

A Bully New Genus from the Andes (Compositae: Liabeae)

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ABSTRACT. *Dillandia* (Compositae, Liabeae) is described as new on the basis of three species: *D. perfoliata* (S. F. Blake) V. A. Funk and H. Rob. (= *Liabum perfoliatum*), *D. chachapoyensis* (H. Rob.) V. A. Funk and H. Rob. (= *Munnozia chachapoyensis*), and *D. subumbellata* V. A. Funk and H. Rob. Phylogenetic analysis of Liabeae using data from the nuclear ribosomal DNA internal transcribed spacer (Kim et al. unpublished data) places two of the *Dillandia* species outside the subtribe Munnoziinae and separates them from all other clades in the tribe as well. Irregular spine groupings on the pollen confirm the separation of these species from the Munnoziinae. Morphological analysis suggests that these two and one additional species form a monophyletic group defined by their possession of bullate leaf surfaces and pale anther thecae. This study is an example of how molecular and morphological data, when used together, can lead to a better classification.

The Liabeae is a well-defined Neotropical tribe that contains approximately 180 species distributed in 15 genera. The plants grow in a wide variety of habitats throughout much of Mexico, Central America, the West Indies, and western South America. The greatest diversity in the tribe is found in Andean northern Peru. The tribe is characterized by a combination of morphological characteristics, and as in most tribes there are taxa with exceptions to some of them. For the Liabeae, the characteristics include the following: opposite leaves that are often strongly trinervate and white-tomentose beneath, yellow corollas, cylindrical or columnar cypselae usually with a biseriate pappus of outer scales and inner capillary bristles, and the frequent occurrence of white latex. Although the tribe is easily recognizable, its acceptance was not immediate and its component taxa have been variously placed in other tribes, most frequently the Vernoniaeae (Cassini 1823, 1825, 1830; Nash 1976) or Senecioneae (Bentham 1873). Recent phylogenetic studies have supported the monophyly of the tribe and its placement near the Vernoniaeae (Jansen and Kim 1996). Bremer (1994) did not recognize subtribes within the Liabeae; Robinson (1983) and Funk et al. (1996) recognized three: Munnoziinae, Paranepheliinae, and Liabinae.

A few traditional (Robinson 1983) or cladistic (Bremer 1994; Funk et al. 1996) schemes have been presented, but these studies were conducted at a genus level rather than a species level and therefore they did not directly address generic limits, especially in the larger genera. As a result, all uncertainties of generic relationships were not resolved.

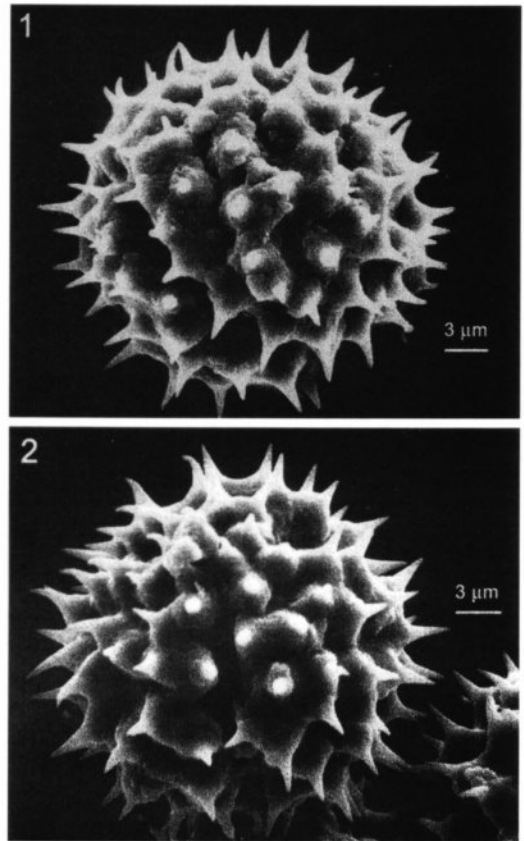
Until the present effort, no test of evolutionary schemes by DNA sequencing has been available.

A molecular analysis of the nuclear ribosomal DNA internal transcribed spacer (ITS) of the Liabeae has been underway since 1998 and the results are now in hand (Kim et al. unpublished data). One interesting result of this study is the new placement of some species that have traditionally been included in *Munnozia* Ruiz and Pavon (subtribe Munnoziinae) by Robinson and Brettell (1974) and Robinson (1983). Historically *Munnozia* and *Chrysactinium* (Kunth) Wedd. have been treated as a generic pair and have always seemed to form a well-established, related group. Members of this generic group nearly always have a general habit of elongate peduncles, black anther thecae, subquadrate raphids in the cypselae walls, and a uniform distribution of spines on the pollen grains. The relationship held even for some anomalous elements including *Munnozia* subg. *Kastnera* (Sch. Bip.) H. Robinson and Brettell, which lacks chaffy extensions on the receptacle among the florets and has less numerous bristles and broader squamellae in the pappus, and the *M. hastifolia* (Poepp.) H. Robinson and Brettell group, which has pale anther thecae. Still, not all the generic characteristics had been examined in all the species.

The results of the ITS sequence analysis (Kim et al. unpublished data) clearly indicated that *Munnozia perfoliata* (S. F. Blake) H. Rob. and Brettell was consistently placed considerably apart from the other species of *Munnozia* and *Chrysactinium*. In fact, it was located in a more basal position on the cladograms in a different subtribe, the Liabinae. Al-

though readily identifiable, *Munnozia perfoliata* had not previously been considered a candidate for separate generic status.

In 1994 a new species, *Munnozia chachapoyensis* H. Rob., was described from Peru. It was instantly recognized as a close relative of *M. perfoliata* because of its similarly bullate leaves. In addition, a new species was discovered during the examination of available herbarium material, again with similar leaves and anthers; it is described here as new. We were unable to obtain sequence data for *M. chachapoyensis* because it is known only from the type specimen, which had been preserved in alcohol. However, recently we received leaf material for the new species that had been preserved in silica gel (from M. Dillon, *Sánchez and Dillon 8035, F*) and we were able to obtain sequence data. The new species appeared on the cladograms as very closely related to *M. perfoliata*, with the two species forming a well supported monophyletic group (Kim et al. unpublished data). Although we have no sequence data for *M. chachapoyensis*, we assume that all three species are part of a monophyletic group because of the similar morphology and the shared unique characteristic of bullate leaves. A detailed examination of the morphology of the three species has shown that they have several characteristics that separate them from *Munnozia*. In addition to the bullate leaves, these characteristics include pale anther thecae, and the fact that the raphids of the cypselae, though subquadrate and more or less like those of *Munnozia*, are very sparse, and located mostly near the costae. In addition, SEM images of the pollen (Figs. 1, 2) show a basic difference. The pollen of the members of the Munnoziinae has spines that are characteristically evenly distributed and not grouped (Figs. 140, 168 and others in Robinson and Marticorena 1986) while that of *M. perfoliata* has an irregular spine distribution with the spines grouped or partially coalescent in twos and threes (Figs. 1, 2). This feature is known from many genera in the Liabeae, but is not known in the Munnoziinae (Robinson and Marticorena 1986). This



FIGS. 1-2 SEM images of the pollen of *Dillandia perfoliata* (S. F. Blake) V. A. Funk and H. Rob. Note that the spines are grouped or partially coalescent in groups of two and three. Fig. 1. Oblique view showing intercolpus. Fig. 2. Colpar view. Photos by Greg McKee.

difference alone might have raised questions about the relationship if it had been observed previously.

The genus *Munnozia* is not the proper disposition of the species group containing *Munnozia perfoliata*, *M. chachapoyensis*, and a new species. This group is distinguished by bullate leaf surfaces, pale yellow anther thecae, and irregularly dispersed spines on the pollen. The new genus *Dillandia* is established herein to accommodate these three species.

KEY TO THE GENERA OF THE LIABEAE

- 1. Abaxial surfaces of leaves green, without tomentum; leaves and stems with stiff hairs with enlarged bases 2
- 2. Coarse perennial herbs, subshrubs, shrubs, or small trees; leaves with 5-9 palmately arranged veins; cypselae 4-sided with 4 ribs *Erato*
- 2. Small erect, decumbent, or creeping herbs; leaves 3-nervate; cypselae compressed with 2 ribs *Philoglossa*
- 1. Abaxial surfaces of leaves covered with dense white or grey tomentum; leaves and stems without stiff hairs with enlarged bases 3
- 3. Anther thecae dark brown or black 4

4. Pappus white; small herbaceous perennials; leaves in a rosette or grouped close together on a short stem *Chrysactinium*
4. Pappus sordid or reddish; usually lax subshrubs, sometimes annual or perennial herbs; leaves cauline *Munnozia*
3. Anther thecae pale yellow or very light brown 5
5. Heads sessile subtended by a rosette of leaves or nearly sessile with peduncles of less than 2 cm long *Paranephelius*
5. Heads on peduncles greater than 2 cm long 6
6. Leaves pinnately veined 7
7. Herbs; heads few; disc florets 10–55; petioles sessile, subperfoliate or perfoliate, not winged 8
8. Adaxial surfaces of leaves rugose to nearly smooth; corollas reddish-orange to red; involucre bracts eximbricate, linear-lanceolate with attenuate tips *Pseudonosotis*
8. Adaxial surfaces of leaves bullate; corollas yellow to yellow and purple; involucre bracts subimbricate, lanceolate with acute tips *Dillandia*
7. Trees, shrubs, or vines; heads many; disc florets 3–34; petioles narrowly to broadly winged 9
9. Trees or shrubs; petiole without wings, bases of petiole pair fused into a sheath; raphids of the cypsela wall elongate *Ferreyranthus*
9. Vines or shrubs; petiole with or without wings, sometimes included in perfoliate leaf base but not fused into a sheath; raphids of the cypsela wall subquadrate *Oligactis*
6. Leaves 3-nervate 10
10. Pappus lacking *Cacosmia*
10. Pappus of bristles, awns, and/or squamellae 11
11. Pappus of plumose bristles; disc corollas red-purple *Chionopappus*
11. Pappus of capillary bristles, awns, and/or squamellae; all corollas yellow 12
12. Heads terminal and solitary on leafy stems; leaf bases fused into a sheath *Bishopanthus*
12. Heads few to many but not solitary; leaf bases without a sheath 13
13. Inflorescences with all alternate branching; receptacle scarcely alveolate, without hairs, squamellae, or projections; Argentina and Bolivia *Microliabum*
13. Inflorescences with at least basal branches opposite; receptacles with hairs, squamellae, or projections; Bolivia northward to Mexico 14
14. Plants without latex; style branches of disc florets longer than hispidulous part of distal style shaft; anther bases digitate; rays 20–120; involucre bracts 50–150 in 5 series; raphids of cypsela walls subquadrate *Liabum*
14. Plants with latex; style branches of disc florets shorter than hispidulous part of distal style shaft; anther bases minutely crenulate; rays usually absent or when present 4–25; raphids of cypsela walls elongate 15
15. Herbs; rays always absent; leaf blades shallowly to deeply lobed; petioles winged to base, sometimes perfoliate; disc florets 25–30; inner pappus of 40–50 capillary bristles, outer of 20–40 squamellae *Liabellum*
15. Shrubs or vines; rays usually present (absent in a few species); leaf blades entire or serrate; petiole bases simple, not winged and without pseudostipules; disc florets 5–30; inner pappus of 30–40 bristles, outer of 10–15 squamellae *Sinclairia*

TAXONOMIC TREATMENT

DILLANDIA V. A. Funk and H. Robinson, gen. nov.—TYPE: *Liabum perfoliatum* S. F. Blake, *Journal of the Washington Academy of Sciences* 17: 291. 1927. = *Dillandia perfoliata* (S. F. Blake) V. A. Funk and H. Rob.

Plantae herbaceae in caulibus foliis abaxialiter et interdum involucri pallide arachnoide tomentosae; folia opposita base anguste vel late perfoliata adaxialiter bullata margine multe dentata vel crenata. Capitula pedunculata; involucre subimbricata gra-

data; receptacula nuda; flores radii 15–40, corollae flavae in tubis pilosae; flores disci 10–40, corollae flavae vel purpureo-tinctae. Cypselae 7–10-costatae, raphidis sparsis subquadratis; setae pappi 10–30 sordidae. Grana pollinis irregulariter spinosa.

Moderate to small herbs less than 60 cm tall; no reports of milky sap; with or without stolons, procumbent or erect. *Stems* terete, covered with an arachnoid tomentum that often becomes more sparse at maturity. *Leaves* cauline, opposite, sessile, subpetiolate or not, perfoliate or not; blades mostly lanceolate to ovate, margins crenate-dentate, abaxial

surfaces covered with dense, white or off-white tomentum; adaxial surface deep green, beautifully bullate; venation pinnate with arachnoid tomentum on primary and to a lesser extent on secondary veins. *Inflorescences* of 1–2 heads or, more frequently, a 3–7-headed pseudo-dichasium or sub-umbel; peduncles 1–5 cm long, erect, slender, usually with arachnoid tomentum, scapes, when present, 9–30 cm long, erect, slender, usually with arachnoid tomentum. *Heads* radiate, 8–12 mm in diameter (excluding rays), 6–12 mm in height. *Receptacles* without chaff. *Involucres* campanulate, phyllaries subimbricate in 5–6 rows, free, glabrous or with sparse arachnoid tomentum, mostly ovate to lanceolate, the inner narrower and longer than the outer. *Ray florets* pistillate, fertile, 15–40, corollas yellow to bright yellow and showy, tubes pilose, lamina oblong to narrowly oblong, narrowing at apex, apices irregularly 2-notched, styles yellow. *Disc florets* bisexual, usually 10–30, corollas yellow to yellow and purple, tubes pilose, anthers 5, yellow, bases rounded, apices acute, styles yellow. *Cypselae* (immature) 7–10-ribbed, densely setulose, with a few subquadrate raphids, carpodium annular; pappus of a single row of 10–30, off-white or yellow bristles 3–6 mm long. *Pollen grains* 32–37 μm in diameter, echinate, the spines grouped or more or less coalescent in twos and threes.

Dillandia contains moderate-sized to small herbs either stoloniferous or solitary. Although latex is common in the tribe, it was not mentioned on any of the herbarium labels that we examined. Noteworthy features of the plants include the bullate leaves, the distinctive pollen, and the pale anther thecae. The name *Dillandia* honors Michael Dillon (often referred to as “Dillon of the Andes”) and his long association with the Compositae of the Andes especially in northern Peru.

KEY TO THE SPECIES OF DILLANDIA

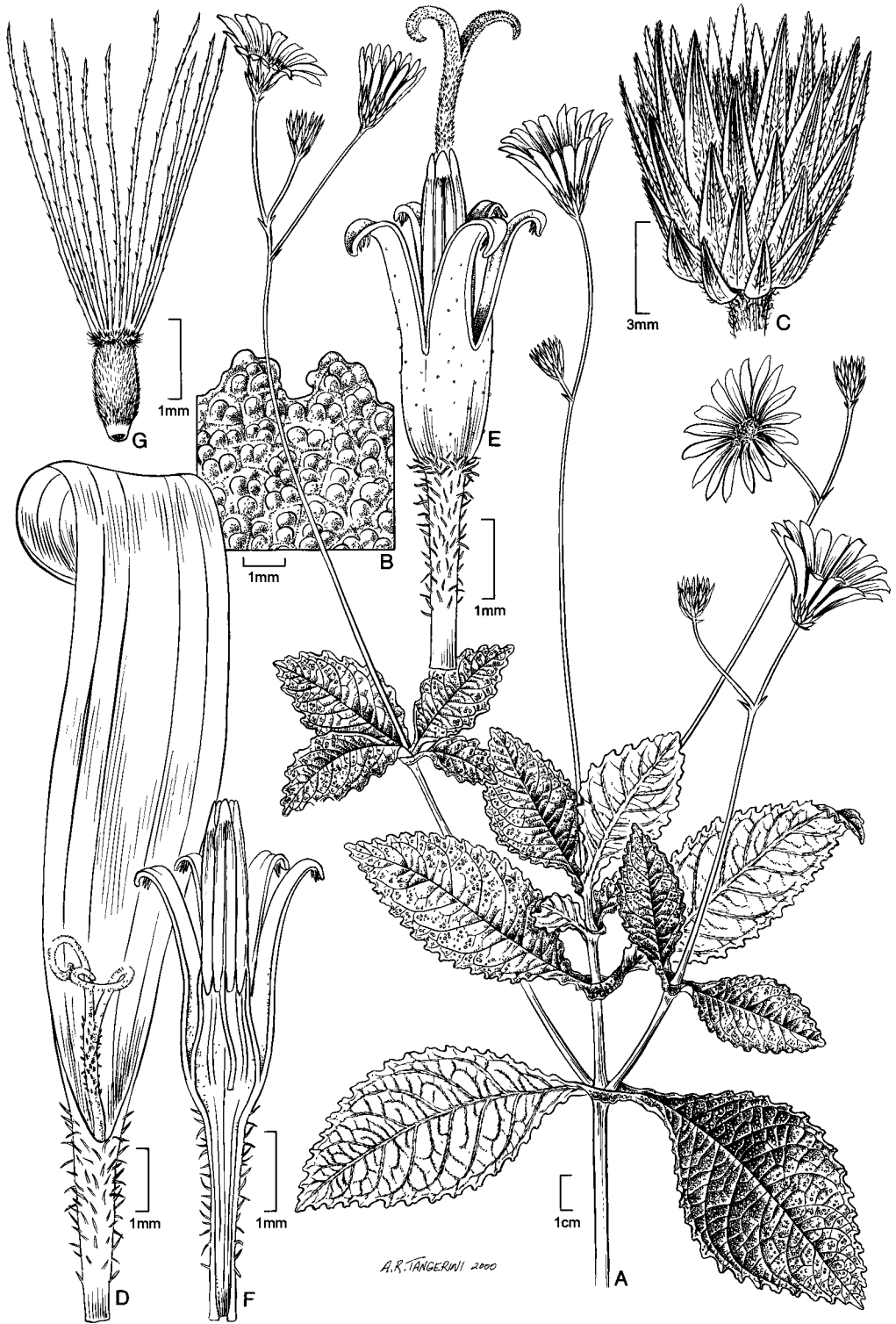
- 1. Stems prostrate, rooting at the proximal nodes; leaf blades ovate, 2–5 cm wide; adaxial surfaces with rounded mamillae ca. 0.2 mm high × 0.2 mm wide; disc corollas 4.0–5.5 mm long, tubes pilosulous 1. *D. perfoliata*
- 1. Stems erect, not rooting at the nodes; leaf blades lanceolate to elliptical, 1.0–2.5 cm wide; adaxial surfaces with conical papillae 0.6–0.9 mm high × 0.5–0.6 mm wide; disc corollas ca. 9 mm long, tube nearly glabrous or with a few hairs at the base of the throat 2
- 2. Leaf blades 3.0–4.5 × 1.0–1.4 cm, venation pinnate with ca. 7 difficult to distinguish secondary

veins on each side of the mid-vein; primary veins on adaxial surfaces with sparse gray tomentum; older leaves not persistent; 1–3 heads in each inflorescence 2. *D. chachapoyensis*

- 2. Leaf blades 7–13 × 1.0–2.5 cm, venation pinnate with ca. 40 easy to distinguish secondary veins on each side of the mid-vein; primary veins on adaxial surfaces with dense white tomentum; older leaves marcescent; 5–7 heads in each inflorescence 3. *D. subumbellata*

- 1. **DILLANDIA PERFOLIATA** (S. F. Blake) V. A. Funk and H. Robinson, comb. nov. *Liabum perfoliatum* S. F. Blake, Journal of the Washington Academy of Sciences 17: 291. 1927—*Munozia perfoliata* (S. F. Blake) H. Rob. and Brettell, Phytologia 28: 55. 1974—TYPE: COLOMBIA. El Cauca: “La Gallera” Micay Valley, Cordillera Occidental, herb in forest, “flowers yellow,” 2000–2200 m elevation, 1 July 1922, Killip 7952 (holotype: US!; isotypes: NY! US!). Figure 3.

Stoloniferous herbs 8–60 cm in height. *Stems* often rooting at the proximal nodes, leafy portions 5–36 cm long, internodes 1–9 cm long. *Leaves* strongly to moderately (rarely narrowly) perfoliate; blades ovate to narrowly ovate, 4–12 × 2–5 cm (including bases), bases narrowed, margins crenate approaching dentate with teeth 0.5 mm long × 1.0 mm wide, apices acuminate to obtuse, adaxial surfaces bullate with rounded mamillae ca. 0.2 mm high × 0.2 mm wide; venation pinnate with 10–15 easily distinguished secondary veins on each side, primary and secondary veins with sparse, arachnoid indument. *Inflorescences* of 1–3 (5 on *Luteyn et al.* 12246) heads borne singly or in erect, terminal pseudo-dichasia; peduncles 1.0–5.5 cm long; scapes, when present, 10–15 cm. *Heads* 8–10 mm high, 6–12 mm wide. *Involucres* with phyllaries 25–40, subimbricate in 5–6 rows; outer series ovate to broadly lanceolate, 1–3 × 1 mm, pale green with purple or green near apex, margins entire to subentire, apices callose-apiculate, inner series narrowly lanceolate to linear, 5.5–6.5 × 1 mm, yellow-green, margins entire, apices apiculate. *Ray florets* 15–25, corollas pale or bright yellow, 12–16 mm long; tubes 2–3 × 0.5 mm, lamina oblong, 10–11 × 2.0–2.5 mm; styles 5–6 mm long, style branches 1.5 mm long. *Disc florets* ca. 20–30, corollas yellow to purple and yellow, 4.0–5.5 mm long, tubes 2 × 0.33 mm, throats 2–3 × 1.0 mm, lobes 1.5–2.0 mm long; stamens 3 mm long, thecae 2 mm long, yellow, apical appendages ovate ca. 0.4 × 0.4 mm; styles 6–8 mm long, style branches 1.5–2.0 mm long. *Cypselae* (immature) ca. 7–



ribbed, 1.0–1.5 × 0.5 mm, light to dark brown, pilose, raphids subquadrate; pappus bristles 15–30, yellow-white, 3–4 mm long. *Pollen grains* ca. 35–37 μm in diameter.

Dillandia perfoliata is named for its characteristic perfoliate leaf bases. Blake, in his original description (1927), wrote "A most distinct species of the *Liabum grandiflorum* group, readily recognized by its leaves, inflorescence and involucre." This has not changed, the bullate, perfoliate leaves, and few-headed inflorescence, along with the prostrate habit remain the best characteristics that separate it from other taxa. *Dillandia perfoliata* has been found in eight locations, six in Colombia and two in Ecuador. According to information on the specimen labels, the species has been found on wet vertical cliffs in tropical forest, in cloud forests, and on banks and in low montane forests from 1200 to 2500 m in elevation. Flowering specimens have been collected once or twice in each of the months of February, May, July, and August; it may flower most of the months of the year. The distribution covers the Cordillera Occidental from southern Chocó to the very northern part of Ecuador.

Representative Specimens Examined. COLOMBIA. Chocó: Carretera Ansermanuevo—San José del Palmar, limite con el Valle del Cauca, Alto del Galápago, 2100 m, 27 Aug 1978, *Forero et al.* 2153 (COL, NY!); Chocó: Ansermanuevo—San José del Palmar road, from Chocó-Valle border west 10 km towards San José del Palmar, 2050 m, 15 May 1984, *J. Luteyn et al.* 10563 (F!, NY!, S, TEX, UC, US!). Nariño: road between Junín and Altaquer on Pasto-Tumaco road, 2.9 km NE of Junín, 13.7 km W of Altaquer, 1200 m, 26 Feb 1992, *T. Croat* 72468 (MO, US!). Putumayo: El Mirador, ca. 50 km generally east of San Francisco, 2100 m, 5 Aug 1965, *R. M. King and A. E. Guevara* 6184 (F!, NY!, US!). Valle/Chocó: Mpio. El Cairo, Correg. Boquerón, Vereda Las Amarillas, Serranía de los Paraguas, along road to and beyond Cerro del Inglés, 1750–2050 m, 13 May 1988, *J. Luteyn et al.* 12246 (MO, NY!).

ECUADOR. Carchi: 48.3 km W of Tufiño, ca. 16 km E of Maldonado, 2430 m, 20 Jul 1992, *J. Panero and B. Clark* 3038 (MEXU, TEX, US!). Carchi: 9–10 mi SE of Maldonado on road to Tulcán, 2480–2550

m, 27 Jul 1983, *S. A. Tompson and J. E. Rawlins* 924 (CM, F!).

2. **DILLANDIA CHACHAPOYENSIS** (H. Robinson) V. A. Funk and H. Robinson, comb. nov. *Munnozia chachapoyensis* H. Rob., *Phytologia* 76: 20–21. 1994.—TYPE: PERU. Amazonas, Chachapoyas, 27 km NE of Florida, off road up a logging trail, 1200 m, 30 December 1979, *James Aronson* 1021 (holotype: US!; isotype: MO). [The isotype is not currently in the herbarium at MO; possibly it is in the backlog.] Figure 4.

Herb 30 cm in height. *Stems* with no evidence of rooting at the proximal nodes, leafy portions ca. 10 cm long (only top part of plant available), internodes 0.3–2.0 cm long. *Leaves* sessile, not perfoliate; blades elliptical to lanceolate, 3.0–4.5 × 1.0–1.4 cm, bases briefly subpetiolate, margins crenulate with teeth 1.5 mm long × 2.0 mm wide, apices briefly acute, adaxial surfaces bullate with cone-shaped mamillae ca. 0.8–0.9 mm high × 0.5–0.6 mm wide; venation pinnate with ca. 7 difficult-to-distinguish secondary veins on each side of the midrib, primary and secondary veins with sparse arachnoid indument. *Inflorescences* of 1–3 heads in erect, terminal pseudo-dichasia; peduncles 2.5–5.0 cm long; scapes, when present, 9–12 cm long, gray, covered with arachnoid tomentum. *Heads* 12 mm high, 12 mm wide. *Involucres* with phyllaries ca. 40, subimbricate in 5 rows; outer series oblong to oblong lanceolate, 1.5–5.0 × 1.0–1.8 mm, pale green, with purple or green near apex, margins entire, apices rounded or obtuse, inner series linear-lanceolate, ca. 9 × 1 mm, yellow-green, margins entire, apices acuminate apiculate. *Ray florets* ca. 20, corollas bright yellow, 18–19 mm long, tubes 4 × 0.5 mm, lamina narrowly oblong, 14–15 × 1 mm; styles ca. 9 mm long, style branches ca. 2 mm long. *Disc florets* ca. 10, corollas yellow to purple and yellow, 9 mm long, tubes 4.5–5.0 × 0.5 mm, throats 4.5–5.0 × 1 mm, lobes 3 mm long; stamens ca. 4 mm long, thecae 2.8 mm long, yellow, apical appendages oblong-ovate, ca. 0.5 × 0.2; styles ca. 10 mm long, style branches ca. 2.25 mm long. *Cypselae* (immature) ca.

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FIG. 3. *Dillandia perfoliata*. (S. F. Blake) V. A. Funk and H. Rob. A. habit, B. adaxial leaf surface, C. head, D. ray corolla, note the sweeping hairs on the style characteristic of the Ecuadorian collection but not present on the Colombian specimens, E–F disc florets without the ovary or pappus, G. cypselae with pappus. Drawing by Alice Tangerini from collection by *Panero & Clarke* 3038.

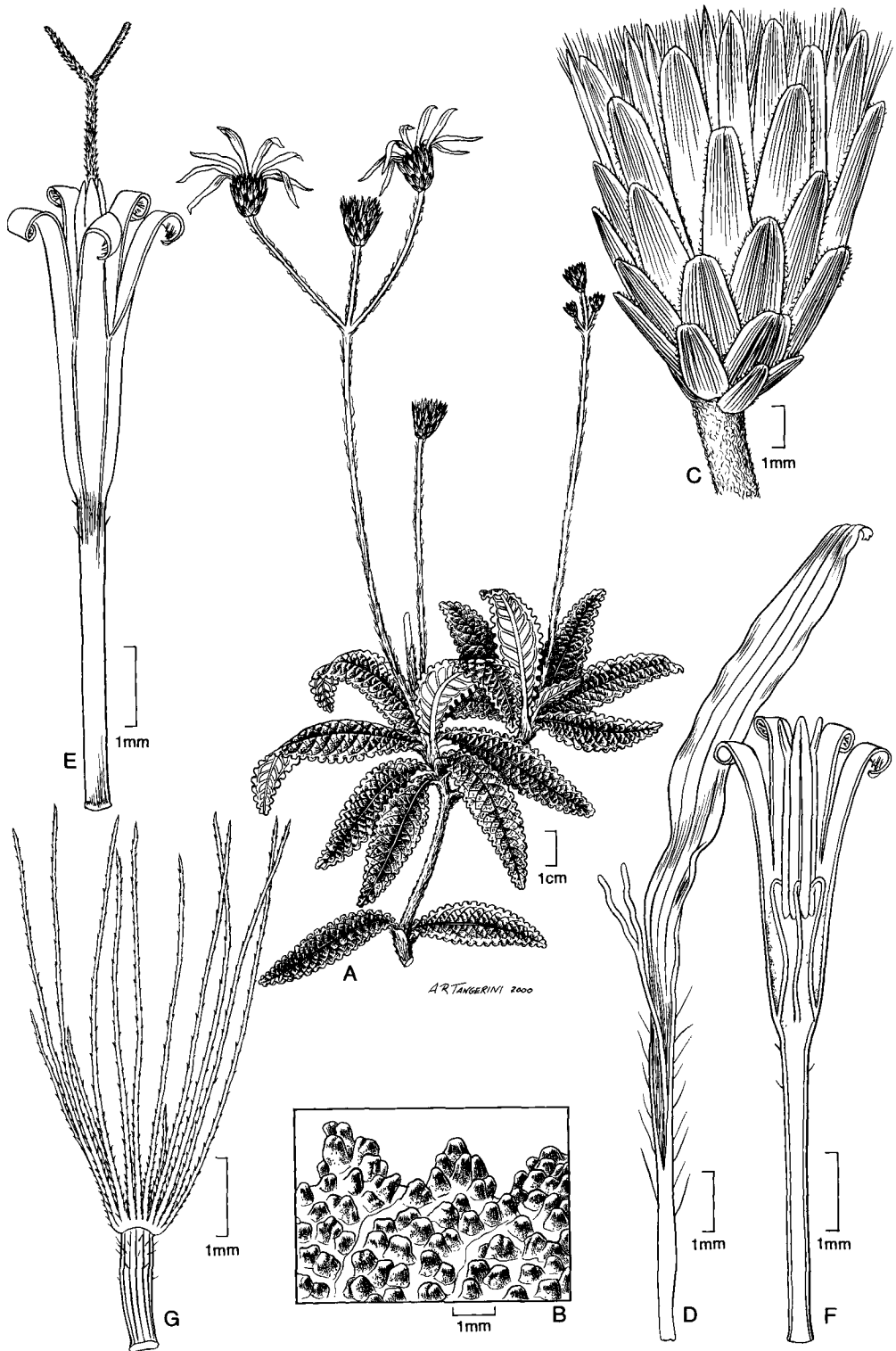


FIG. 4. *Dillandia chachapoyensis* (H. Rob.) V. A. Funk and H. Rob. A. habit, B. adaxial leaf surface, C. head, D. ray corolla, E-F disc florets without the ovary or pappus, G. cypselas with pappus. Drawing by Alice Tangerini from collection by Aronson 1021.

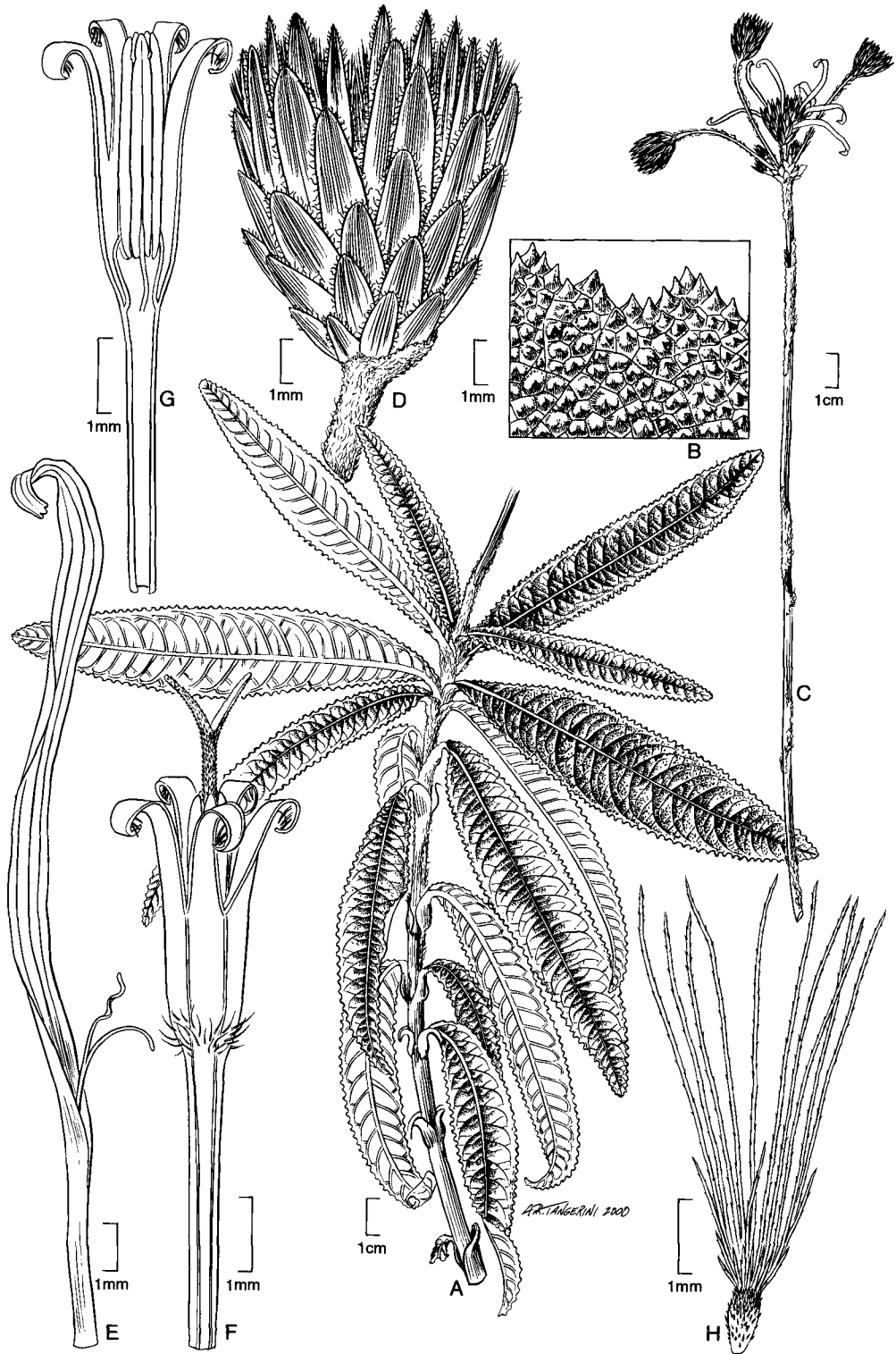


FIG. 5. *Dillandia subumbellata* V. A. Funk and H. Rob. A, habit, maximal portion of stem, B, adaxial leaf surface, C, habit, distal portion of stem, D, head, E, ray corolla with style, F-G, disc floret without ovary or pappus, H, cypsel with pappus (immature). Drawing by Alice Tangerini from collection by Gentry 80300.

10 ribbed, 1.7×0.5 mm, densely setulose; pappus bristles ca. 20, yellow-white, 4–5 mm long. *Pollen grains* ca. $32 \mu\text{m}$ in diameter.

Dillandia chachapoyensis is named for the Peruvian Province Chachapoyas from whence it was collected. In his original discussion of this species, Robinson said that it "... is a small but beautiful member of the genus" (*Munnozia*). It has a similar bullate leaf surface to *D. perfoliata* but differs from it by the much broader leaf bases, leaves that are smaller and more narrow, and larger disc corollas (9 mm versus 4.0–5.5 mm long). *Dillandia chachapoyensis* is known only from the type specimens and the label has few details about the plant or its habitat.

3. **DILLANDIA SUBUMBELLATA** V. A. Funk and H. Robinson, sp. nov.—TYPE: PERU. San Martín: Prov. Rioja, Bajando a Venceremos, Florida-Rioja, 16 km al E de El Progreso, 2020 m, 14 July 1995, I. Sánchez V. and M. O. Dillon 8035 (holotype: US!; isotypes: F!, CPUN, HAO, NY!, MO!, TEX!, USM). Figure 5.

A *Dillandia chachapoyensis* in laminis foliorum adaxialiter papilliformiter bullatis similes sed in foliis longioribus demum marcescentibus in nervis secundariis utrinque ca. 40 et in inflorescentiis subumbellatis distincta.

Spindly herbs 40–50 cm in height. *Stems* not rooting at the proximal nodes, leafy portions 20–30 cm long (most of the plant available), internodes 0.3–3.0 cm long. *Leaves* sessile, not perfoliate; blades linear-lanceolate, 7–13 \times 1.0–2.5 cm, margins crenulate with teeth 0.8–1 mm long \times 1.0–1.5 mm wide, bases briefly subpetiolate, apices rounded-acute, adaxial surfaces bullate with cone shaped mammillae ca. 0.6–0.7 mm high \times 0.5–0.6 mm wide; venation pinnate with ca. 40 easy to distinguish secondary veins on each side of the midvein, dense white arachnoid indument along main veins and sparse indument on secondary veins. *Inflorescences* of 5–7 heads in erect, terminal, sub-umbels; peduncles 1–4 cm long; scapes ca. 30 cm. *Heads* 10 mm high, 10 mm wide. *Involucres* with phyllaries ca. 40, subimbricate in 6 rows; outer series oblong to oblong lanceolate, 1.5–5.0 \times 1.00–1.25 mm, pale green with purple or green near apex, margins entire, apices rounded or obtuse, inner series linear-lanceolate, ca. 8–9 \times 1 mm, yellow-green, margins entire, apices acuminate to apiculate. *Ray florets* ca. 40, corollas yellow, 15–18 mm long; tubes 3.5–4.0 \times 0.5 mm, lamina narrowly oblong, 11–14 \times 1.5 mm;

styles ca. 10–11 mm long, style branches ca. 2 mm long. *Disc florets*, ca. 40, corollas yellow, 9 mm long, tubes 4 \times 0.5 mm, throats 4 \times 1 mm, lobes 2 mm long; stamens ca. 3 mm long, thecae 2 mm long, yellow, apical appendages oblong-ovate, ca. 0.5 \times 0.25; styles ca. 10 mm long, style branches ca. 2.5 mm long. *Cypselae* (immature), 5–7-ribbed, 1.25 \times 0.5 mm, densely setulose; pappus bristles ca. 20, yellow-white, 6–7 mm long. *Pollen grains* ca. $35 \mu\text{m}$ in diameter.

The epithet for *Dillandia subumbellata* is derived from the shape of the inflorescence, which is umbel-like. According to Sanchez and Dillon 8035 the plant is a stoloniferous herb and according to Gentry 80300 it was found in a "tepui-like bromeliad sward" with scattered small trees. A number of new species of taxa generally found on tepui have been collected in this locality in the past. The species grows in both southern Ecuador and northern Peru.

Representative Specimen Examined. ECUADOR. Morona-Santiago, Gualaquiza Canton, Campamento Achupalla, Cordillera Del Condor, 15 km E of Gualaquiza, 2090 m, 21 July 1993, A. Gentry 80300 (MO!, US!).

Recognition that the species now in *Dillandia* form a distinct genus is an example of how molecular and morphological data can be used together. The molecular phylogeny produced for another study (Kim et al. unpublished data) was in conflict with what was previously thought to be the relationships among the species based on morphology. Although both *Dillandia perfoliata* and *D. chachapoyensis* had been thought to be unusual and interesting members of *Munnozia*, it was felt that they fit into the concept of the genus. The molecular phylogenetic analysis of the ITS data indicated that *D. perfoliata* was not closely related to *Munnozia*. The subsequent detailed examination of the morphology and pollen showed that *D. perfoliata* differed from *Munnozia* in several characters. In addition, the morphological analysis indicated that *D. chachapoyensis* and the new species, *D. subumbellata*, were also part of the new genus. The analysis of more recently acquired leaf material of *D. subumbellata* grouped *D. subumbellata* with *D. perfoliata*. The examination of both morphological and molecular data worked well in this study with the molecular data indicating there was a problem and the morphology solving it. This combined approach provides what we judge to be a better classification.

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