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NOTES ON LYCHNOPHORINAE FROM MINAS GERAIS, BRAZIL, A SYNOPSIS OF *LYCHNOPHORIOPSIS* SCHULTZ-BIP., AND THE NEW GENERA *ANTEREMANTHUS* AND *MINASIA* (VERNONIEAE: ASTERACEAE)

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Abstract.—Limits of the Vernonian subtribe Lychnophorinae are refined using pubescence, style bases, anther appendages, and pollen, with an emphasis on the anther appendages. *Episcothamnus* H. Robinson is reduced to synonymy with the formerly monospecific *Lychnophoriopsis* Schultz-Bip. *Lychnophora damazioi* Beauverd and *L. candelabrum* Schultz-Bip. are transferred to *Lychnophoriopsis,* and *L. hatschbachii* is described as new. A key is given to the four species of *Lychnophoriopsis. Anteremanthus hatschbachii* is described as a new genus and species from Minas Gerais, Brazil. The genus *Minasia* is described for *Vernonia alpestris* Baker, *M. scapigera* nom. nov. (for *Vernonia scapigera* Baker hom. illeg.), and *M. pereirae* sp. nov. The 10 genera presently included in the Lychnophorinae are listed. Among the genera excluded from the subtribe are *Chresta* Vell. ex DC. and *Soaresia* Schultz-Bip.

A specimen of Vernonieae from Brazil sent some years ago by Gert Hatschbach has been recognized from the first as an undescribed species, but the generic placement remained undecided until the present study. The specimen shows the general form of the genus *Vernonia* Schreb. s.l, with discrete multiflowered heads and type A pollen. Nevertheless, many features of the plant, such as the large, abruptly petiolate, leathery leaves and the appressed dense pubescence, made assignment to *Vernonia* a repellent idea, even though the proper relationship remained unresolved. A detailed review of characters has now demonstrated a proper place for the specimen in the subtribe Lychnophorinae. Also resolved at the same time are the positions of a number of other Lychnophorinae from the state of Minas Gerais in Brazil, where many members of the subtribe are concentrated.

The Lychnophorinae have been defined in the past mostly by the few-flowered heads in dense glomerules and the often broad, strap-shaped, deciduous inner segments of the pappus. However, within the traditional Lychnophorinae the character of the number of florets in the head fails even in the generic pair *Lychnophora/Lychnophoriopsis,* and the pappus in such genera as *Eremanthus* is sometimes capillary. In addition, the present re-evaluation of characteristics of the subtribe shows that many unusual, robust Vernonieae of eastern Brazil should be considered members of the subtribe Lychnophorinae, in spite of the facts that their heads may have numerous florets and may not be densely congested in clusters, and that their pappus segments may be capillary. The alternative defining characteristics cited here are not necessarily restricted to the Lychnophorinae, but they seem rather consistent within the group. These include a lack of enlarged nodes or sclerified cells at the bases of the styles, usual extensive presence of a pubescence of T-shaped hairs, presence of sclerified cells in the anther appendages, lack of glands on

the anther appendages, and presence of Type A pollen (Keeley & Jones 1979) (*Lychnophora*-type of Stix 1960).

Characters most notable in the subtribe Lychnophorinae for their nearly complete absence are sterile tails appended to the basal ends of the fertile anther spurs, glands on the anther appendages, or paleae on the receptacle. Distinct sterile tails on the anther thecae occur in few of the Lychnophorine genera reviewed, although they occur in various Piptocarphinae and many Paleotropical Vernonieae. In the Lychnophorinae, as recognized here, the monotypic *Proteopsis* Mart. & Zucc. ex Schultz-Bip. has distinct sterile tails on the basal ends of the fertile spurs of the anthers, whereas the genus *Minasia* described below has very short tails. Glands have not been seen on the anther appendages in any Lychnophorinae, although glands, or in a few cases such as *Vernonia fuertesii* (Urban) H. Robinson and *V. petiolaris* DC., short spines occur erratically on the anther appendages in various Vernonineae. The receptacle seems to lack distinct paleae in unquestioned Lychnophorinae. Monotypic Brasilian genera that have pales such as *Heterocoma* DC. and *Bishopalea* H. Robinson or that have receptacular projections such as *Sipolisia* Glaziou ex Oliv., and related genera such as *Alcantara* Barroso (Robinson 1981), were placed in the Vernoniinae by Robinson et al. (1980), and have never been placed in the Lychnophorinae. They seem to belong to no presently named subtribe.

Enlargements or sclerified cells at the base of the style are absent from all unquestioned Lychnophorinae. There is a small sclerified node at the base of the style in the monotypic genus *Albertinia* Spreng., placed in the Lychnophorinae by Robinson et al. (1980), but that genus has no character closely associated with the Lychnophorinae in this study except a partially sclerified anther appendage, and it is here excluded from the subtribe. The lack of such a node seems particularly important in view of the wide occurence of such a structure in many Vernoninae and Piptocarphinae.

The sclerified or partially sclerified cells of the anther appendage seem to have special significance in delimiting a number of groups in the tribe including the Lychnophorinae. Members of the subtribe Vernoniinae show little or no sclerification of the cell walls of the anther appendage, and many of the appendages in the group also bear glands or even short hairs. Examples of the subtribe include *Vernonia* and the genera of the *Lepidaploa* Complex (Robinson 1990). In contrast, the cells of the anther appendage have distinctly sclerified walls in all unquestioned members of the Lychnophorinae, and none are known to bear glands. The sclerified cells may be marginal as in *Eremanthus* Less. or throughout the appendage as in *Lychnophora* Mart. Such thickenings are also seen in some other genera mentioned above that may be related to the Lychnophorinae but are presently excluded such as *Heterocoma* and *Bishopalea*. In *Albertinia* they are only weakly developed at the margins. A comparatively unrelated subtribe that seems to characteristically have sclerified appendages is the Piptocarphinae, but the latter usually has a distinct sclerified node at the base of the style (lacking in *Pollalesta* H.B.K.) and has round-tipped sweeping hairs in the style branches. Sweeping hairs of the subtribe Lychnophorinae are like most non-piptocarphine Vernonieae in having pointed tips (Robinson 1980b). The Piptocarphinae is broadened by these characters to include the recently described *Cuatrecasanthus* H. Robinson and *Joseanthus* H. Robinson (1989). Anther appendages with sclerified cells also occur in the Mexican and Mesoamerican *Lepidonia* Blake (Robinson & Funk 1987) which is presently unplaced in any recognized subtribe. Previously placed in the Vernoniinae (Robinson et al. 1980), but here left unplaced subtribally, is the neotropical *Pacourina* Aubl. that has a sclerified anther appendage co-occurring with lo-

phate Type E pollen (Keeley & Jones 1979), a type most common in paleotropical elements of the tribe.

The pollen type of the Lychnophorinae is exclusively Type A, having a weakly lophate surface and a continuous perforated tectum. The type is considered a reversion from more strongly lophate ancestors in the Vernonieae (Robinson 1990), but it is nevertheless one of the most common forms in the tribe and is consistent in many groups such as the Piptocarphinae and typical *Vernonia.* Two genera often placed in the Lychnophorinae that have lophate pollen are *Soaresia* Schultz-Bip. nom. cons. (≡*Bipontia* Blake) and *Chresta* Vell. ex DC. (Robinson 1980a, excluding *Eremanthus eriopus* Schultz-Bip. ex Baker). *Chresta,* including *Argyrovernonia* MacLeish (1984), *Glazioviantbus* Barroso (MacLeish 1985a), and *Pycnocephalum* (Less.) DC. (MacLeish 1985b), was traditionally included in the Lychnophorine *Eremanthus* (Baker 1873), but *Chresta* has non-sclerified anther appendages in addition to the lophate pollen found in most of the species. *Chresta* and *Soaresia* Schultz-Bip., although placed in the subtribe by Robinson et al. (1980), are not considered lychnophorine in the present study.

The Vernonieae have many taxa in both hemispheres bearing T-shaped hairs. Such hairs are particularly prominent in many members of the Lychnophorinae, even commonly occurring on the corolla lobes (Figs. 17, 25).

The Lychnophorinae, as characterized in this study, is extended to clearly include a number of Neotropical species concentrated in Minas Gerais, Brazil that have at times been compared with or questionably included in the genus *Vernonia.* Among the latter are *Lychnophora damazioi* Beauverd, which has recently been transferred to *Vernonia* (Leitão Filho & Semir 1979). It proves to be lychnophorine as Beauverd (1913) originally supposed, and it is placed in the genus *Lychnophoriopsis,* which is revised below. Also included is the Hatschbach specimen for which the study was initiated, and for which a new monospecific genus *Anteremanthus* is described below. Finally, the Lychnophorinae includes the problematic *Vernonia alpestris* Baker, which is here made the type of the new genus *Minasia,* containing three species.

The Lychnophorinae here is considered to include the following ten genera: *Anteremanthus* H. Robinson, *Chronopappus* DC., *Eremanthus* Less. (syn. *Sphaerophora* Schultz-Bip., not Blume, ≡ *Paralychnophora* MacLeish), *Vanillosmopsis* Schultz-Bip, *Lychnophora* Mart. (syn. *Haplostephium* Mart.), *Lychnophoriopsis* Schultz-Bip. (syn. *Episcothamnus* H. Robinson), *Minasia* H. Robinson, *Piptolepis* Schultz-Bip., *Pithecoseris* Mart., *Proteopsis* Mart. & Zucc. ex Schultz-Bip. The precise limits of the tribe, limits of some of the genera, and detailed relationships between the genera remain to be resolved.

Synopsis of *Lychnophoriopsis* Schultz-Bip.

Lychnophoriopsis Schultz-Bip., Pollichia 20/21:375. 1863. Type: *Lychnophoriopsis heterotheca* Schultz-Bip. ≡ *Lychnophora heterotheca* (Schultz-Bip.) Jones & Coile.

Episcothamnus H. Robinson, Phytologia 48: 209. 1981. Type: *Lychnophora candelabrum* Schultz-Bip. ≡ *E. candelabrum* (Schultz-Bip.) H. Robinson.

Plants shrubby, weakly candelabriform, 1–2 m high. Stems and branches 5–10 mm wide, densely whitish tomentose or lanate, hairs with spreading tips. Leaves densely spirally inserted, sessile, oblong to linear, mostly 2–16 cm long and 0.3–0.9 cm wide, base slightly constricted, lateral margins distinctly recurved, sometimes nearly meeting below, apex rounded to narrowly acute; upper surface green, glabrous to sparsely pilose, lower surface whitish lanate with appressed to loose T-shaped hairs; venation pinnate or with secondary veins joining in more or less longitudinal series. Inflores-

cence densely spiciform; heads discoid, sessile in axils of reduced leaves, contiguous or nearly so, involucre campanulate, 20–25 mm high and mostly 12–15 mm wide; involucral bracts ca. 30–60, subimbricate, of graduated lengths, tips rounded to narrowly lanceolate or shortly aristate, inner bracts sometimes with distinctly narrowed and reflexed tips; outer surfaces densely lanate to sometimes mostly glabrescent; receptacle glabrous, without pales. Florets regular, 9–23 in a head, rarely heteromorphic with inner achenes sterile; corollas lavender, narrowly funnelform, 9–15 mm long, glabrous below, with long narrow tube, throat short and scarcely broadened, linear lobes glanduliferous and hairless or with few to many contorted or T-shaped hairs; thecae without sterile basal appendages on lower ends of spurs, ca. 3–5 mm long; appendages narrowly oblong-ovate to lanceolate, 1–2 mm long, with distinctly weakly sclerified walls throughout, without glands; style base without node or sclerified cells; sweeping hairs of style branches acute-tipped. Achenes 2.5–6.0 mm long, 8–10-ribbed, glabrous, with layers of elongate sclerified cells in walls, with scattered idioblasts on surface sometimes in short series; base truncate with a poorly differentiated carpopodium, with oblong sclerified cells in 4–5 series; pappus biseriate, outer series of long narrow squamae, sometimes basally connate, inner segments weakly persistent or easily deciduous, strap-shaped with few weak marginal teeth or bristle-like distally with scabrae on sides and surfaces, often twisted; in plants with heteromorphic achenes, the inner pappus segments strap-shaped in outer fertile achenes, bristle-like in inner sterile achenes. Pollen grains somewhat oblate, 50–60 μm in diameter in fluid, Type A with perforated tectum continuous over areoles.

The genus is notable for its densely spirally inserted leaves with recurved lateral margins and its heads of 10–25 florets borne in dense, cylindrical, spicate clusters among axils of somewhat shortened terminal leaves. Central sterile achenes with a differentiated pappus were originally used to distinguish the genus from the closely related *Lychnophora* (Schultz-Bip. 1863), but they have not been seen with certainty in any specimens. As a result, the genus *Episcothamnus* (Robinson 1981) is clearly congeneric, and the two type species are very closely related.

The closest generic relationship of *Lychnophoriopsis* is to *Lychnophora,* which has the same type of achenes having distinctive, poorly differentiated carpopodia with elongate cells. The genera could be combined, but the heads of *Lychnophoriopsis* are markedly larger and more discrete than those of *Lychnophora,* and are borne on longer inflorescences. The heads of *Lychnophoriopsis* have distinctly more florets and do not form secondary heads with each other, as in *Lychnophora.* This difference was emphasized by Leitão Filho & Semir (1979) when they removed *L. damazioi* from *Lychnophora.* The other character cited by Leitão Filho and Semir was the more persistent inner pappus of *L. damazioi,* but the pappus in the other species is more deciduous, as in *Lychnophora.* The anther appendages of *Lychnophora* have characteristically stronger thickenings in the cell walls thoroughout the appendage.

Key to the Species of *Lychnophoriopsis*

1. Leaves short with rounded tips; all involucral bracts narrowly lanceolate to linear; inner pappus segments bristle-like, rather persistent, scarcely flattened in distal half, distinctly scabrous outside and on margins ..... *L. damazioi*
– Leaves long with acute tips; most involucral bracts ovate or broadly lanceolate; inner pappus segments flattened throughout, easily deciduous, toothed only on margins ... 2
2. Involucral bracts with broadly rounded tips, becoming mostly gla-

brous with age; inflorescence more than twice as long as wide .... *L. hatschbachii*

– Involucral bracts with narrowly obtuse or acute tips, with persistent white tomentum on whole outer surface; inflorescence less than twice as long as wide 3

3. Inflorescence as wide as long; tips of involucral bracts obtusely pointed to shortly acute; heads with 10–17 florets; leaf margins more broadly recurved near base, nearly meeting underneath ..... *L. heterotheca*

– Inflorescence longer than wide; tips of involucral bracts narrowly acute; heads with 20–25 florets; leaf margins not more broadly recurved near base, not nearly meeting underneath ..... *L. candelabrum*

Lychnophoriopsis candelabrum
(Schultz-Bip.) H. Robinson, comb. nov.

Lychnophora candelabrum Schultz-Bip., Pollichia 20/21:345. 1863. Type: Brazil; Minas Gerais, Sello (B, destroyed). Neotype (selected by Robinson 1981): Brazil; Minas Gerais, 62 km SW of Diamantina toward Curvelo, King & Bishop 8573 (UB, isoneotype US).

Episcothamnus candelabrum (Schultz-Bip.) H. Robinson, Phytologia 48:210. 1981.

The epithet is treated as a noun in apposition and is not declined. The species is known at this time only from the neotype. Other material recently identified as this species has been redetermined in this study as *L. heterotheca.* The two species are very close, but *L. candelabrum* is generally more robust; detailed distinctions are given under *L. heterotheca.*

Lychnophoriopsis damazioi (Beauverd) H. Robinson, comb. nov.

Lychnophora damazioi Beauverd, Bull. Soc. Bot. Genève, series II, 5:241. 1913. Type: Brazil; Minas Gerais, Serra do Cipó, in campis, June 1908, Damazio 2010 (G). *Vernonia damazioi* (Beauv.) Leitão Filho & Semir, Revista Brasil. Bot. 2:113. 1979.

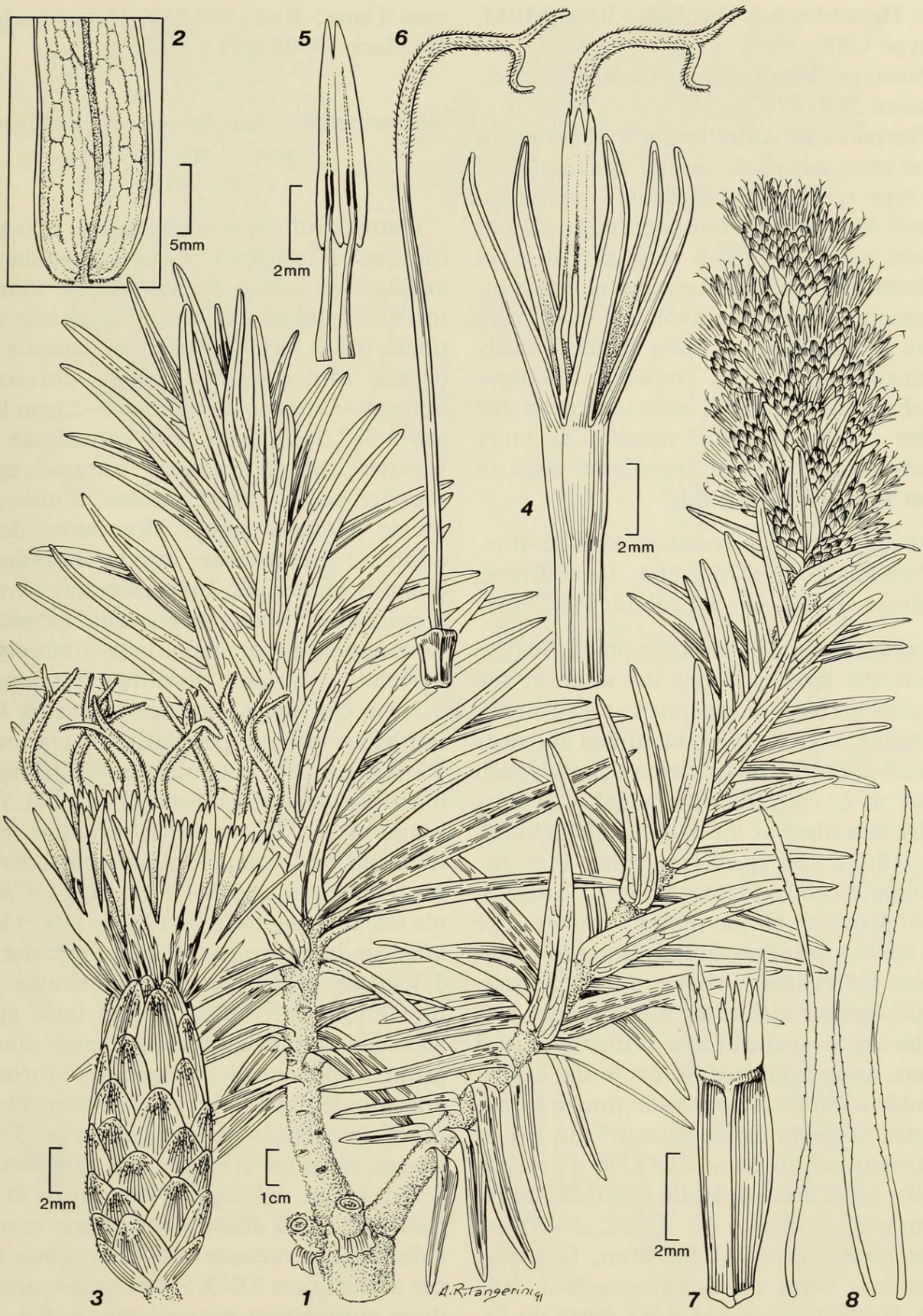
Lychnophora unicaulis Glaziou, Bull. Soc. Bot. France 56, Mém. 1(3):379. 1909, nom. nud.

The species is the most distinctive in the genus in its short blunt leaves and narrow, scabrous, rather persistent pappus bristles. The involucral bracts have the longest and narrowest tips of any member of the genus, distinctly narrower than those of *L. candelabrum.*

Lychnophoriopsis hatschbachii
H. Robinson, sp. nov.
(Figs. 1–8)

Plantae fruticosae pauce ramosae ad 1.5 m altae. Folia dense spiraliter inserta sessilia lineari-lanceolata plerumque 5–10 cm longa base 7–10 mm lata margine anguste recurvata apice acuta supra glabra subtus appresse albo-lanata, nervulis aliquantum longitudinaliter dispositis. Inflorescentiae elongatae ad 10 cm longae et ca. 5 cm latae. Capitula ca. 3 cm longa et 0.8–1.0 cm lata; bracteae involucri ca. 27–30 appresse subimbricatae 4–17 mm longae et ca. 3 mm latae apice rotundatae vel obtusae extus plerumque glabrae vel glabrescentes distaliter persistentiter dense glanduliferae et arachnoideo-tomentellae. Flores ca. 9–10 in capitulo; corollae lavandulae ca. 15 mm longae plerumque glabrae in lobis perpauce glanduliferae non piliferae, tubis ca. 5 mm longis, faucibus ca. 2 mm longis, lobis ca. 7 mm longis; thecae ca. 5 mm longae; appendices lanceolatae ca. 2 mm longae. Achaenia ca. 5 mm longa glabra; squamae pappi exteriores 1.5–2.0 mm longae, setae interiores taeniatae ca. 7 mm longae vix vel non contortae.

Type: Brazil; Minas Gerais, Mun. Diamantina, Rod. Guinda-Cons. Mata, km 20, campo rupestre, solo rochoso, 1000 m, arbusto pouco ramificado, até 1.5 m, capítulos



Figs. 1–8. *Lychnophoriopsis hatschbachii* H. Robinson; 1. Habit; 2. Underside of leaf base showing venation; 3. Head, moist; 4. Corolla with anthers and style; 5. Anthers; 6. Style with nectary at base; 7. Achene showing outer pappus segments; 8. Segments of deciduous inner pappus.

lilás, Hatschbach & Nicolack 53058 (MBM; isotype US).

Paratype: Brazil; Minas Gerais, s.l., s.d., Glaziou 20372 (K).

The paratype collection of the species for some years served the author as a model for the type species of the genus, *Lychnophoriopsis heterotheca.* The present study has shown it represented a throughly distinct undescribed species. The more elongate inflorescences and blunt involucral bracts with more nearly glabrous outer surfaces easily distinguish the species. The leaves also have much more appressed pubescence on the under surface and the venation is more nearly longitudinal in appearance than in other species of the genus.

Lychnophoriopsis heterotheca Schultz-Bip., Pollichia 20/21:376. 1863. Type: Brazil; Minas Gerais, s.l., s.d., Reidel 1009 (P).

Examination of a photograph of the type shows the species is not the same as the Glaziou herbarium specimen at Kew under the name *L. heterotheca* identified above as *L. hatschbachii.* The species is actually much closer to *L. candelabrum,* which was originally described at the same time (Schultz-Bip. 1863), and specimens other than the neotype recently identified as *L. candelabrum* prove to be the present species. The two species are close, but seem to show consistent differences in shape of the leaf base, length versus width of the inflorescence, size of the heads, shape of tips of the involucral bracts, and number of florets in the heads.

Additional specimens seen: Brazil; Minas Gerais, Serra do Espinahaço, 67 km SW of Diamantina on hwy BR-259, Ferreira, Stutts, MacLeisch & Smith 998 (US); Mun. Gouveia, Corrego do Tigre, 1100 m, Hatschbach 27245 (US); Mun, Gouveia, subida da Serra do Espinhaço, Rod. BR-259, Hatschbach 44653 (US); Serra do Espinhaço, BR-259, Hatschbach, Anderson, Barneby & Gates 36435 (F, K, NY, US, VEC, VEN); Mun. Gouveia, Barro Preto, Torre da Telemig, Hatschbach & Kummrow 49697 (US); Mun. Gouveia, prox. trevo para Datas, Rod. BR-259, Hatschbach & Nicolack 53096 (NY).

Anteremanthus hatschbachii H. Robinson, gen. et sp. nov.
(Figs. 9–17)

Plantae fruticosae ad 2 m altae, pilis plerumque T-formibus. Caules irregulariter angulati vel sulcati dense appresse tomentosi non fistulosi. Folia alterna, petiolis distinctis 0.5–2.7 cm longis crassis sulcatis appresse tomentosis; laminae coriaceae oblongo-ellipticae plerumque 9–23 cm longae 2.5–8.0 cm latae base rotundatae vel breviter obtusae margine integrae apice breviter acutae supra virides minute appresse pilosulae subtus albescentes dense appresse tomentosae, nervis secundariis pinnatis numerosis. Inflorescentiae thyrsoideae, ramis alternis longis valde ascendentibus appresse tomentellis in partibus nigromaculatis, ramulis distalibus plerumque 0.5–1.8 cm longis, bracteis primariis foliiformibus breviter petiolatis 4–8 cm longis 1.8–2.8 cm latis in laminis oblongo-ovatis, bractiis secundariis subsessilibus 3.0–1.5 cm longis 0.8–1.2 cm latis, bracteis capitulorum basilaribus foliiformibus breviter ovatis plerumque 0.5–1.5 cm longis. Capitula late campanulata 10-12 mm alta et lata; bracteae involucri ca. 60 subimbricatae ca. 5 seriatae ovatae vel oblongo-ovatae 3–7 mm longae inferne ca. 2 mm latae apice acutae vel apiculatae extus dense minute glandulo-punctatae plerumque T-formiter arachnoideo-pilosulae; paleae nullae. Flores ca. 60 in capitulo, corollae albae ca. 5 mm longae, tubis ca. 1 mm longis, faucibus ca. 1 mm longis, lobis ca. 3 mm longis et 0.5 mm latis extus dense glanduliferis et pilosulis, pilis plerumque non T-formibus; thecae antherarum 3.0–3.5 mm longae; appendices antherarum triangulares ca. 0.6 mm longae et 0.35 mm latae, parietibus in cellulis marginalibus mediocriter incrassatis; basi stylorum non noduliferi non scleroidei. Achaenia ca. 3 mm longa 8–10-costata, dense longe setulifera base dense glanduli-

Figs. 9–17. *Anteremanthus hatschbachii* H. Robinson; 9. Section of vegetative stem; 10. Inflorescence; 11. Head, moist; 12. Corolla with anthers and style; 13. Anther; 14. Style; 15. Achene; 16. Trichome from lower leaf surface; 17. Trichomes from corolla lobe.

fera plerumque in costis in idioblastis bicellularibus sparsis obtecta; carpopodia annuliformia, cellulis subquadratis ca. 6-seriatis valde scleroideis; setae pappi ca. 40 in parte longiores facile deciduae 5–6 mm longae apice distincte latiores valde armatae, setae pappi in parte intermediores subpersistentes plerumque 3–6 mm longae apice non latiores, setae in seriebus breviores exteriores persistentes ca. 1 mm longae. Grana pollinis in diametro ca. 45 μm in typis A-formibus irregulariter subareolatis.

Type: Brazil; Minas Gerais, Mun. Grão Mogol, Rio Itacambiruçu, Campo rupestre, solo rochoso, arbusto 2 m, flores alvas, 15 May 1988, G. Hatschbach & M. Hatschbach & O. S. Ribas 52026 (MBM; isotype US).

The genus is named for the apparently related genus *Eremanthus* Less. with a negative prefix to reflect the strong differences in all the traditional characters. The species is named for the collector Gert Hatschbach of the Museo Botânico Municipal of Curitiba in Paraná.

In vegetative form and in the anther appendage the new genus resembles such species as *Eremanthus bicolor* (Schultz-Bip.) Baker, *E. glomerulatus* Less., and *E. incana* (Less.) Less. The discolorous petiolate leaves and the inflorescence bracts resemble those of *E. bicolor* particularly closely. The branching form of the inflorescence with discrete multi-flowered heads and the elongate funnelform corollas are completely different from any *Eremanthus* and the inflorescence seems almost unique in the Lychnophorinae. The slight approach to the inflorescence type in the subtribe is seen in the most lax types of inflorescence in the following new genus.

Minasia H. Robinson, gen. nov.
(Figs. 18–25)

Plantae herbaceae perennes ad 0.7 m altae, pilis plerumque T-formibus. Caules primarii breves usque ad 4 cm alti perdense foliati. Folia primaria spiraliter inserta superne rosulata sessilia oblanceolata vel lineari-lanceolata 15–20 cm longa et 1–5 cm lata base breviter late amplexicaulia supra basem attenuate late petioliformia margine integra apice breviter acuta supra et subtus dense appresse tomentosa, nervis secundariis ascendentiter pinnatis utrinque ca. 10. Inflorescentiae scaposae numerosae in caulibus secundariis elongatae ad 0.6 m altae velutinae superne interdum ramosae; bracteae foliiformes decrescentes plerumque remotae plerumque 4–8 cm longae 0.5–2.5 cm latae base anguste petioliformes apice distincte acutae vel acuminatae; bracteae superiore congestae. Capitula solitaria in axillis bracteorum superiorum congestorum disposita late campanulata 1.5–2.3 cm alta et 0.7–1.0 cm lata; bracteae involucri 50–60 subimbricatae ca. 5-seriatae oblongae ad 10 mm longae et 2 mm latae apice obtusae vel acutae extus superne dense glanduliferae et tomentosae; paleae nullae. Flores 20–30 in capitulo; corollae lavandulae ca. 8–14 mm longae inferne glabrae vel sparse glanduliferae, tubis 3–5 mm longis, faucibus cylindricis 1.0–1.5 mm longis, lobis 3–6 mm longis extus superne glanduliferae et pauce vel dense piliferae, pilis saepe T-formibus; thecae antherarum 3–4 m longae base breviter appendiculatae; appendices apicales antherarum ovato-oblongae vel lanceolatae 0.25–0.50 mm longae et ca. 0.10–0.12 mm latae, parietibus in cellulis marginalibus mediocriter incrassatis; basi stylorum non noduliferi non scleroidei. Achaenia 2.5–3.5 mm longa ca. 8-costata evanescentiter persparse setulifera in idioblastis pauci-cellularibis sparse obtecta; carpopodia annuliformia, cellulis minute subquadratae ca. 6-seriatis mediocriter scleroideis; setae pappi capillares scabrae mediocriter facile deciduae exteriores breviores ca. 20 attenuatae, setae interiores ca. 35 plerumque 5–9 mm longae apice lateriores. Grana pollinis in diametro ca. 55 μm in typus A-formibus irregulariter subareolatis.

Figs. 18–25. *Minasia alpestris* (Gardner) H. Robinson; 18. Habit; 19. Head; 20. Corolla with anthers and style; 21. Anthers; 22. Style with nectary; 23. Achene with complete pappus; 24. Achene without inner pappus; 25. Trichomes from corolla lobe.

Type: *Vernonia alpestris* Gardner ≡ *Minasia alpestris* (Gardner) H. Robinson.

The two previously known species of the genus have evidently impressed others as being misplaced in *Vernonia*. Jones (1979) did not include the species in his review of *Vernonia* in the New World, although no alternate disposition was indicated. *Minasia* is distinct in its short stemmed, rosulate form with broadened leaf bases encircling much of the stem. The leaves have broadly petioliform bases instead of distinct petioles, as seen in *Anteremanthus,* and the T-shaped hairs form a dense appressed tomentum covering both surfaces. The anthers are different from most in the subtribe by their short but usually distinct, sterile tails.

Key to the Species of *Minasia*

1. Primary leaves linear, with acute apices; inflorescences with heads densely congested in subspherical clusters; achenes with numerous setulae in basal half .... *M. scapigera*
– Primary leaves oblanceolate, with obtuse or shortly acute apices; inflorescences with heads staggered in axils of congested upper bracts; achenes with few setulae below or setulose throughout 2
2. Base of plant 2.0–2.5 cm wide; leaves 12–22 cm long, 2.5–4.5 cm wide; scapes densely velutinous with short spreading hairs; anther appendages ca. 0.5 mm long, ca. 4 times as long as wide, acute; achenes with few setulae below ..... *M. alpestris*
– Base of plant 1.0–1.5 cm wide; leaves mostly 5–8 cm long, 0.5–1.0 cm wide; scapes with appressed tomentum; anther appendages ca. 0.25 mm long, ca. 2 times as long as wide, obtuse to subacute; achenes with numerous setulae over whole surface ..... *M. pereirae*

Minasia alpestris (Gardner) H. Robinson, comb. nov. (Fig. 18–25)

Chresta alpestris Gardner, London J. Bot. 1:239. 1842. Type: Brazil; Minas Gerais, Adamantium, in montibus altis et rupestribus Gardner 4820 (BM; isotypes C, photo, K, photo).

Vernonia alpestris (Gardner) Baker, Fl. Bras. 6(2):55. 1873.

The heads of the species seem characteristically larger as well as more loosely disposed than those of *M. scapigera.*

Additional specimens seen: Brazil; Minas Gerais, Mun. Datas, Vargens dos Bastos, 5 km 0, campo rupestre, afloramentos rochosos, capitulos, lilas palido, 13 Sep 1985, Hatschbach & Kummrow 49645 (US); ca. 18 km E of Diamantina, 1100 m, rocky summits with soil-filled crevices and small areas of white sand, herb to ca. 50 cm tall, 19 Mar 1970, Irwin, Fonsêca, Souza, Reis dos Santos & Ramos 27909 (NY, US); just west of Serra, road from Concepcão to Diamantina, occasional on sandstone, herbaceous perennial to 5 dm high, flowers purple, 9 Aug 1960, Maguire, Magalhaes & Maguire 49133 (NY, US).

Minasia pereirae H. Robinson, sp. nov.

Plantae herbaceae rosulatae ad 1.5–2.5 dm altae; caules 1.0–1.5 cm alti in basibus foliorum dense obtecti. Folia anguste oblanceolata plerumque 5–8 cm longa 0.5–1.0 cm lata base breviter amplexicaulia ad 7 mm lata inferne subpetioliformia ca. 2 mm lata apice breviter obtusa vel breviter acuta supra et subtus dense appresse T-formiter pilosa supra appressiores subtus densiores et pallidiores, nervis secundariis obscuris ca. 10 erecto-patentibus brevibus. Inflorescentiae scaposae 1.5–2.5 dm altae; scapi appresse tomentosae inferne sparse et remote bracteiferae, bracteis anguste ellipticis 1–2 cm longis 2–3 mm latis, inflorescentiae superne plerumque aliquantum seriate tri-

capitatae. Capitula ca. 1 cm alta et lata; bracteae involucri 40–45 ca. 6-seriatae oblongae 1.5–7.0 mm longae 1.0–1.5 mm latae apice obtusae extus dense sordide tomentosae; receptacula alveolata sparse pilosula. Flores ca. 40 in capitulo; corollae lavandulae ca. 8 mm longae, tubis ca. 4 mm longis anguste infundibulares base et superne sparse glanduliferis, faucibus ca. 1.5 mm longis extus glanduliferis, lobis lanceolatis ca. 2.5 mm longis et base 0.6 mm latis extus glanduliferis superne dense contorte vel T-formiter pilosis; thecae antherarum ca. 2 mm longae, appendices apicales antherarum ovato-oblongae ca. 0.25 mm longae et 0.11 mm latae apice obtusae. Achaenia ca. 3 mm longa omnino setulifera; setae pappi pallide rufescentes longiores 5–6 mm longae apice vix angustiores, setae exteriores breviores 1.5–3.0 mm longae apice attentuatae. Grana pollinis in diametro ca. 50 μm.

Type: Brazil; Minas Gerais, Diamantina, Rio das Pedras, flores lilaz, 29 May 1955, Pereira 1626 (NY).

Minasia pereirae has the general habit of *M. alpestris,* but is distinctly smaller in all its parts. In addition to the difference in size, the anther appendages are much shorter in comparison to their length and have blunter tips, and the achenes have setulae throughout their length instead of having them restricted to the basal part.

One other specimen, Brasil: Minas Gerais; Mun. Gouveia, Barro Preto, torre Telemig, campo rupestre, solo rochoso, 20 Mar 1987, Hatschbach, Cervi & Cordeiro 51160 (US); seems to belong to the genus, and it was tentatively determined by the author a few years ago as *Vernonia alpestris.* The mostly appressed pubescence of the stems, head size, corolla length, anther appendage, and achene setulae are most like the present species, but the vegetative parts that are available are mostly different. The specimen consists of slender leafy shoots with a few small densely congested heads distally. The shoots may have arisen from a basal rosette, but a rosette is not present. The leaves are narrowly petiolate, the bases are narrowly inserted on the stem, and the apices are narrowly acute. The pieces cannot be placed with confidence in any of the three species presently recognized in the genus. Further collecting may clarify the relationship of the specimen.

Minasia scapigera H. Robinson, nom. nov.

Vernonia scapigera Baker, Fl. Bras. 6(2):55. 1873, non *Vernonia scapigera* Less., Linnaea 4:250–251. 1829. Type: Brazil; Minas Gerais, Inter Villa de Campanha et St. João d'El Rey, in pratis alpestribus, s.d., Martius s.n. (M, photos NY, US).

The species has long been recognized under the name *Vernonia scapigera* Baker, a later homonym. The species is properly validated here for the first time based on the Baker (1873) description.

Additional specimens seen: Brazil; Minas Gerais, s.l., s.d., Glaziou 19545 (NY); Serra do Espinhaço, ca. 10 km N of São João da Chapada, road to Inhaí, cerrado, gallery and campo, 22 Mar 1970, Irwin, Fonsêca, Souza, Reis dos Santos & Ramos 28085a (US), 28086 (NY); Mun. Pres. Kubitchek, Rod. BR-259, campo rupestre, solo arenoso, capítulos lilás, 1000 m, Hatschbach & Nicolack 53104 (MBM, US); Diamantina, Agua Limpa, flores lilaz, 22 May 1955, Pereira 1459 (NY).

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