (SCROPHULARIACEAE) FROM DURANGO, MEXICO

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ABSTRACT

Castilleja chlorosceptron, *sp. nov.*, is described from the Sierra Madre of western Durango. In its rhizomatous habit, scabrous stems, and evenly divided calyces with acute lobes, *C. chlorosceptron* is most similar and probably most closely related to *C. durangensis*. The new species differs from the latter particularly in its glabrous leaves with nonclasping bases and its much smaller flowers.

KEY WORDS: *Castilleja*, Scrophulariaceae, México

Two recent collections from western Durango, México, have brought to attention a previously undescribed species of *Castilleja*.

Castilleja chlorosceptron Nesom, *sp. nov.* TYPE: MEXICO. Durango: Mpio. Canelas, on the road to Topia and Canelas, 6 km E of Canelas, 30 km E of jct of this road with road to Topia (at Cuevacillas); 1770 m, W slope, eroded rounded ridges, reddish igneous soil, more or less barren beneath, with yellow pines and oak (*Q. eduardii*, *Q. viminea*, *Q. scytophylla*). Rare, in small patches particularly on knoll tops; 29 Jun 1992, *R.W. Spellenberg 11059* with J. Bacon (HOLOTYPE: TEX!; Isotypes: CIIDIR,NMC).

Castillejae durangensi Nesom similis sed foliis ac bracteis glabris, foliis angustioribus basibus non amplectentibus, et floribus multo minoribus differt.

Herbaceous perennials arising from a system of slender (almost wiry), scale leaved rhizomes, apparently without a central axis. Stems erect, 5-15 cm tall, slender, eglandular, minutely but densely scabrous with deflexed hairs 0.05-0.10 mm long (to 0.5 mm in the upper inflorescence). Leaves densely crowded

and overlapping from bottom to top of the stem, on nodes ca. 1 mm apart, ascending, glabrous, 3 veined, entire, linear or becoming lanceolate upwards, 2-3 cm long, 1.5-2.5 mm wide, not at all basally clasping. Floral bracts mostly green, red at the very apex, glabrous, lanceolate, entire, 11-20 mm long, about equaling the associated calyces. Calyces greenish, slightly pink tinged, red only at the very apex, the upper 1/4 densely granular glandular, minutely hispidulous on the proximal portion, 12-13 mm long, the primary lobes 2-3 mm long, the secondary lobes 0.5-0.8 mm deep with acute tips. Corollas 15-16 mm long, the teeth of the lower lip narrowly oblong, ca. 1 mm long, the galea 2-3 mm long, "blushed reddish, flanges red," with a densely granular glandular dorsal surface without other hairs, exserted 3-5 mm from the calyx; stigma bilobed, 1.4-1.6 mm wide, yellow-green, prominently exserted. Mature fruit not seen.

Additional collection examined: MEXICO. Durango: Mpio. El Salto, 32 km W of El Salto, woods of oak, pine, and some *Abies*, 2300 m, 10 Jul 1982, *Hernández M. 7844* (WIS).

The plants of *Castilleja chlorosceptron* (named for their primarily green, wandlike aspect) are herbaceous and diminutive in stature, with stems arising from slender rhizomes without a central axis, and they produce glabrous, crowded ascending, linear, entire, nonclasping leaves, minutely scabrous stems, lanceolate floral bracts, shallowly and evenly divided calyces, and small corollas. In its rhizomatous habit, minutely scabrous stems, crowded, narrow, entire leaves, and evenly divided calyces with acute lobes, *C. chlorosceptron* is most similar to and probably most closely related to *C. durangensis* Nesom, secondarily to *C. aspera* Eastw. (Nesom 1992), both members of the group centered around *C. scorzoneraefolia* Kunth and treated by Eastwood (1909) within *Castilleja* sect. *Euchroma* (Nutt.) Benth. The new species differs from *C. durangensis* in its much thinner rhizomes, glabrous leaves and bracts, leaves with nonclasping bases, and much smaller flowers (calyces 12-13 mm long vs. 18-22 mm long; corollas 15-16 mm long vs. 21-25 mm long), the galeas with only glandular hairs (vs. glandular as well as pilose, eglandular hairs).

Castilleja durangensis is represented by many collections from the area of El Salto in southwestern Durango (Nesom 1992), where it is endemic. *Castilleja chlorosceptron* is partially sympatric with *C. durangensis*, and although it has been collected only twice, it appears to have a significantly wider geographic distribution.

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LITERATURE CITED

Eastwood, A. 1909. Synopsis of the Mexican and Central American species of *Castilleja*. Proc. Amer. Acad. Arts 44:563-591.

Nesom, G.L. 1992. New species and taxonomic evaluations of Mexican *Castilleja* (Scrophulariaceae). Phytologia 72:231-252.

Phytologia (August 1992) 73(2):140-142.

A NEW SPECIES OF *JUSTICIA* (ACANTHACEAE) FROM NORTHEASTERN MEXICO

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ABSTRACT

A new species of *Justicia* sect. *Pentaloba* is described from Nuevo León, México: **J. hintoniorum**. It is most closely related to *J. pilosella* and *J. turneri*, differing from both in its hairy capsules.

KEY WORDS: *Justicia*, *Siphonoglossa*, Acanthaceae, México

Hilsenbeck (in Henrickson and Hilsenbeck 1979) segregated four species of the genus *Siphonoglossa* Oerst. as *Siphonoglossa* sect. *Pentaloba* Hils. At the conclusion of his studies, Hilsenbeck (1990) transferred sect. *Pentaloba* to *Justicia*, but even within the latter genus, the species of sect. *Pentaloba* still form a distinctive group, particularly on the basis of their terete and greatly elongated floral tubes. The species of sect. *Pentaloba* differ from typical *Siphonoglossa* in the following features: floral bracteoles foliaceous and oblong to lanceolate (vs. subulate-bracteate), flowers axillary (vs. mostly spicate), calyces 5 lobed (vs. 4 lobed), stigmas 2 lobed (vs. 1 lobed), capsules ovoid (vs. fiddle shaped), seeds strongly flattened (vs. thickened), and a base chromosome number of x=14 (vs. x=11). All four species of sect. *Pentaloba* have their primary geographic range in northeastern México and adjacent Texas, west into Arizona.

In the identification of recently collected specimens and accompanying curation of other LL,TEX accessions, a previously undescribed species of *Justicia* sect. *Pentaloba* (Hils.) Hils. has been discovered.

Justicia hintoniorum Nesom, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Aramberri, N of Aramberri, IRF Lampacitos, 995 m, 16 Jun 1990, *Hinton et al. 20354* (HOLOTYPE: TEX!).

Justiciae pilosellae (Nees) Hils. et *J. turneri* Hils. similis sed ab ambobus fructibus strigosi-hirsutulis differt; a *J. turneri* corollis purpureis lobis majoribus differt; a *J. pilosella* foliis majoribus tenuioribus discoloribusque differt.

Perennials with ascending-erect stems 8-18 cm tall, slightly woody at the base, arising from slender rhizomes, densely pilose-hispid with a mixture of stiffly spreading to slightly deflexed hairs 1.0-1.5 mm long and shorter (0.3-0.5 mm long), strongly deflexed hairs, the hairs with a slight tendency to occur in lines on the stem. Leaves opposite, relatively thin, discolorous (lighter beneath), ovate to elliptic, mostly (15-)30-80 mm long with petioles 3-15 mm long, the blades 10-30 mm wide, eglandular, strigose-puberulent beneath, moderately to sparsely strigose-hispid above, the petioles with spreading cilia up to 1.5 mm long. Flowers axillary, sessile, solitary in upper half of the plant; paired bracteoles obovate to slightly spatulate, 10-14 mm long, 3-4 mm wide; calyx 7-10 mm long, the lobes linear-triangular, 0.3 mm wide at base, 6-9 mm long, equal, united for ca. 1 mm at the base; corollas distinctly purplish, moderately hispid, the tube 16-22 mm long, ca. 2 mm wide, the upper lobe erect, oblong, apically 2 toothed, 8-9 mm long, 2.5-3.0 mm wide, the lower 3 lobes spreading, oblong-oblanceolate, apically rounded, 6-10 mm long, 3.5-6.0 mm wide; stamens 2, exserted 3-6 mm from the tube, the thecae subparallel, 1.0-1.5 mm long, lower with a spurred base; styles ca. equal the tube length, slightly hispid-strigose near the base, the stigmatic lobes 0.1 mm long. Capsules ca. 10 mm long, basal stipe strongly flattened, 4-5 mm long, the head ovoid, 5-6 mm long, 3-4 mm wide, brown, prominently pubescent with stiff, retrorsely appressed hairs on the basal 2/3 and shorter, erect hairs near the apex. Seeds 4, bright orange, 2.5-3.0 mm long and wide, strongly flattened and disciform, without a thickened margin, the faces with bullate tuberculate incrustations 0.1-0.2 mm broad. Chromosome number unknown.

Additional collections examined: MEXICO. Nuevo León: Mpio. Iturbide: Iturbide to Camarones, oak and pine woods, 1305 m, 6 Sep 1991, *Hinton et al. 21416* (TEX); Iturbide to Agua Blanca, mixed forest of oak and walnut, 1385 m, 21 Aug 1991, *Hinton et al. 21216* (TEX); 16 mi W of Linares, rocky mt. side from Hwy 60, on shale, mixed oak, *Mimosa*, with *Zamia* and *Agave*, 8 Sep 1962, *Turner & Powell 1051* (TEX).

The distinctiveness of this species was focused by the three recent collections (including the type) made by the Hinton family. The first known collection (*Turner & Powell 1051*), however, was made almost 30 years earlier and has been identified by Hilsenbeck as *Justicia pilosella*, although the salient features of *S. hintoniorum* were not noted in his description (1990) of *J. pilosella*. Fruiting specimens of *J. hintoniorum* can be immediately distinguished from the other four species of sect. *Pentaloba* by their prominently strigose-hirsute capsules; the new species differs from *J. pilosella* in its larger, thinner, discolorous leaves and from *J. turneri* in its purple corollas with much larger lobes. These three species are most closely related among themselves; the other two species of sect. *Pentaloba* occur further west in México and the southwestern United States and are characterized by linear leaves.

All four collections of *Justicia hintoniorum* have been made in a relatively

small area of southeast-central Nuevo León. The geographic range of *J. hintoniorum* is essentially contiguous with that of *J. turneri* (which occurs mostly to the east and northeast) and apparently completely overlapping with that of *J. pilosella*. Both of the latter species have been collected very near or within the range of *J. hintoniorum*.

ACKNOWLEDGMENTS

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LITERATURE CITED

Henrickson, J. & R.A. Hilsenbeck. 1979. New taxa and combinations in *Siphonoglossa* (Acanthaceae). Brittonia 31:373-378.

Hilsenbeck, R.A. 1990. Systematics of *Justicia* sect. *Pentaloba* (Acanthaceae). Pl. Syst. Evol. 169:219-235.

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NEW SPECIES AND COMBINATIONS IN *PODACHAENIUM* (ASTERACEAE, HELIANTHEAE)

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ABSTRACT

A new species from Chiapas (Reserva El Triunfo), **Podachaenium chiapanum** B. Turner & Panero, is described and illustrated, and the new combination, **P. standleyi** (Steyermark) B. Turner & J. Panero, is made. The latter occurs in Guatemala and has been considered to be synonymous with the Oaxacan species *P. pachyphyllum* (Klatt) S.F. Blake by recent workers. Characters which distinguish these several taxa are listed. Along with the widespread *P. eminens*, the genus now contains four species.

KEY WORDS: Asteraceae, Heliantheae, *Podachaenium*, México

Routine identification of Mexican Asteraceae has occasioned the present paper.

Prior to the transfer of *Calea skutchii* S.F. Blake into *Podachaenium* by H. Robinson (1978), the genus was thought to be monotypic. Jansen *et al.* (1982), however, transferred the latter to the genus *Squamopappus* but, at the same time, transferred into *Podachaenium* another species, *P. pachyphyllum* (including *C. standleyi*), that had long resided in *Calea*.

In the present paper we accept *Podachaenium* as enlarged by Jansen *et al.* (1982), add an additional species *P. chiapanum* to the genus, and resurrect the name *Calea standleyi*, giving it specific status within an expanded *Podachaenium*.

As we currently view the genus, *Podachaenium* contains four species, as keyed, and discussed in the account that follows.

KEY TO SPECIES OF *PODACHAENIUM*

1. Leaves palmately veined, broader than long, or nearly so; widespread. .. .. *P. eminens*

1. Leaves trinervate from well above the base, or pinnately nervate, 2-4 times as long as broad; Oaxaca, Chiapas, Guatemala. ..... (2)

   2. Stems sparsely pilose to glabrous; involucral bracts ca. biseriate, mostly 3-6 mm long, appressed. ..... (3)

   2. Stems densely and permanently rusty pilose; involucral bracts 3-4 seriate, mostly 6-12 mm long, loose and spreading; Chiapas. ..... *P. chiapanum*

3. Leaves pinnately nervate; petioles mostly 0.5-1.0 cm long; blades elliptic, widest at or near the middle; ray florets ca. 13, the ligules 15-20 mm long. ..... *P. pachyphyllum*

3. Leaves with 3(5) principal nerves; petioles mostly 2-7 cm long; blades ovate to trullate ovate, wider well below the middle; ray florets 8-11, 12-15 mm long; Guatemala. ..... *P. standleyi*

Podachaenium chiapanum B. Turner & J. Panero, *sp. nov.* TYPE: MEXICO. Chiapas: Mpio. Jaltenango, Reserva El Triunfo, 15° 39′ N, 92° 48′ W, evergreen cloud forests, 2200 m, 12 Jun 1990, *M. Heath & A. Long 956* (HOLOTYPE: TEX).

Podachaenium pachyphyllo (Klatt) S.F. Blake similis sed differt caulibus dense persistente ferruginei-pilosis, foliis pinnatinervibus in sicco ferruginei-nigris, capitulescentiis capitulorum 8-10 compositis, pedunculis ultimis 1-5 cm longis dense persistente brevipilosis, capitulis hemisphaericis ca. 4 cm latis trans radios expansos (vs. 1.5-2.0 cm), flosculis radii ca. 21 ligulis plerumque 15-20 mm longis (vs. flosculis radii 13 ligulis 8-10 mm longis).

Shrub or small tree 1.7-3.0 m high. Stems angulate, brownish black, densely and persistently short pilose but glabrescent with age. Leaves drying brownish black, mostly 10-20 cm long, 3-8 cm wide; petioles 1.5-4.0 cm long; blades elliptic-ovate, pinnately nervate, the nerves usually persistently pubescent with appressed rusty hairs, the margins serrate. Heads 10-20, arranged in irregular cymose panicles, the ultimate peduncles mostly 2-5 cm long, densely pilose with persistent rusty red short hairs. Involucres hemispheric, 15-20 mm across, 8-12 mm high, the bracts linear-lanceolate, 3-4 seriate, subequal, loosely imbricate and usually reflexed for about 1/2 their length, rusty red pubescent throughout. Receptacle hemispheric, the bracts persistent, shorter than the florets, the apices mostly obtuse. Ray florets pistillate, fertile, the ligules white, mostly 15-20 mm long, 2-4 mm wide. Disk florets numerous, the corollas yellow, ca. 3 mm long, the tubes ca. 0.8 mm long, sparsely pubescent. Anthers

brownish black. Achenes, those of the ray, 3 sided, 3 awned, those of the disk radially flattened, the body about 2 mm long, pubescent above, the pappus of 2 coarsely hispidulous awns ca. 1.5 mm long, between these 1-4 minute deciduous scales.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Chiapas: al NW de la Reserva del Triunfo, en el Cerro del Filo, ca. 1980 m, 11 May 1982, *Calzada et al. 8776* (TEX); Reserva El Triunfo, path to Cerro El Triunfo, 2000 m, Apr 1989, *Heath & Long MA14* (TEX).

Podachaenium chiapanum is distinguished from both *P. pachyphyllum* and *P. standleyi* by a number of characters, as indicated in Table 1.

Podachaenium eminens (Lag.) Sch.-Bip.

This widespread species with its distinctive broad, palmately veined, leaves offers no problem in identification and is not considered further here. Excellent illustrations of the taxon have been provided by Nash (1976) and McVaugh (1984). The long ignored *Podachaenium andinum* E. André (Rev. Hortic. 64:414, 1892.), from the illustrations accompanying its description, appears to belong to *P. eminens*.

Podachaenium pachyphyllum (Sch.-Bip. *ex* Klatt) Jansen, Harriman, & Urbatsch, Syst. Bot. 7:482. 1982.

Altamirania pachyphylla Greenm.

Aspilia pachyphylla Sch.-Bip. *ex* Klatt

Aspiliopsis pachyphylla (Greenm.) Greenm.

Calea pachyphylla (Sch.-Bip. *ex* Klatt) S.F. Blake

Jansen, Harriman, & Urbatsch (1982) have discussed adequately the nomenclatural history of this taxon, noting most of its salient features. The species is known only from northcentral Oaxaca. Jansen *et al.* (1982) included within their concept of this species material from Guatemala which we consider to be sufficiently distinct from *P. pachyphyllum* so as to be recognized as a species, as noted in Table 1, and by the account that follows.

Podachaenium standleyi (Steyermark) B. Turner & J. Panero, *comb. nov.* BASIONYM: *Calea standleyi* Steyermark, *in* Standley & Steyermark, Publ. Field Mus. Nat. Hist., Bot. Ser. 22:299. 1940.

Verbesina standleyi (Steyermark) D. Nash.

Table 1. Comparison of characters.

P. pachyphyllum	*P. chiapanum*	*P. standleyi*
1. Stems:		
glabrescent	densely pilose	glabrous
2. Leaf blades:		
trullate ovate	ovate trullate	elliptic
widest below middle	widest near middle	widest near middle
mostly with 3 principal nerves	pinnately nervate	pinnately nervate
glabrous	persistently pubescent along veins beneath	glabrous
drying green	drying rusty black	drying green
3. Petioles:		
ca. 1 cm long	1-2 cm long	2-7 cm long
4. Capitulescence:		
heads 15-30	heads 10-20	heads 15-30
15-30 cm across	8-10 cm across	15-40 cm across
5. Peduncles (ultimate):		
glabrescent	persistently rusty pilose	sparsely white pilose to glabrate
6. Heads:		
globose	hemispheric	± globose
ray florets ca. 13	ray florets ca. 21	ray florets 8-11
8-10 mm long	15-20 mm long	12-15 mm long
7. Involucres:		
3-4 mm high	6-8 mm high	3-6 mm high
bracts biseriate	bracts 3-4 seriate	bracts biseriate
appressed	loose and spreading like the rays	appressed
8. Disk Achenes:		
glabrous or nearly so	markedly coarsely hispid above	glabrous

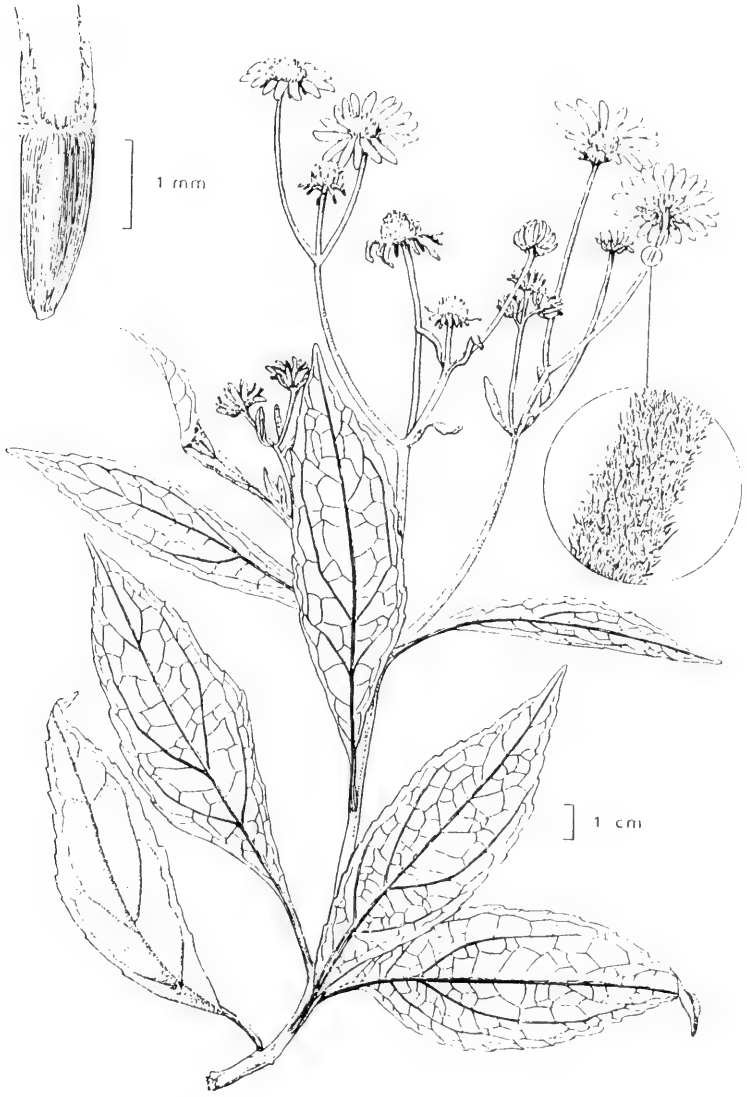

Fig. 1. Podachenium chiapanum, from holotype.

The type of this taxon is from Guatemala: Dept. San Marcos, between Todos Santos and Finca El Porvenir, Volcán Tajumulco, 1300-3000 m, 1 Mar 1940, *Steyermark 37004* (HOLOTYPE: F!). Jansen *et al.* (1982) also examined the holotype but thought it not sufficiently distinct from *P. pachyphyllum* so as to be distinguished.

In addition to the holotype we have examined five other collections of *Podachaenium standleyi*, all from the Department of San Marcos, as follows (*Steyermark 36277, 36359, 36341; Williams et al. 26269, 27189* – all these at F). The most obvious differences that distinguish *P. standleyi* from *P. pachyphyllum* are the leaves, the former having trullate to ovate leaves with three principal nerves, being widest well below the middle, the petioles mostly 2-7 cm long (vs. elliptical and pinnately nervate with petioles 1-2 cm long). Additional differences are listed in Table 1. On total characters, however, *P. standleyi* appears to stand somewhat closer to *P. pachyphyllum* than it does to *P. chiapanum*.

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LITERATURE CITED

Jansen, R.K., N.A. Harriman, & L.E. Urbatsch. 1982. *Squamopappus* gen. nov. and redefinition of *Podachaenium* (Compositae: Heliantheae). Syst. Bot. 7:476-483.

McVaugh, R. 1984. *Podachaenium* in Flora Novo-Galiciana, 12:752-755.

Nash, D. 1965. *Podachaenium*, in Flora of Guatemala. Fieldiana 24, pt. 12:289-290.

Robinson, H. 1978. Studies in the Heliantheae (Asteraceae). X. The relationship of *Calea skutchii*. Phytologia 38:413-414.

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FOUR NEW SPECIES OF *CLIBADIUM* FROM NORTHERN SOUTH AMERICA (ASTERACEAE: HELIANTHEAE)

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ABSTRACT

Clibadium funkiae is described from Colombia and **C. alatum**, **C. napoense**, and **C. zakii** are described from Ecuador.

KEY WORDS: Asteraceae, Heliantheae, *Clibadium*, Ecuador, Colombia

The descriptions provided here are the result of a review of *Clibadium* for the Flora of Ecuador undertaken prior to sending the material on loan. During the study, three undescribed species have been discovered from Ecuador. Resolution of material from adjacent Colombia has shown an additional new species from Antioquia. While the new species are described below, it should be noted that two previously described species of the present author from Perú are now considered synonyms, *C. rimachii* H. Robinson (1988) is the same as *C. divaricatum* S.F. Blake, and *C. vargasianum* H. Robinson (1979) is only an unusually hirsute variant of the widespread *C. surinamense* L.

Clibadium funkiae H. Robinson, *sp. nov.* HOLOTYPE: COLOMBIA. Antioquia: 3 km SE of Santa Elena on road from Medellín to Santa Elena and Río Negro, 15 km NW of Río Negro (centro), 2450 m, 30 Jul. 1979, *Stuessy & Funk 5709* (US). PARATYPES: COLOMBIA. Antioquia: Municipio Frontino, Corregimiento Nutibara, región Murrí carretera hacia La Blanquita, Finca Palmera, 1700 m, 15 Jul. 1986, *Acevedo, Martínez, Orrego, Restrepo, Sánchez, & Silva 1344* (NY,US). Municipio de Yarumal, 2 km antes del alto de Ventanas, camino a Vereda Alegre, 2030 m, 20 Aug. 1986, *Callejas, Churchill, Acevedo, & Saldarriaga 2488* (HUA,NY,US). Municipio de Caldas, Vereda La Corrala, 2440 m alt., 14 Sept. 1987, *Escobar, Velásquez, & Marulanda 7911* (US). Municipio

Frontino, road to Murrí, 15 km W of Nutibara (Altos de Cueva), 1850 m, 17 Oct. 1987, *Brant & Martínez 1378* (MO,US); km 17 of road Nutibara - La Blanquita, region of Murrí, 1860 m, 3 Nov. 1988, *Zarucchi, McPherson, Roldán, & Escobar 7097* (MO,US) region of Murrí, c. 13 road-km from Nutibara, 2000 m, 9 Dec. 1988, *McPherson 13396* (MO,US).

Plantae fruticosae scandentes ad 2 m altae et ad 6 m longae; caules atrobrunnescentes teretes vel subhexagonales hispiduli et leniter retrorse vel antrorse appresse strigillosi, ramis ad angulum ca. 90° patentibus. Folia opposita, petiolis 1-3 cm longis; laminae ovatae plerumque 7-14 cm longae et 2.5-6.0 cm latae base acutae vel leniter acuminatae margine antrorse serrulatae apice anguste breviter acuminatae supra et subtus appresse strigillosae quinquenervatae, nervis secundariis majoribus e fere ad basem et 0.8-2.0 cm supra basem ad marginem inferiorem subparallelis. Inflorescentiae in ramis foliosis et in ramulis recte patentibus terminales subdense corymbosae, ramulis dense puberulis, in capitulis sessilibus vel subsessilibus 1-3 terminatis. Capitula 4-6 mm alta et 2-4 mm lata; bracteae involucri steriles 2-4 et bracteae feminei 3 vel 4 subcoriaceae late ovatae vel late oblongae 3-5 mm longae et 1.5-3.0 mm latae apice obtusae extus strigillosae, bracteae masculini 3 vel 4 scariosae obovatae 2-4 mm longae et 1.0-1.5 mm latae apice leniter erosae minute fimbriatae extus glabrae. Flores radii 3 vel 4; corollae albae tubulares 2.5-3.0 mm longae, lobis 0.3-0.5 mm longis extus subglabris vel pauce glanduliferis et dense argute breviter setuliferis. Flores disci 4-6; corollae albae 3.0-4.5 mm longae, tubis basilaribus 0.5-1.0 mm longis, faucibus 2-3 mm longis, lobis 0.5-0.8 mm longis et 0.3-0.7 mm latis extus dense longe argute setuliferis, ductis validis corollarum 10 ad nervos et mediolobatis; thecae antherarum nigrae 1.3-2.0 mm longae, appendicibus apicalibus nigris ovatis 0.2-0.3 mm longis. Achenia radii biconvexa obovata ca. 2.5 mm longa 1.5 mm lata distaliter dense argute pilosula, rostris apicalibus minutis deciduis; achenia disci 2.0-2.5 mm longa pilosula superne densiores. Grana pollinis in diametro ca. 25 μm.

The Antioquian species is distinct from the widely distributed *Clibadium surinamense* L. by the appressed strigillose pubescence of the leaves, the bearing of the heads often in sessile or subsessile groups of 2 or 3, and the 10 strong ducts in the disk corollas. The specimens with branches have those branches spreading at right angles in a manner not seen in *C. surinamense*. Material of the new species shows some variation. The type and *Escobar et al. 7911* from 2450-2500 m alt. have spreading to slightly retrorse hairs on the stems and the heads are mostly 5-6 mm long with 4 sterile bracts. Most of the specimens from 1700-2000 m have antrorsely strigillose stems and smaller heads

with about 2 sterile bracts. One specimen, *Callejas et al. 2488* from 2030 m is like the type specimen in its heads and like the lower elevation material in its stem pubescence.

The specimens were originally identified as *Clibadium pentaneuron* S.F. Blake because of the two pairs of well developed secondary veins near the base of the leaf blade, but the Blake species has a broader, divaricately branched inflorescence and is restricted to southwestern Colombia. *Clibadium pentaneuron* is closer to *C. laxum* S.F. Blake of Ecuador and southwestern Colombia.

The specimens are cited from wet montane forests, edge of primary forests and in a transition zone to subpáramo.

Clibadium alatum H. Robinson, *sp. nov.* HOLOTYPE: ECUADOR. Carchi: environs of Maldonado, wet montane forest, alt. 1450-1650 m, 3 June 1978, *Madison, Plowman, Kennedy, & Besse 4940* (US).

Plantae suffruticosae ad 6 m altae; caules atrobrunnescentes teretes dense appresse strigillosi, ramis ad angulum 30°-50° ascendentibus. Folia opposita, petiolis 3.5-14.0 cm longis ad basem distincte anguste alatis; laminae late ovatae vel suborbiculares 17-29 cm longae et 8-23 cm latae base late subcordatae vel subtruncatae vel rotundatae abrupte in alis petiolarum acuminatae margine crenato-serratae vel dentatae apice breviter acutae breviter acuminatae supra minute strigillosae subtus appresse strigillosae e 4-7 cm supra basem valde trinervate, nervis secundariis majoribus ascendentibus, nervis secundariis inferioribus 2-4 minoribus congestis recte patentibus. Inflorescentiae in ramis foliosis terminales late corymboso-cymosae ad 20 cm latae, ramulis dense puberulis, ramulis distalibus seriate cymosis subdense sessiliter vel subsessiliter capituliferis. Capitula ca. 5 mm alta et 3.5-4.0 mm lata; bracteae involucri steriles 3 vel 4 et bracteae feminei 7-9 subcoriaceae late ovatae vel late oblongae 4-5 mm longae et 1.8-3.5 mm latae apice obtusae vel breviter acutae distaliter breviter ciliatae extus distaliter pauce appresse strigillosae; bracteae masculini 6 vel 7 scariosae ca. 3 mm longae 1-2 mm latae distaliter erosae breviter ciliatae. Flores radii 7 vel 8; corollae albae tubulares ca. 2 mm longae, lobis 0.3-0.5 mm longis glabris. Flores disci ca. 8; corollae albae 3.5 mm longae, tubis basilaribus ca. 0.8 mm longis, faucibus anguste campanulatae 2.0-2.2 mm longae, lobis 0.5-0.7 mm longis et 0.4-0.5 mm latis extus dense scabridulis, ductis 5 ad nervos sub sinubus terminatis; thecae antherarum nigrae ca. 1.5 mm longae, appendicibus apicalibus nigris ovatis ca. 0.3 mm longis. Achenia radii biconvexa submatura ca. 1.8 mm longa 1.2 mm lata distaliter

dense argute hispidula, rostris apicalibus subpersistentibus glabris 0.6-0.8 mm longis; achenia disci 2.0-2.7 mm longa inferne glabra distaliter dense argute pilosula. Grana pollinis in diametro ca. 23 μm.

The species has leaves with large blades and very long petioles, but seems to be the only member of the genus with distinct wings on the petioles. The wings reach the bases of the petioles, and the wings of adjacent leaves nearly meet at the node. The rostrum of the ray achenes is longer than those in most species of *Clibadium*.

Clibadium napoense H. Robinson, *sp. nov.* HOLOTYPE: ECUADOR. Napo: Cantón Napo, Zatzayacu, alt. 500 m, 28 Mar. 1935, *Mexia 7110A* (US). PARATYPES: ECUADOR. Napo: Río Napo, Chiroisla, alt. 250 m, 24 Aug. 1979, *Holm-Nielsen, Jaramillo, & Coello 19785* (AAU,QCA, US). Left margin of Río San Miguel, near outlet to Río Putumayo, ca. 200 m, 1 Aug. 1980, *Andrade 33147* (AAU,QCA,QNA,US). Cantón Archidona, N bank Río Suno, 15 km NW of Loreto, 8 km W of El Progreso, 600 m, 12 Dec. 1989, *Neill, Hurtado, & Alvarado 9156* (MO,US).

Plantae fruticosae 1.5-2.5 m altae; caules brunescentes teretes vel subhexagonales dense strigillosi, ramis ad angulum 30° vel 50° patentibus. Folia opposita, petiolis 1-5 cm longis; laminae ovatae plerumque 10-18 cm longae et 3.5-8.5 cm latae base rotundatae vel obtusae interdum breviter acuminatae margine appresse antrorse serrulatae apice anguste breviter acuminatae supra minute scabridulae planae subtus appresse strigillosae inferne quinquenervatae, nervis secundariis fere ad basem et e 1-2 cm supra basem insertis ad marginem basilarem plerumque subparallis. Inflorescentiae in ramis foliosis terminales laxe corymbosae, ramulis seriate cymosis dense rigide puberulis. Capitula sessile contigua vel non contigua 3.0-3.5 mm alta et ca. 3 mm lata; bracteae involucri steriles 3 vel 4 et bracteae feminei 5 vel 6 subcoriaceae interiores aliquatum scariosae majores late ovatae vel late oblongae 3.0-3.5 mm longae et 2.5-3.5 mm latae apice obtusae vel breviter acutae margine breviter ciliatae extus distaliter scabridulae; bracteae masculini tenuiter scariosae ca. 2.5 mm longae. Flores radii 5 vel 6; corollae albae tubulares 1.8-2.2 mm longae, lobis 3 ad 0.5 mm longis extus subglabris vel breviter puberulis. Flores disci 8-11; corollae 2.8-3.0 mm longae, tubis basilaribus 0.6-0.8 mm longis, faucibus 1.5-1.7 mm longis, lobis 0.6-0.7 mm et longis 0.4-0.6 mm latis extus dense breviter argute puberulis, ductis 5 ad nervos dispositis

sub sinubus terminatis; thecae antherarum nigrae 1.0-1.2 mm longae, appendicibus apicalibus nigris ovatis ca. 0.25 mm longis et 0.2 mm latae. Achenia radii biconvexa ca. 2.5 mm longa 2 mm lata supra mediam dense argute pilosula, rostris minutis deciduis breviter lobatis; achenia disci 2.0-2.2 mm longa argute pilosula superne densius pilosula. Grana pollinis in diametro 23-25 μm.

The new species is related to *Clibadium glabrescens* S.F. Blake, which also occurs on the eastern slopes of Andes in an area reaching farther north into southernmost Colombia and farther south to the Ecuadorian Department of Morona-Santiago. The Blake species is distinct in its glabrous stems. The new species seems to occur primarily on wooded or sandy streambanks.

Clibadium zakii H. Robinson, *sp. nov.* HOLOTYPE: ECUADOR. Bolivar: Carretera Chillanes - Bucay, en la hacienda "Tiquibuso" del Sr. Gonzalo Gómez, alt. 2100 m, 10 Sept. 1987, *Zak & Jaramillo 2881* (MO,US).

Plantae fruticosae scandentes 2-3? m altae; caules atrobrunnescentes teretes vel subhexagonales dense hispiduli, ramulis ad angulum 45°-60° patentibus. Folia opposita, petiolis 1.0-1.3 cm longis; laminae ovatae plerumque 7-8 cm longae et 4.0-4.5 cm latae base obtusae vel breviter acutae non acuminatae margine minute serrulatae apice anguste breviter acuminatae supra sparse scabridae et dense minute scabridulae subtus plerumque in nervis et nervulis hispidulae e 0.5-1.0 cm supra basem trinervatae, nervis secundariis basilaribus pertenuibus. Inflorescentiae in terminis ramis foliosis et in axiles superioribus dispositae, ramulis rotundate dense corymbosis distaliter non seriate cymosis, bracteolis lanceolatis 2-3 mm longis et ca. 0.5 mm latis hispidulis, pedunculis 0-2 mm longis dense hispidulis. Capitula subcontigua 4-5 mm alta et 3 mm lata; bracteae involucri steriles 2 vel 3 coriaceae ovatae ca. 4 mm longae et 2.5 mm latae acutae margine ciliatae extus dense strigillosae; bracteae feminei ca. 5 subcoriaceae oblongae ca. 4 mm longae et 2.2-2.5 mm latae apice obtusae margine superne in pilis brevibus argutis fimbriatae extus subglabrae; bracteae masculini 1 vel 2 obovatae scariosae ca. 2.5 mm longae et 1 mm latae. Flores radii ca. 5; corollae albae tubulares ca. 2.5 mm longae breviter puberulae et dense breviter glanduliferae supra mediam et in lobis densiores, lobis 3, 0.3-0.4 mm longis. Flores disci ca. 5; corollae albae supra mediam in pilis argutis et glandulis brevibus obsitae in lobis densiores, tubis basilaribus ca. 0.4 mm longis, faucibus ca. 1.5 mm longis, lobis ca. 0.5 mm longis et latis, ductis 5 ad nervos et 3-5 mediolobate

dispositis; thecae antherarum nigrae ca. 1.2 mm longae, appendicibus apicalibus ovatis 0.50-0.55 mm longis et 0.25-0.30 mm latis. Achenia radii biconvexa immatura ca. 1.5 mm longa, 1.2 mm lata supra mediam pauce argute pilosae et dense breviter glanduliferae, rostris deciduis ca. 0.3 mm longis late infundibularibus; achenia disci immatura ca. 1 mm longa supra mediam flexuose argute pilosula in partibus terminalibus densiores. Grana pollinis in diametro 25-27 μm.

The species was first recognized as distinct by the rounded corymbose form of its inflorescence branches. The inflorescence does not have distal branches bearing any cymose series of sessile heads of the type found in more common members of the genus, such as *Clibadium surinamense*. The new species is also distinguished from *C. surinamense* by the presence of reddish ducts in the middle of the lobes of the disk corollas. The anther appendages are longer than those seen on any other species in the study, twice as long as the appendages of some other species. The numerous, short, glandular hairs of the distal halves of the corollas and disk achenes are also rather distinctive, but similar glands have been seen on the disk achenes of one specimen of *C. surinamense* (Ecuador: Los Ríos, *Dodson, Dodson, Embree, & Perry 7037* [SEL,MO,US]) and may occur more widely in that species.

LITERATURE CITED

Robinson, H. 1979. New species of *Clibadium, Heterosperma* and *Milleria* from Peru (Heliantheae: Asteraceae). Wrightia 6:46-48. pl. 82-85.

_____. 1988. Studies in the Heliantheae (Asteraceae). XXXXII. New species of *Clibadium, Monactis* and *Verbesina* from the northern Andes. Phytologia 65:50-61.

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CROTALARIA INCANA VAR. *GRANDIFLORA* (LEGUMINOSAE), A NEW VARIETY FROM SOUTH AMERICA

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ABSTRACT

Crotalaria incana var. **grandiflora**, *var. nov.*, a large flowered variety from Colombia, Ecuador, Perú, Bolivia, and Paraguay is described.

KEY WORDS: *Crotalaria*, Leguminosae, Colombia, Ecuador, Perú, Bolivia, Paraguay, South America

During preparation of a treatment of the genus *Crotalaria* for Flora Neotropica, an analysis of the variation in the wide ranging and weedy species *C. incana* L. was conducted (Adler & Windler 1983). The variation in morphological characters was examined in the light of the differences in geography and topography. Varieties *incana* and *australis* have the broadest range in the New World and are distinguished primarily by their indument types. Variety *australis* is characterized by its dense spreading trichomes and variety *incana* is characterized by a more sparse, loosely appressed indument. Senn (1939) described var. *nicaraguensis* to recognize Central American plants with glabrous or nearly glabrous stems and fruits. Windler & Adler's study found a fourth variety, characterized by flowers that are substantially larger than those of the other three varieties. Bentham had affixed the name *C. grandiflora* to a herbarium sheet but never submitted it for publication. N.L. Britton (1889) included the epithet in a paper, enumerating the collections of H.H. Rusby in 1885 and 1886, but did not validate it. In order to make the varietal name available for our use, we submit the following diagnosis:

Crotalaria incana L. var. **grandiflora** Windler, Adler, & Skinner, *var. nov.* TYPE: BOLIVIA. Depto. La Paz, Prov. Sud Yungas, Yanacachi, abajo del "Hogar Fe y Alegria," 1950 m, exp. SSE, 20-30 degree slope sendero por abajo, hacia chacras y el rio, Matorral, May 4, 1987, *R. Seidel & E. Richter 874* (HOLOTYPE: US!).

Crotalaria incana L. forma *microphylla* Chodat & Hassler, Bull. Herb. Boissier 4(2nd series):835. 1904. TYPE: PARAGUAY. Cordillera, San Bernardino, *E. Hassler 3526* (HOLOTYPE: G!).

Diagnosis: Flores grandes (14-15 mm longi), calycibus 11-13 mm longis, carinis 11-14 mm longis (Fig. 1).

This large flowered variety of *Crotalaria incana* is native to upper elevations in tropical South America and appears at lower elevations in the more temperate climates of southern South America. Representative collections are as follows:

COLOMBIA. Atlantico, Nr. Barranquilla, *Dugand 127* (F). Bolivar, Nr. Cartagena, roadsides nr. sea-level, *Killip & Smith 14160* (F). Magdalena, Isla de Salamanca, *Romero-Castaneda 10523* (MO).

ECUADOR. Azway, Valley of Río Paute, between Paute and Cuenca, 7200-8000 ft., *Camp E-2318* (F,MO). Chimborazo, Nr. Ituigna, Río Chanchan, 4000-4500 ft., *Camp E-2975* (F). Loja, Nr. Loja, *Steyermark 54848* (F,MO).

PERU. Amazonas, Prov. Bongara, on road to Pomacocha, 13 km N of Puente Ingenio, *Hutchison & Wright 6834* (F). Ancash, Huaraz, Baños de Chancos, *Sandeman 4603* (F). Apurimac, Prov. Abancay, Quebrada, 1 km E of Abancay, *Stork et al. 10554* (F,MO). Cuzco, Pauwcartamboa, *Balls B6677* (F). Junín, Tarma, Carretera Central, 1-3 km E of Palca, *Edwin & Schunke 3934* (F,IAN). Piura, 40-43 km E of Olmos on road to Pucara, *A. Gentry et al. 22660* (BALT). Puno, Region of Puno, *Soukup 516* (F).

BOLIVIA. La Paz, Coripati Yungas, *Bang 2067* (F,MO). Tarija, Ruta Tarija-Ville Montes, Serere, *Krapovickas et al. 19149* (CTES).

PARAGUAY. Amambay, Sierra de Amambay, *M, Hassler 12039* (RB). Caaguazu, in region of Igatimi, in field, *E. Hassler 4723* (P). Cordillera, San Bernardino, Costa de Lago Ipacaray, *Quarin et al. 1475* (CTES). San Pedro, Río Tapiracuay, 8 km de San Estanislao, *Krapovickas et al. 13911* (CTES).

ARGENTINA. Entre Rios, Depto. Concordia, alrededores del obrador Salto Grande, *N.S. Troncoso et al. 1714* (BALT).

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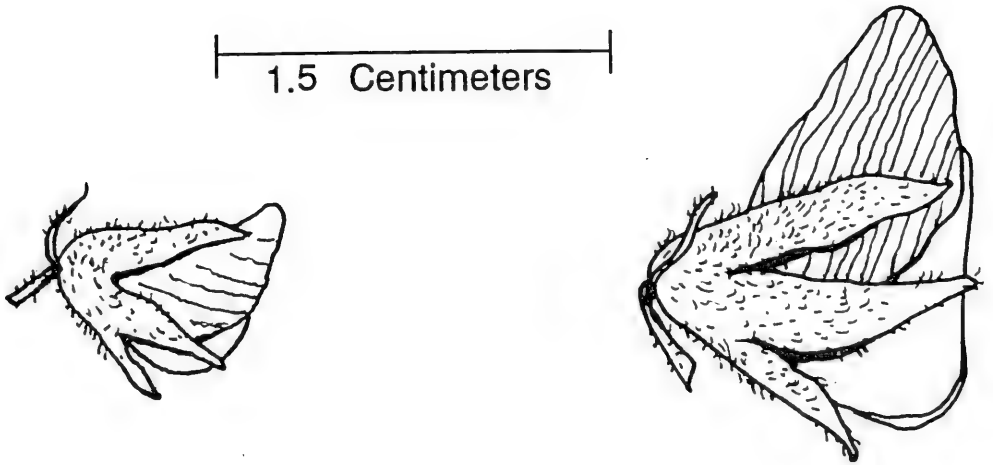

FIG. 1. a. var. *incana* b. var. *grandiflora*

REFERENCES

Adler, L. & D.R. Windler. 1983. An analysis of the subspecific classification in the New World *Crotalaria incana* L. Unpublished.

Britton, N.L. 1889. An enumeration of the plants collected by Dr. H.H. Rusby in South America. 1885-1886. VII. Bull. Torrey Bot. Club 16:192.

Senn, H.A. 1939. The North American species of *Crotalaria*. Rhodora 41:317-366.

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STUDIES ON *MIKANIA* (COMPOSITAE: EUPATORIEAE) - XVIII. NEW SPECIES FROM BRAZIL

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ABSTRACT

Mikania nana, M. pacei, and **M. reynoldsii**, three new species from Brazil, are described and illustrated.

KEY WORDS: Compositae, Eupatorieae, *Mikania*, Minas Gerais, Paraná, Brazil

Continued study of the genus *Mikania* has resulted in the recognition of the following new species from Brazil.

Mikania nana W. Holmes, *sp. nov.* (Fig. 1). TYPE: BRAZIL. Paraná: Rio Pequena (mun. São José dos Pinhais), 900 m, 5 November 1969, *Gert Hatschbach 22847* (HOLOTYPE: MBM).

Species ad *Mikaniam vimineam* DC. similis sed differt foliis elliptico-ovatis (non linearibus) et petiolatis (non sessilibus).

Semidecumbent to erect; stem 21 cm long, striate, villous to semitomentose. Leaves opposite, lanceolate to elliptic ovate, 1.5-3.6 x 1.0-1.7 cm, bases cuneate to attenuate, with 3 conspicuous nerves, usually with another pair of obscure nerves below these, apices acute, margins irregularly serrate to doubly serrate, apices of teeth denticulate, upper surfaces pilose, muricate, lower surfaces pilose particularly on the nerves; petioles 0.3-0.5 cm long, sparingly pilose; internodes 1-5 cm long, gradually becoming longer above. Capitulescence racemo-corymbose, dense, 2.0 x 3.5 cm; branchlets villous. Heads borne more commonly in clusters of three, the central one nearly sessile, the outer short pedunculate, or heads borne singly; ultimate branchlets (peduncles) 0.5-2 mm long, villous. Heads 9-10 mm long; subinvolucral bracts linear to oblanceolate, 5-7 mm long, obscurely nerved, apices pilose. Phyllaries oblong to oblong

Figure 1. Habit of *Mikania nana* W. Holmes.

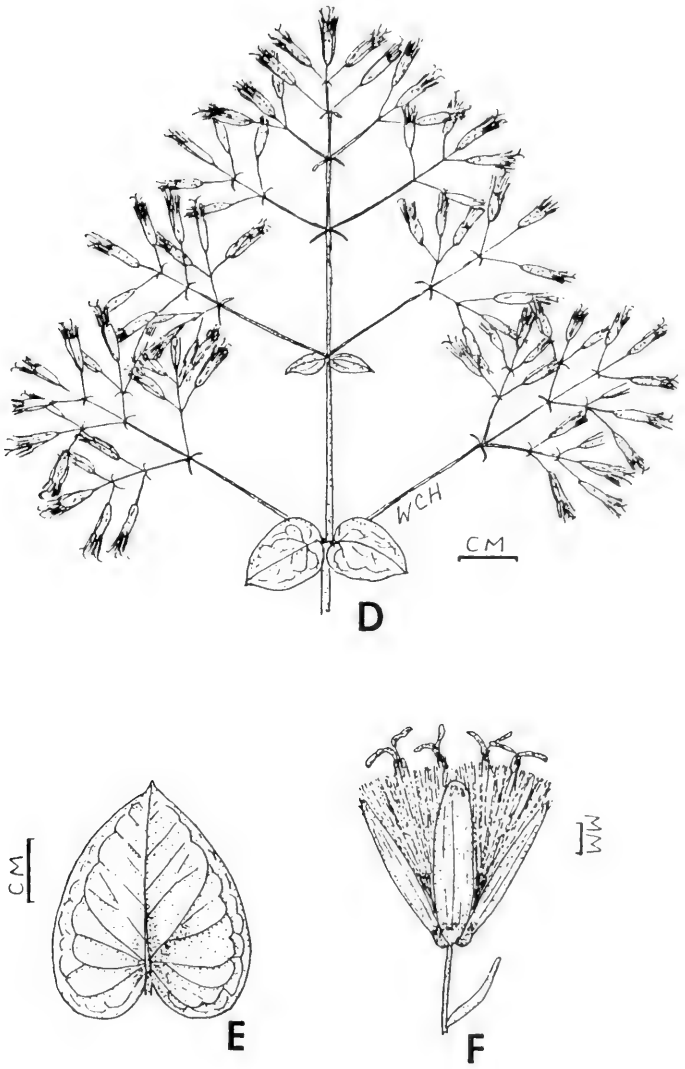

Figure 2. *Mikania pacei* W. Holmes. D. capitulescence; E. leaf; and F. head with subinvolucral bract.

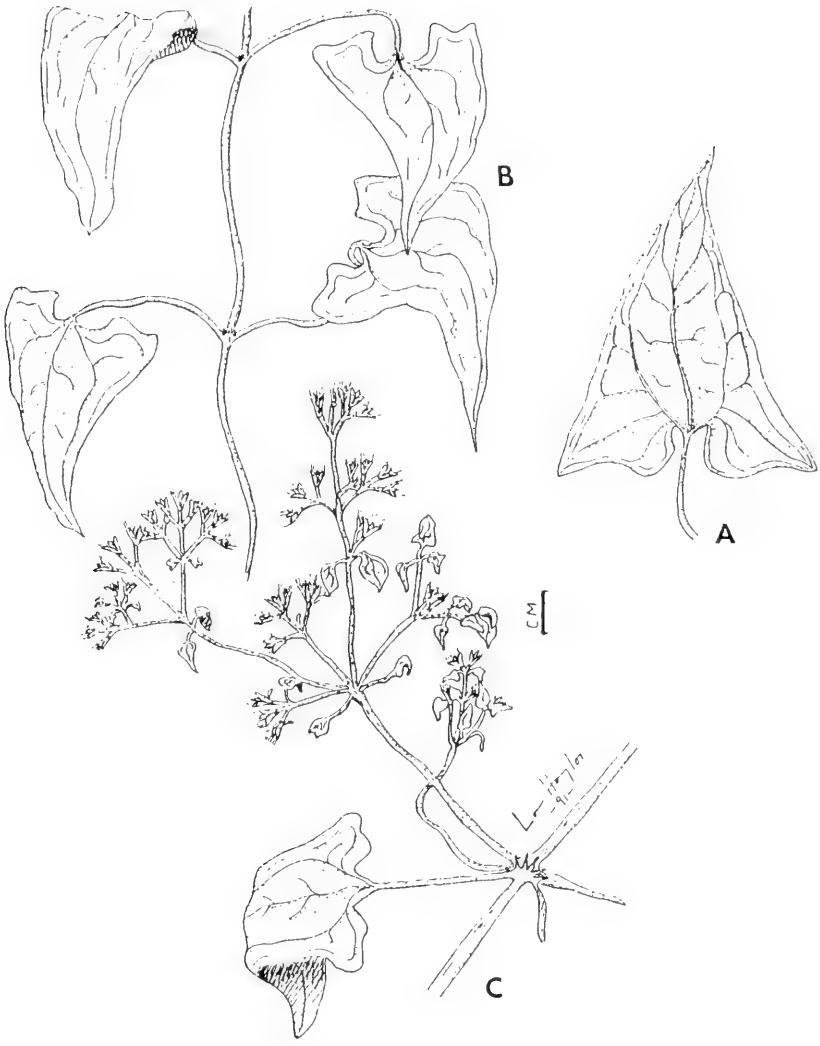

Figure 3. *Mikania reynoldsii* W. Holmes. A. leaf; B. stem and leaves; and C. capitulescence and stipulelike appendage.

ovate, 5.0-5.5 mm long, mostly glabrous, bases slightly gibbous, apices acute to obtuse, slightly pilose. Corollas white, 5.0-5.3 mm long, tubes 2.5-3.0 mm long, throats semicampanulate to funnelform, 1.00-1.75 mm long, teeth ovate, 1.00-1.25 mm, densely villous; stigmatic surfaces densely hirsute. Achenes 2.0-2.7 mm long, lightly villous. Pappus bristles 50-60, 5-6 mm long, margins scabrid.

The new species is known only from the type material. It is characterized by its diminutive size, racemo-corymbose capitulescence, 9-10 mm long heads, densely villous corolla teeth, and hirsute stigmatic surfaces.

Mikania pacei W. Holmes, *sp. nov.* (Fig. 2). TYPE: BRAZIL. Minas Gerais: Senador Mourão (mun. Diamantina), 24 January 1978, *Gert Hatschbach 40884* (HOLOTYPE: MBM; Isotype: BAYLU).

Species ad *Mikaniam obtusum* DC. similis sed differt foliis ovatis et orbicularibus (non oblongis) cum basi auriculata (non obtusa).

Erect, 1.0-1.3 m tall; stems terete, glabrate, internodes 4-5 cm long. Leaves opposite, broadly ovate to nearly orbicular, 2.5-5.0 x 1.8-3.8 cm, bases auriculate, apices rounded and apiculate, margins entire, venation semipalmate from just above the base of the blade; upper and lower surfaces glabrate, reticulate; petioles ca. 1 mm long, 2 mm wide (the leaves appearing nearly sessile), glabrous. Capitulescence paniculate, 15-23 x 15-20 cm, heads in corymbiform clusters of ca. 8 x 7 cm; lower bracts leaflike, upper bracts becoming smaller, bases cuneate; branchlets glabrous, terete; ultimate branchlets (peduncles) 4-9 mm long, thin, glabrous. Heads 8-9 mm long. Subinvolucral bracts linear, glabrate, borne at base of the peduncle. Phyllaries ovate to elliptic oblong, 4.0-4.8 mm long, apices rounded, puberulent, margins ciliolate, especially in the upper half. Corollas cream, ca. 4.5 mm long, tube ca. 2 mm long, throat funnelform to semicampanulate; teeth ovate, ca. 1 mm long. Pappus bristles white, 38-40, 5.0-5.5 mm long, margins scabrid. Achenes 2.2 mm long, gradually tapering from summit to base, brown.

PARATYPE: BRAZIL. Minas Gerais: 15 km ao norte de Cunha Magalhães (mun. Cunha Magalhães), 20 January 1972, *Gert Hatschbach 29013, L.B. Smith, & E. Ayensu* (MBM,BAYLU).

Mikania pacei is similar to *M. obtusata* DC., a species with oblong leaves with acute to obtusely narrowed bases (Barroso 1958). *Mikania pacei* has broadly ovate to nearly orbicular leaves with auriculate bases.

The species is named in honor of Lula Pace: botanist, geologist, and first woman on the Baylor University faculty to hold the doctor of philosophy degree (Trantham 1925). Her plant collections made between 1903-25 are the basis of the university collection. Dr. Pace, one of Baylor's most revered professors,

made significant original contributions to the botanical literature, primarily in cytology and embryology.

Mikania reynoldsii W. Holmes, *sp. nov.* (Fig. 3). TYPE: BRAZIL. Minas Gerais: Trilha dos Garimpeiros (mun. Grão Mogol), 1100 m, 12 February 1991, *Gert & Maria Hatschbach 55084 & O.S. Ribas* (HOLOTYPE: MBM; Isotype: BAYLU).

Species ad *Mikaniam micranthum* HBK. similis sed differt foliis sagittatis ad subhastatis (non triangulo-ovatis) et pseudostipulis manifestis (non obscuris).

Twining vines to 5-6 m long; stems terete, striate, glabrate; internodes 7-13 cm long. Leaves opposite, triangular, blades 5-8 x 3.5-5.0 cm, bases sagittate to subhastate, acute at the insertion of the petiole, trinerved from the bases; apices acute to acuminate, margins entire to remotely denticulate, glabrous above, with resinous glands below; petioles 2.0-4.5 cm long, thin, glabrate; opposite petiole bases connected by stipulelike appendages ca. 5 mm wide and 1.5 mm long, margins serrate to fimbriate to lobed. Capitulescence a compound corymb, ca. 10 x 10 cm; heads disposed in corymbs, 4 x 6 cm; branchlets glabrate, angular; bracts similar to leaves but reduced in size. Heads 6.5-7.0 mm long; ultimate branchlets (peduncles) 0.5-3.5 mm, glabrous; subinvolucral bracts elliptic to obovate, ca. 3 mm long, acute to acuminate, glabrous. Phyllaries elliptic oblong to ovate, ca. 4 mm long, acute, glabrous except for the puberulent to slightly ciliolate apices. Corollas white to cream, ca. 3 mm long, tube ca. 1.2 mm long, throat funnelform to campanulate, ca. 1.3 mm long, teeth deltate-ovate, ca. 0.6 mm long, acute-acuminate. Achenes ca. 2.4 mm long, tan, tapering from summit to base, with globular resinous glands. Pappus bristles 31-36, 2.5-3.0 mm long, white, scabrid.

PARATYPE: BRAZIL. Minas Gerais: Grão Mogol (mun. Grão Mogol), mountains to the west of town, 1130 m, 14 Jun 1990, *W.C. Holmes 5069* (BAYLU,MBM).

The new species appears similar to the well known and widely distributed *Mikania micrantha* HBK., a species with triangular-ovate leaves with cordate bases, heads 5-6 mm, and a flat topped corymbose capitulescence (Robinson 1934). *Mikania reynoldsii* is distinguished by its triangular leaves with sagittate to subhastate bases and more branched capitulescence. Both species possess stipulelike enations, but those of *M. reynoldsii* are considerably more prominent than those of *M. micrantha*.

The new species commemorates Dr. Herbert H. Reynolds, President of Baylor University, whose dynamic stewardship of the University has promoted creative activities and research. His foresightedness in recognizing the importance of international studies has greatly advanced botanical studies at Baylor.

This paper and a forthcoming treatment of the *Mikania* of Paraná, in collaboration with Dr. Gert Hatschbach of Museu Botânico Municipal of Curitiba, are a direct product of his patronage.

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LITERATURE CITED

Barroso, G.M. 1958. Mikaniae do Brazil. Arq. Jard. Botanico Rio de Janeiro. 16:239-333.

Robinson, B.L. 1934. *Mikania scandens* and its near relatives. Contr. Gray Herb. 104:55-71.

Trantham, H. 1925. Dr. Lula Pace: An appreciation of her life and services. Baylor Monthly 5:1-2.

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NEW SYNONYMS IN THE TUBER BEARING *SOLANUM*

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ABSTRACT

Names recently determined as synonyms of recognized taxa of tuber bearing *Solanum* are listed.

KEY WORDS: Solanaceae, *Solanum*, nomenclature

During preparation of my monographic work on the South American tuber bearing *Solanum* (sect. *Petota*), I found so far, some species which to me are only synonyms of those previously quoted by other authors. Among these new synonyms are the following:

Solanum bukasovii Juz., Bull. Acad. Sci. U.R.S.S., Ser. Biol. 2:303. 1937.

Solanum amabile Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco, 2:60. 1956.

Solanum canasense Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 123. 1944.

Solanum canasense Hawkes var. *alba* Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:57. 1956.

Solanum canasense Hawkes var. *calcense* Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:58. 1956.

Solanum canasense Hawkes var. *intihuatanense* Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:58. 1956.

Solanum canasense Hawkes var. *latifolia* (Vargas) Ochoa, *Los Solanum Tuberíferos Silvestres del Perú.* Lima, Perú. 170-175. 1962.

Solanum canasense Hawkes var. *lechnoviczii* (Hawkes) Ochoa, *Los Solanum Tuberíferos Silvestres del Perú.* Lima, Perú. 168. 1962.

Solanum espinarense Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:60. 1956.

Solanum hapalosum Ochoa, Bol. Soc. Arg. Bot. 22(1-4):297-299. 1983.

Solanum lechnoviczii Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 123. 1944.

Solanum lechnoviczii Hawkes var. *latifolia* Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:61. 1956.

Solanum ochoae Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:59. 1956.

Solanum pampasense Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 125. 1944.

Solanum pumilum Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 124. 1944.

Solanum punoense Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 123. 1944.

Solanum sicuanum Hawkes, *nom. nov.*, *The Potato, Evolution, Biodiversity & Genetic Resources.* London, Great Britain. 148. 1990.

Solanum soukupii Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 122-123. 1944.

Solanum soukupii Hawkes var. *espinarense* (Vargas) Ochoa, *Los Solanum Tuberíferos Silvestres del Perú.* Lima, Perú. 278. 1962.

Solanum bukasovii Juz. var. **multidissectum** (Hawkes) Ochoa, *comb. nov.* BASIONYM: *Solanum multidissectum* Hawkes, Bull. Imp. Bur. Pl. Breed. & Genet. Cambridge. 124. 1944.

Solanum colombianum Dun. *in* A.DC., *Prodr.* 13, I, 33. 1852.

Solanum cacetanum Ochoa, Phytologia 46(7):495. 1980.

Solanum marinasense Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:53. 1956.

Solanum canasense Hawkes var. *xerophylla* (Vargas) Ochoa, *Los Solanum Tuberíferos Silvestres del Perú.* Lima, Perú. 170. 1962.

Solanum canasense Hawkes var. *xerophilum* (Vargas) Hawkes, *The Potato, Evolution, Biodiversity & Genetic Resources.* London, Great Britain. 138-139. 1990.

Solanum lechnoviczii Hawkes var. *xerophylla* Vargas, *Las Papas Sudperuanas.* Univ. Ncl. del Cusco. 2:61-62. 1956.

Solanum raphanifolium Card. et Hawkes, Jour. Linn. Soc. Bot. 53:94-95. 1946.

Solanum hawkesii Card., Jour. Linn. Soc. Bot. 53:95-96. 1946.

Solanum tuberosum L. subsp. *andigena* (Juz. et Buk.) Hawkes, Proc. Linn. Soc. Bot. 166:130-137. 1956.

Solanum paramoense Bitt. *ex* Pittier, *Man. Pl. Usual. Venez.* 329. 1926.

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