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FLORA OF PERU

J. Francis Macbride and Collaborators

Family Asteraceae: Part V

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FLORA OF PERU

Family Asteraceae: Part V

Abstract

The tribe Inuleae (Asteraceae) is treated for Peru and includes 19 genera, 55 species, and 2 varieties. Keys to genera and species, descriptions, and illustrations are provided for *Achyrocline* (5 spp.), *Antennaria* (1 sp.), *Belloa* (9 spp.), *Blumea* (1 sp.), *Chevreulia* (1 sp.), *Cuatrecasasiella* (1 sp.), *Facelis* (2 spp.), *Gamochoeta* (4 spp.), *Gnaphalium* (7 spp.), *Helichrysum* (1 sp.), *Jalcophila* (1 sp.), *Loricaria* (7 spp., 2 vars.), *Lucilia* (2 spp.), *Mniodes* (4 spp.), *Novenia* (1 sp.), *Pluchea* (4 spp.), *Pterocaulon* (1 sp.), *Stuckertiella* (1 sp.), and *Tessaria* (1 sp.). *Gamochoeta oreophila* Dillon & Sagást. is provided to replace *G. monticola* Dillon & Sagást., an invalid name due to an earlier homonym.

Tribe INULEAE

Inuleae Cass., Jour. Phys. 88: 193. 1819. TYPE: *Inula* L.

Gnaphalieae Rydb., Fl. Rocky Mts. 833. 1917. TYPE: *Gnaphalium* L.

Dioecious or bisexual, annual or perennial herbs, shrubs, rarely trees; stems usually arachnoid or glandular. Leaves alternate or opposite, cauline or rosulate, the margins mostly entire. Capitulescences paniculate, spiciform, cymose-corymbiform, glomerulate, or of solitary heads. Capitula disciform, discoid, or rarely radiate; involucre cylindrical to campanulate or hemispherical; phyllaries numerous, usually imbricate, indurate or hyaline, scarious, usually stramineous, sometimes white, or variously colored; receptacles plane or convex, usually naked; marginal florets pistillate,

the corollas filiform or ligulate (rarely tubular), the styles divided into linear branches; disc florets usually hermaphroditic, functionally staminate or occasionally gynoecia fertile, the corollas tubular, the anthers connate, appendaged, bases obtuse to sagittate, usually caudate, the styles divided, bidentate, or undivided, the branches slender, subulate, and attenuate, or oblong-linear and rounded, obtuse, or truncate, unappendaged; ovaries mostly terete. Achenes mostly terete, small, often ribbed, variously pubescent, glandular, or glabrous; pappus bristles usually 1–2-seriate, smooth to scabrid, barbellate, or plumose, often fused at the base, deciduous together as a unit or persistent on the achene.

Inuleae is well defined in Peru; members may be recognized by alternate or at times rosulate leaves (opposite in *Chevreulia* and *Cuatrecasasiella*), usually with arachnoid pubescence and caudate anthers. In Peru, it includes 55 species and two varieties distributed in 19 genera. Several genera have centers of diversity in the Peruvian Andes, including *Belloa*, *Loricaria*, and *Mniodes*. A few members are used medicinally (e.g., *Achyrocline*, *Gnaphalium*, *Loricaria*, *Tessaria*) and one, *Helichrysum*, is cultivated for ornamental value.

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- TURNER, B. L., A. M. POWELL, AND J. CUATRECASAS. 1967. Chromosome numbers in Compositae. XI. Peruvian species. Ann. Missouri Bot. Gard., 54: 172–177.

Key to Genera of Inuleae in Peru

1. Plants dioecious; individual capitula exclusively homogamous (polygamo-dioecious in *Antennaria*) 2
2. Erect shrubs or subshrubs, 20 cm tall or greater; stems laterally flattened; leaves laterally compressed XII. *Loricaria*
2. Cespitose, perennial herbs or suffruticose perennials, less than 20 cm tall; stems cylindrical; leaves not laterally compressed 3
3. Stems clearly visible, internodes evident; basal leaves rosulate and cauline leaves alternate or basal leaves lacking and cauline leaves opposite, decussate, mostly linear to oblong .. 4
4. Basal leaves rosulate; capitulescences scapose, cymose-corymbose .. II. *Antennaria*
4. All leaves opposite, cauline; capitula solitary, terminal VI. *Cuatrecasasiella*
3. Stems shortened into a dense cushion, internodes not evident; leaves spiral and tightly appressed to the stem, imbricate, usually ovate to obovate XIV. *Mniodes*
1. Plants bisexual; individual capitula heterogamous 5
5. Styles of hermaphroditic (or functionally staminate) florets briefly divided at the apex, the branches pilose along the dorsal side and the distal portion of the shaft, apex rounded; or greatly divided with two linear branches, apex acute to rounded, pilose 6
6. Stems winged, the wings discolorous; leaves discolorous; capitulescences spiciform-glo-merulate; capitula sessile XVII. *Pterocaulon*
6. Stems unwinged, or if winged, not discolorous; leaves not discolorous; capitulescences of corymbiform cymes; capitula pedunculate 7
7. Large shrubs or more often trees; capitula with only one hermaphroditic floret XIX. *Tessaria*
7. Shrubs or herbs; capitula with (3-)5-15 hermaphroditic florets XVI. *Pluchea*
5. Styles of hermaphroditic florets divided, the branches linear to oblong, apex truncate to acute or rounded, dorsally papillose or with an apical ring of papillae 8
8. Achenes densely sericeo-pubescent 9
9. Plants caulescent; stems sparsely branched and erect or much-branched and cespitose or decumbent 10
10. Erect annual herbs; pappus bristles plumose VII. *Facelis*
10. Cespitose perennial herbs; pappus bristles scabrous XIII. *Lucilia*
9. Plants acaulescent, pulvinate XV. *Novenia*
8. Achenes glabrous, papillose, or pubescent with scattered glandular or duplex trichomes 11
11. Achenes fusiform, terminally rostrate V. *Chevreulia*
11. Achenes ovoid to oblong-cylindrical, not rostrate 12
12. Pappus bristles free at the base (except *Helichrysum*), individually deciduous 13
13. Capitula solitary, pedicels evident; leaves glabrous or glandular on both sur-faces 14
14. Capitula 20-50 mm wide; phyllaries variously colored, greater than 2 mm wide (cultivated) X. *Helichrysum*
14. Capitula 4-5 mm wide; phyllaries green, less than 1 mm wide (native species) IV. *Blumea*
13. Capitula glomerulate, pedicels obscure; leaves tomentose (at least lower sur-faces) 14
15. Involucre cylindrical to narrowly oblong or narrowly campanulate; pis-tillate florets 1-8 I. *Achyrocline*
15. Involucre campanulate; pistillate florets 25-150 IX. *Gnaphalium*
12. Pappus bristles fused at the base, deciduous together as a unit 16
16. Stems 1-2 cm long; leaves oblong-lanceolate, 3.5-5 mm long, 0.5-1.5 mm wide; pistillate florets usually 4 per capitulum XI. *Jalcochila*

- 16. Stems greater than 2 cm long; leaves linear-lanceolate to ovate, usually greater than 5 mm long, greater than 2 mm wide; pistillate florets usually 10 or more per capitulum 17
- 17. Hermaphroditic florets 4-merous XVIII. *Stuckertiella*
- 17. Hermaphroditic florets 5-merous 18
- 18. Style branches of hermaphroditic florets acute to rounded, evenly papillose externally and lacking an apical ring of collecting trichomes III. *Belloa*
- 18. Style branches of hermaphroditic florets truncate, not evenly papillose externally, but with an apical ring of collecting trichomes VIII. *Gamochoeta*

I. *Achyrocline*

Achyrocline (Less.) DC., Prodr. 6: 219. 1838.
 TYPE: *Gnaphalium satureioides* Lam. ≡
Achyrocline satureioides (Lam.) DC.

Gnaphalium subgenus *Achyrocline* Less., Syn. Comp. 332. 1832.

Perennial herbs, suffrutescent or shrubs, tomentose or rarely glabrate; stems leafy, erect to decumbent or rarely scandent. Leaves alternate; petiolate or sessile; blades linear to ovate, arachnoid to lanate, the margins entire to crenulate. Capitulescences glomerulate, cymose-paniculate to corymbose, open or dense, rarely of solitary heads. Capitula 3–5.5 mm high, ca. 1.5–2 mm wide, disciform; involucre cylindrical to narrowly oblong or narrowly campanulate; phyllaries imbricate, 2–3-seriate, scarious, brown to white or rarely reddish, the outer gradually shorter, base lanate, the inner glandular on abaxial surface; receptacles flat, naked or rarely with rudimentary paleae; pistillate florets 1–11(–23), the corollas filiform, dentate or shallowly 2–4-cleft; hermaphroditic florets 1–4(–6), fertile, the corollas tubular, base dilated, 4–5-lobed, the lobes usually pubescent with multicellular, stalked, capitate-glandular trichomes, the anther bases sagittate, caudate, the terminal appendages lanceolate, obtuse, the style branches slender, unappendaged, apex truncate, penicillate, the nectary conspicuous. Achenes oblong to ovoid, subcompressed, ca. 4–5-ribbed, papillose with imbricate cells; pappus bristles scabrid, barbellate, basiseriate, bases cohering by patent cilia, readily deciduous, apical cell rounded. Chromosome number: $n = 14$.

Key to Species of *Achyrocline*

- 1. Leaves decurrent; stems winged *A. alata*
- 1. Leaves not decurrent; stems not winged 2
- 2. Leaves linear to linear-lanceolate; outer phyllaries ovate, apex obtuse or rounded 3

A genus of 15–20 species distributed primarily in tropical and subtropical South America, with five in Mexico and Central America and a few in tropical Africa, Madagascar, and Comores. In Peru, it is represented by five species distributed in a wide variety of habitats and elevations throughout the Andean Cordillera. This genus most closely resembles *Gnaphalium* in habit and floral structure; however, *Achyrocline* is readily distinguished by its narrow capitula with fewer than 25 florets and glabrous achenes.

This genus is in need of experimental and field study throughout its range. Several of its species exhibit considerable morphological and ecological variability that presents problems for determining species boundaries.

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3. Plants with reduced habits, usually less than 50 cm tall; leaves 2–3(–5) cm long, 1–3 mm wide *A. ramosissima*
 3. Plants not reduced in habit, usually greater than 1 m tall; leaves 4–10 cm long, 2–9 mm wide *A. satureioides*
 2. Leaves lanceolate to elliptic or obovate; outer phyllaries lanceolate, apex acute 4
 4. Leaves elliptic to obovate, (0.5–)1.3–3.5 cm long, 5–16 mm wide *A. celosioides*
 4. Leaves lanceolate to elliptic, 1.5–5 cm long, 2–8 wide *A. peruviana*
1. ***Achyrocline alata* (Kunth) DC.**, Prodr. 6: 221. 1838.

Gnaphalium alatum Kunth, Nov. Gen. Sp. (fol.) 4: 62. 1820. TYPE: Ecuador, Prov. Chimborazo, "circa Alausi Quitensium," *A. Bonpland* 3243 (holotype, P, not seen, IDC Microfiche 6209. 96: II. 4, F neg. 37578, fragment, F).

Gnaphalium incanum Kunth, Nov. Gen. Sp. (fol.) 4: 63. 1820. TYPE: Peru, Dept. Cajamarca, Prov. Hualgayoc, "juxta urbem Micuipampa," 1830 m, *A. Bonpland* 3680 (holotype, P, not seen, IDC Microfiche 6209. 96: II. 5, F neg. 37601).

Gnaphalium pellitum Kunth, Nov. Gen. Sp. (fol.) 4: 63. 1820. TYPE: Peru, Dept. Cajamarca, Prov. Hualgayoc, "juxta urbem Micuipampa," 1830 m, *A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 96: II. 6, F neg. 37604, fragment, F). Non *G. pellitum* Hort. Götting. ex DC.

Gnaphalium rufescens Kunth, Nov. Gen. Sp. (fol.) 4: 61. 1820. TYPE: Colombia, Prov. Cauca, "inter fluvium Putes et villam San Miguel," *A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 96: I. 7, F neg. 37571, fragment, F).

Achyrocline madioides Meyen & Walpers, Nov. Actorum Acad. Caes. Leop.-Carol. German. Nat. Cur. (suppl.) 19: 275. 1843. TYPE: Peru, Dept. Arequipa, *W. G. Walpers s.n.* (holotype, B, probably destroyed, F neg. 15134).

Perennial herbs to 1.5 m tall; stems ascending to decumbent or scandent, glabrous to tomentose, alate. Leaves sessile; blade linear-lanceolate to oblanceolate, decurrent on stems, 2–12 cm long, 2–15 mm wide, trinerved from near the base, glabrous and glandular to densely tomentose beneath and arachnoid above, base attenuate, apex acute, the margins entire to crenulate. Capitulescences glomerulate, cymose-paniculate, dense or open. Capitula 3.0–5.5 mm high, ca. 1.5 mm wide, sessile; involucre cylindrical to narrowly campanulate, yellow to cream-white; outer phyllaries ovate to lanceolate, 2–3 mm long, 1–1.5 mm wide, apex acute, the inner phyllaries linear-spatulate, 4–5 mm long, 0.5–1.5 mm wide, apex acute to obtuse; pistillate florets 3–11(–23), the corollas 2.5–4.0 mm long; hermaphroditic florets 1–3(–6), the corollas 2.5–4.0 mm long. Achenes narrowly ellipsoid to ovoid, 0.5–0.7 mm long; pappus ca. 2.5 mm long. Chromosome number: $n = 14$ (Jansen & Stuessy, 1980).

Achyrocline alata has a wide distribution throughout the Andean Cordillera from Colombia to Argentina, Brazil, and Paraguay. It inhabits a variety of environments within its range, but in Peru it is usually found in secondary vegetation or disturbed roadsides (2400–4100 m). In Peru it is known by the common names: *ajenjo*, *Foster-sacha*, *huira-huira*, *ishpingo amarillo*, *vira-vira*, *yatama blanca*, and *yshpingo*.

Achyrocline alata is readily distinguished from other Peruvian species by its decurrent leaf bases and alate stems. Pubescence is quite variable; individuals range from predominately glabrous to densely arachnoid-tomentose. No ecological or geographical patterns are obvious for these pubescence morphs, and the capitular and floral morphology is relatively constant. *Gnaphalium incanum*, *G. pellitum*, and *G. rufescens* are all readily referable to *Achyrocline*. They are all quite pubescent, and their decurrent leaf bases forming winged stems and few-flowered capitula agree well with the present broad concept of *A. alata*. *Achyrocline madioides* Meyen & Walpers is provisionally placed here also. Further detailed populational investigations may lead to the taxonomic recognition of these pubescent morphs.

Individuals with smaller leaves, greatly reduced stem wings, and smaller, few-flowered capitula approach *A. satureioides*, a species with linear leaves, unwinged stems, and narrowly cylindrical capitula. While *A. alata* and *A. satureioides* are closely related, the latter species is typically found at elevations below 1500 m. We have not found sympatric populations to date, but two collections (*Vargas 456*, F, and *Weberbauer 5638*, GH) have stems both with and without wings.

AMAZONAS. Chachapoyas: 28–31 km SW of Leimebamba on road to Balsas, 3350–3450 m, *Gentry et al. 23158* (F, MO); 41 km SW of Leimebamba on road to Balsas, 3110 m, *Gentry et al. 23147* (F, MO); Cerros Calla Calla, W side, 45 km above Balsas, 3100 m, *Hutchison & Wright 5774* (F, GH, MO, NY); Cerro Chimchula, cerca a Chachapoyas, 2500 m, *Ochoa 1628, 1637* (F); rocky slopes of Caño Santa Lucía just E of Chachapoyas, 2200–2300 m, *Wurdack 726* (GH, NY, US). **Rodriguez de Mendoza:** Mendoza, 1600 m, *Woytkowski 8273* (GH, MO). **ANCASH. Bolognesi:** Valle de Río Fortaleza, 3600 m,

Cerrate & Gayoso 7819 (MO); Chiquián, 3350 m, *Ferreyra 7455* (MO, US). **Casma:** abra de la Cordillera Negra, 4050 m, *Mostacero et al. 536* (F, HUT, MO). **Huaráz:** Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, HUT, MO); Laguna de Shurup, 3800 m, *Evangelista s.n.* (F, HUT, MO). **Huaylas:** Laguna de Parón, 4100 m, *Mostacero et al. 540, 553* (F, HUT, MO). **Yungay:** Llanganuco, *Ferreyra 14342, 16826, 16863* (MO, USM); slopes below Laguna de Llanganuco in Quebrada de Llanganuco, ca. 25 km above Yungay, 4000 m, *Edwin & Schunke 3818* (COL, F, US); Yungay-Yauya road, 3480 m, *Gentry et al. 37366* (F, MO). **APURÍMAC. Abancay:** arriba de Abancay, 3350–3450 m, *Ferreyra 9812* (MO, USM). **Aymaraes:** 4 km SW of Cotaruse, 26 km SW of Chalhuanca, 3220 m, *Gentry et al. 23302* (F, MO, USM). **AYACUCHO. Huanta:** Carapa, between Huanta and Río Apurímac, 1200 m, *Killip & Smith 22430* (F, US). **La Mar:** above Ayna (Aina), 1600 m, *Weberbauer 5638* (F, GH, US). **CAJAMARCA. Cajamarca:** ca. 6.5 km SW of Cajamarca, 2980 m, *Dillon et al. 2904* (F, MO, TEX, USM); San Juan a Cajamarca, 2800 m, *Ochoa 1475* (GH, F); La Encañada-Jalca de Kumulca, 3300 m, *Sagástegui et al. 8100* (F, HUT, MO, NY), *8105A* (HUT, MO); NE of Porcón, *Sánchez 2858* (CPUN, F). **Celendín:** 4 km NNE of Celendín on road to Balsas, *Edwin & Schunke 3582* (COL, F, NY, US); entre Celendín y Jalca Cumulca, 3000–3100 m, *Ferreyra 15087* (MO, US, USM); Celendín, 2700 m, *Hutchison & Wright 5127* (F, MO, NY); Canyon of the Río Marañón above Balsas, 2930 m, *Hutchison & Wright 5374* (F, MO, NY). **Chota:** Cochabamba, 1800–2200 m, *Ferreyra 783* (USM). **Contumazá:** Guzmango, *Sagástegui 7726* (F, HUT); Cascabamba, 3050 m, *Sagástegui et al. 9038* (F, HUT, K, MO); Jalca El Chuño (Poza Chuño), 4500 m, *Sagástegui et al. 9373* (F, HUT, MO); Cruz del Hueco, 2800 m, *Sagástegui et al. 9918* (F, HUT, MO). **Cutervo:** 4 km E of Huambos on Cutervo trail, 2800 m, *Stork & Horton 19199* (F). **CUZCO. Anta:** Limatambo, 2400 m, *Vargas 456* (MO). **Calca:** Amparacs, 3300 m, *Chávez 3283* (MO). **Cuzco:** San Sebastián, 3300–3400 m, *Pennell 13626* (F, GH, NY, US). **Paruro:** Araypallpa, 3200 m, *Vargas 456* (F). **Paucartambo:** 9–12 km NE of Paucartambo, 2980–3050 m, *Gentry et al. 23413, 23423* (F, MO, USM); 22 km NE of Paucartambo, 3350 m, *Gentry et al. 23430* (F, MO, USM); Cerro de Cusilluyoc, Pillahuata, 2700–2900 m, *Pennell 14089* (GH). **Urubamba:** Machupicchu, 2400 m, *Herrera 1974* (F); Ollantaytambo, 2800 m, *Herrera 3447* (F); Machu Picchu, above Paucarcancha, 3225 m, *Peyton & Peyton 133* (F). **HUÁNUCO. Huamalies:** Llata, 7000 ft, *Macbride & Featherstone 2242* (F, GH, US). **Huánuco:** cerca a Mitocucho, 2600 m, *Cerrate et al. 6887* (MO, USM); between Huánuco and Chinchao, *Dwyer 6115* (MO); Sheiricancha, cerca a Acomayo, 2500–2600 m, *Ferreyra 9333* (MO, USM); Acomayo, Distrito de Chinchao, 2500 m, *Ridoutt 11560* (MO, USM). **Pachitea:** Mitotambo, arriba de Mito, 3200–3300 m, *Ferreyra 10380, 10380A* (USM). **ICA. Nazca:** Puquico Valley, 3400 m, *Rauh & Hirsch P435* (NY). **Pisco:** Valle Río Pisco, 3700 m, *Rauh & Hirsch P354* (NY). **JUNÍN. Concepción:** Mito, 9000 ft, *Macbride & Featherstone 1474, 1475* (F), *1644* (F, US), *1818* (F, GH, US). **Huancayo:** Km 7 Huancayo-Pariahuanca, 3300 m, *Antúñez de Mayolo 38* (F); Huancayo, 3317 m, *Soukup 2955* (COL), *3003* (F), *3151* (COL, US, USM). **Jauja:** Comas, *Ochoa 549* (F). **Tarma:** cumbre a Tarma, 3500 m, *Cerrate 922* (MO, USM); 28–32 km NE of Tarma on road to San Ramón, 2480 m, *Dillon & Turner 1348* (F, MO, TEX, USM); entre Tarma y San Ramón, 1800–2100 m, *Ferreyra 3606*

(MO, USM); Tarma, 3000–3200 m, *Killip & Smith 21914* (F, NY, US); Huacapistana, 1800–2400 m, *Killip & Smith 24206* (NY, US); Tarma, *Macbride & Featherstone 988* (F); Sacsamarca, *Riccio 1541* (US); entre Tarma y Oroya, 10 km de Tarma, 3600 m, *Tovar 2380* (USM). **Yauli:** San Pedro de Cajas, S of Lake Junín, 3800–3900 m, *Pearsall 924* (F). **LA LIBERTAD. Otuzco:** Agallpampa, 3050 m, *López 1873* (F, HUT). **Patáz:** Huancaspata-Tayabamba, 3900 m, *López & Sagástegui 8266* (HUT, MO). **Santiago de Chuco:** Laguna La Victoria, camino a Conzuro, 4000 m, *Sagástegui et al. 6190* (HUT, MO). **LIMA. Canta:** 3100–3200 m, *Pennell 14612* (F, NY, US). **Huarocharí:** Puente de Infiernillo, *Cerrate et al. 4278* (MO, USM); Chicla, entre San Mateo y Casapalca, 3700 m, *Ferreyra 6505* (MO, US, USM); Infiernillo, 3300 m, *Ferreyra 8318* (MO, USM); 4 km E of Chicla, 3800 m, *Gentry & Prance 16448* (F, MO); Río Blanco, 3000–3500 m, *Killip & Smith 21637* (F, NY, US), *Macbride & Featherstone 672* (F, US). **PASCO. Daniel Carrión:** Yanahuana, ca. 10,000 ft, *Macbride & Featherstone 1193* (F, US). **Pasco:** ca. 23 km NNE of Cerro de Pasco on road to Huánuco, 3810 m, *Dillon 2552* (F, MO, USM); La Quinua, ca. 12,000 ft, *Macbride & Featherstone 2021* (F, US). **PIURA. Huancabamba:** Huancabamba, 2950 m, *Hutchison 1603* (F, NY); Mitopampa (Huancabamba-Cuello del Indio), 2650 m, *Sagástegui et al. 8227* (MO, NY). **PUNO. Carabaya:** Macusani to Ollachea, 2000–3000 m, *Dillon et al. 1099, 1265* (F, MO, USM); Ollachea to San Gabón, 1000–2000 m, *Dillon et al. 1103* (F, MO, USM). **SAN MARTÍN. Mariscal Cáceres:** Río Abiseo National Park, 3425 m, *Young & Watson 3519* (F).

2. *Achyrocline celosioides* (Kunth) DC., Prodr. 6: 221. 1838.

Gnaphalium celosioides Kunth, Nov. Gen. Sp. (fol.) 4: 61. 1820. TYPE: Ecuador, Prov. Loja, "crescit juxta Loxam Peruvianorum," *A. Humboldt & A. Bonpland s.n.* (holotype, P, not seen, IDC microfiche 6209. 96: II. 2, F neg. 37585).

Perennial herbs or shrubs to 0.5 m tall; stems much-branched, ascending to procumbent. Leaves sessile; blade elliptic to obovate, (0.5–)1.5–3.5 cm long, (0.3–)0.5–1.6 cm wide, trinerved from near the base, discolorous, both surfaces tomentose, apex obtuse to rounded, base obtuse to cuneate. **Capitulescences** glomerulate, cymose-paniculate, dense or open. **Capitula** 4–5 mm high, ca. 1.5 mm wide, sessile; involucre cylindrical, white; outer phyllaries ovate, ca. 2.5 mm long, 0.8–1 mm wide, apex acute, the inner phyllaries lanceolate to oblanceolate, 3.5–4.0 mm long, 0.4–0.8 mm wide, apex acute to apiculate; pistillate florets 2, the corollas 2.0–2.5 mm long; hermaphroditic florets 3, the corollas 2.2–2.5 mm long. **Achenes** ovoid, 0.7–0.8 mm long; pappus ca. 2.5 mm long.

Achyrocline celosioides ranges from southern Ecuador to south-central Peru (2000–3400 m) and

normally occupies relatively moist sites in inter-Andean valleys. It is readily distinguished from *A. peruviana*, its nearest relative, by the former's shorter, elliptic leaves.

A few populations display considerable variation in leaf size and shape. Two unusual collections from the Cumbre El Gavilán (above Cajamarca) display the following variability: (1) *Ferreyra 3277* (US), has very densely lanate stems with short internodes; ovate, sessile leaves; and sessile, glomerulate capitulescences in the upper leaf axils; (2) *Ferreyra 8538* (MO) has very small leaves (ca. 5 mm long, ca. 3 mm wide) and capitulescences on short peduncles.

Two collections, *Sagástegui & Dillon 12312* (Dept. Ancash) and *Chávez 3372* (Dept. Apurímac) have more narrowly elliptic, sessile leaves and compact, nearly sessile glomerulate capitulescences. Last, a collection from a dry site above the Río Marañón (*Evinger & Hodge 514*, US) has smaller, more narrowly lanceolate leaves, but with capitulescences typical for the species. All these specimens essentially agree with *A. celosioides* in capitular and floral characteristics, but further study may prove them to be worthy of specific rank.

AMAZONAS. Bongará: between Río Utcubamba and Shipasbamba, 1520 m, *Hutchison & Wright 3994* (UC). **Chachapoyas:** 10 km E of Balzas [Balsas], *Evinger & Hodge 514* (US); rocky slopes of Caño Santa Lucía just E of Chachapoyas, 2000–2400 m, *Wurdack 532, 579* (GH, NY, UC, US). **ANCASH.** Recuay: rocky river bluffs, ca. 9000 ft, *Macbride & Featherstone 2517* (F). **APURÍMAC.** Abancay: Curahuasi, 2550 m, *Chávez 3327* (MO). **CAJAMARCA.** Cajabamba: camino a Langla, 2600 m, *Mostacero & Guerra 0008* (HUT). **Cajamarca:** Cumbre El Gavilán, entre Cajamarca y San Juan, 3200 m, *Ferreyra 3277* (US), 8583 (MO); La Encañada-Jalca de Kumpulca, 3300 m, *Sagástegui et al. 8106* (HUT); La Encañada, 2750 m, *Sagástegui et al. 12013* (HUT). **Celendín:** ca. 31 km NE of Cajamarca along road to Celendín, E slopes, ca. 2950 m, *Dillon & Turner 1587* (F); hills above and to N of town, ca. 2700 m, *Hutchison & Wright 5136* (UC). **Hualgayoc:** Bambamarca, 2600 m, *Soukup & Carmona 4935* (US). **JUNÍN.** Concepción: Mito, ca. 9000 ft, *Macbride & Featherstone 1489* (F). **Prov. Unknown:** Uspachaca, ca. 8500 ft, *Macbride & Featherstone 1295* (F). **LA LIBERTAD.** Santiago de Chuco: Hacienda Angasmarca, 2850 m, *Weberbauer 7205* (F, GH). **PIURA.** **Huancabamba:** on road to Canchaque, 18.5 km above and W of Huancabamba, 2900 m, *Hutchison & Wright 6635* (F, MO, NY, UC, USM).

3. *Achyrocline peruviana* Dillon & Sagást., *Phytologia* 60: 107. 1986. TYPE: Peru, Dept. Cajamarca, Contumazá, El Granero, laderas abiertas, 2800 m, 14 Jun 1983, *A. Sagástegui*

A. & S. López M. 10661 (holotype, HUT). **Figure 1.**

Suffrutescent **perennials** to 75 cm tall, much-branched at the base; stems arachnoid-tomentose. **Leaves** sessile; blade narrowly lanceolate to elliptic, (1.5–)4–5 cm long, 2–8 mm wide, discolorous, base attenuate, apex acute, mucronulate, lower surface densely arachnoid-tomentose, upper surface sparsely arachnoid-tomentose, glabrescent, obscurely trinervate, the margins entire. **Capitulescences** glomerulate, cymose-paniculate, open, terminal and axillary. **Capitula** ca. 4 mm high, 1.2–1.5 mm wide, sessile; involucre narrowly campanulate, stramineous; outer phyllaries lanceolate, 2–3 mm long, ca. 1 mm wide, apex acute, the inner phyllaries lanceolate, 3–4 mm long, 1–1.2 mm wide, apex acute; pistillate florets 1–2, the corollas ca. 2 mm long; hermaphroditic florets 2–3, the corollas ca. 2.5 mm long. **Achenes** ovoid, ca. 1 mm long; pappus ca. 2.5 mm long.

Achyrocline peruviana is a narrow endemic known only from dry intermontane localities in the Departments of Cajamarca and La Libertad (2600–3100 m) and is primarily restricted to river valley systems with Pacific drainage. It most closely resembles *A. celosioides*, but differs from that species by possessing more narrowly elliptic or lanceolate leaves, usually at least 4 cm long, with acute, mucronulate apices.

Some individuals of *A. satureioides* approach *A. peruviana* in general appearance, but the former species has strictly cylindrical capitula, with a greater number of pistillate florets and a distribution usually below 1500 m on the eastern escarpment of the Andean Cordillera.

CAJAMARCA. Contumazá: 1–2 km S of Contumazá, 2620 m, *Dillon et al. 4455* (F, HUT, MO, TEX, US, USM); Contumazá, 2600 m, *Sagástegui et al. 10685* (F, HUT, MO). **LA LIBERTAD.** Huamachuco: Hda. Cochabamba, 2750 m, *López & Sagástegui 2781* (HUT). **Otuzco:** Agallpampa, 3100 m, *López 895* (US), 1867 (F, HUT).

4. *Achyrocline ramosissima* (Schultz-Bip.) Britton, *Bull. Torrey Bot. Club* 19: 148. 1892.

Gnaphalium ramosissimum Schultz-Bip., *Bonplandia* 4: 42. 1856. TYPE: Peru, Dept. Puno, Azángaro, cordillera prope Azángaro, 1854, *W. Lechler 1780* (holotype, B, probably destroyed; isotypes, F, NY, G-DEL, not seen, F neg. 28706, w, not seen, F neg. 33153).

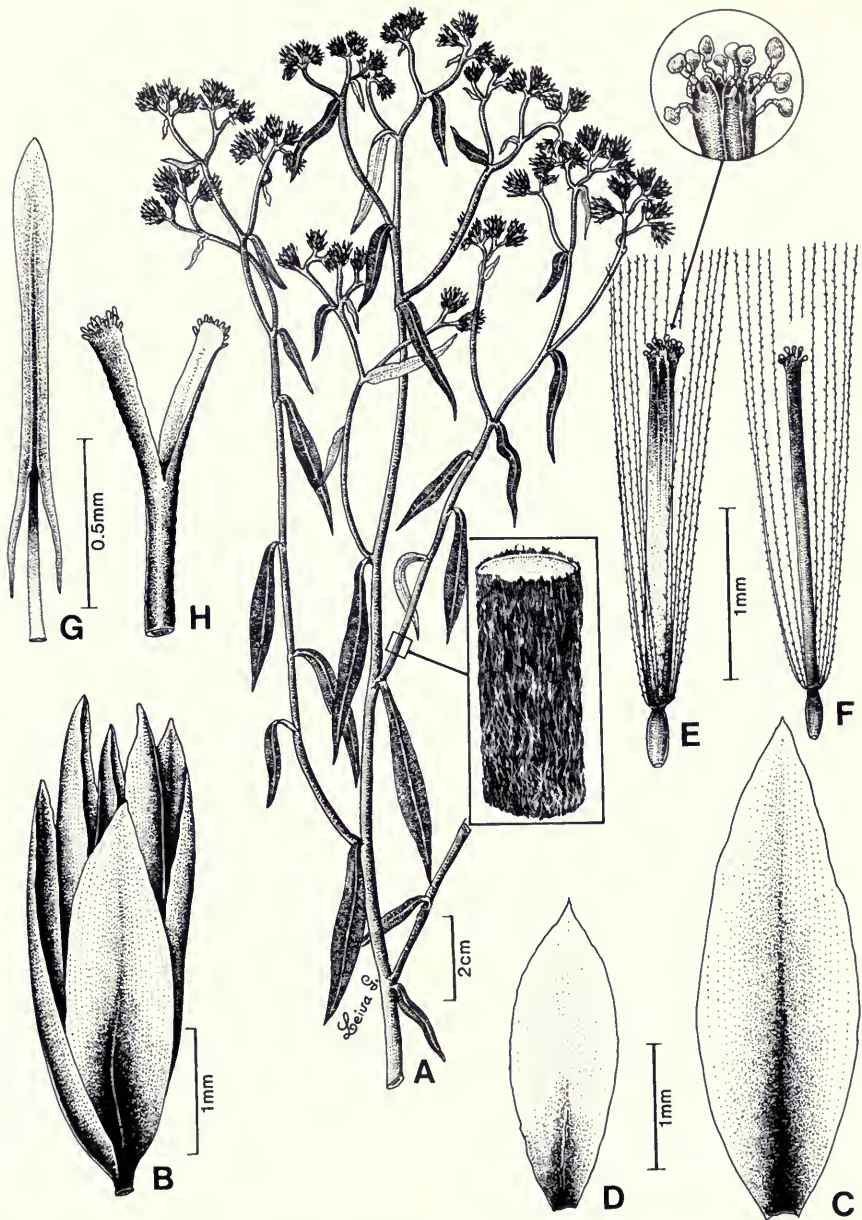


FIG. 1. *Achyrocline peruviana*. A, habit; B, capitulum; C, inner phyllary; D, outer phyllary; E, hermaphroditic floret; F, pistillate floret; G, stamen; H, style branches of hermaphroditic floret. (Drawn from Sagástegui & López 19661, HUT.)

Perennial herbs, 15–50(–70) cm tall, suffruticose; stems much-branched, decumbent to ascending, densely lanate. Leaves sessile; blade linear to linear-lanceolate, 2–3(–5) cm long, 1–3 mm wide, discolorous, the lower surfaces densely lanate, the upper surfaces tomentose, the margins

entire, revolute. Capitulescences corymbiform cymes of glomerules, dense or open. Capitula ca. 4 mm high, ca. 1.5 mm wide, stramineous; involucre cylindrical; outer phyllaries ovate, 1.5–2 mm long, 1–1.2 mm wide, 2–3-fid, base lanate, the inner phyllaries lanceolate to oblanceolate, 3–

3.5 mm long, 0.5–0.8 mm wide; pistillate florets generally 4, the corollas ca. 2.5 mm long; hermaphroditic floret 1, the corollas ca. 2.8 mm long. **Achenes** ellipsoid, ca. 0.7 mm long; pappus 2.5–3 mm long.

Achyrocline ramosissima is distributed from central Peru to northwestern Argentina. In Peru, it occurs in *puna* formations from Junín to Puno (2800–4300 m). It most closely resembles *A. satureioides* but is distinguished from that species by its reduced habit, smaller leaves and capitula, and high-elevation distribution.

Several collections appear to approach *A. satureioides* in habit, but these collections have the small capitula characteristic of *A. ramosissima*: *López M. 618* (HUT), *Cook & Gilbert 523, 702* (US), *Macbride & Featherstone 239* (F), *1020* (F, GH, US), *Killip & Smith 21828* (F, NY), *Iltis et al. 66* (F).

ANCASH. **Huaylas:** Huascarán National Park, Aukispuquio, 3900–4000 m, *Smith et al. 12104* (USM). **AREQUIPA.** **Arequipa:** Km 18 on road between Arequipa and Yura, 3300 m, *Solomon 2848* (MO). **CUZCO.** **Anta:** Huanacori, El Chaccan, 3690 m, *Brunel 901* (MO). **Calca:** Hda. Urco, 2800 m, *Vargas 1768* (GH, NY). **Cuzco:** Saqsaywaman, 3600 m, *López 0618* (HUT); ca. 2 km S of San Gerónimo, 10 km SE of Cuzco, 3200 m, *Solomon 3000* (MO). **Espinar:** Puerto Rosario, Río Quishuarcaucha, 3900 m, *Vargas 10103* (F). **Urubamba:** Ollantaytambo, 2800 m, *Herrera 3399* (F), *Cook & Gilbert 523, 702* (US). **HUANCAVELICA.** **Huancavelica:** Caniorceona, 3 km SE of Conaica, *Tovar 98* (US p.p.); Peccsuca, a 5 km E de Conaica, 3250–3280 m, *Tovar 276* (US); Pana, cerca a Conaica, 3320 m, *Tovar 760* (US, USM). **JUNÍN.** **Huancayo:** Huancayo, 3317 m, *Soukup 1877* (US, USM). **Tarma:** ca. 18 km SSE of Tarma, Río Quishuarcaucha, *Iltis et al. 66* (F, US); Tarma, 3000–3200 m, *Killip & Smith 21828* (F, NY, US); Tarma, *Macbride & Featherstone 1020* (F, US). **Yauli:** Baños, *Capt. Wilkes s.n.* (NY p.p.). **LIMA.** **Huarechiri:** Matucana, 8000 ft, *Macbride & Featherstone 239* (F). **PUNO.** **Azángaro:** Cuturi, entre Aropa y Azángaro, 4200 m, *Aguilar 411* (MO, USM); Isla Arapa, *Aguilar s.n.* (USM). **Huancané:** Moho, 3900 m, *Aguilar 435* (MO, USM). **Melgar:** Araranca, 4100–4300 m, *Pennell 13484* (F, GH, NY, US, USM). **Puno:** near Puno, *Soukup 93* (F). **NO EXACT LOCALITY.** “Perou austral,” 3500 m, *Weddell 4506* (F).

5. *Achyrocline satureioides* (Lam.) DC., Prodr. 6: 220. 1838.

Gnaphalium satureioides Lam., Encycl. 2: 747. 1788. TYPE: Uruguay, Montevideo, 1767, *P. Commerson s.n.* (holotype, P, not seen, F neg. 37572; isotype, G-DEL, not seen, F neg. 28707).

Perennial herbs to 2 m tall, suffruticose; stems much-branched, ascending to decumbent, densely

lanate. Leaves sessile; blade linear to linear-lanceolate, 4–10 cm long, 2–9 mm wide, apex acute. **Capitulescences** glomerate, cymose-paniculate, terminal and axillary. **Capitula** 4.5–5.5 mm high, ca. 1.5 mm wide; involucre narrowly cylindrical; outer phyllaries narrowly ovate to lanceolate, 2.5–3.5 mm long, ca. 1 mm wide, the inner phyllaries lanceolate to linear, 4–4.5 mm long, 0.5–1 mm wide; pistillate florets 4(–8), the corollas 3.2–3.6 mm long; hermaphroditic florets 1–2, the corollas 3.4–3.6 mm long. **Achenes** ovoid, 0.6–0.7 mm long; pappus ca. 4 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984).

Achyrocline satureioides is widely distributed throughout South America in sandy soils, usually at elevations below 2000 m. In Peru it is most commonly found in forest clearings and disturbed sites along the eastern slope of the Andean Cordillera (500–1500 m).

It appears most closely related to *A. ramosissima*, a smaller, alpine species, which most likely is a high-elevation derivative of *A. satureioides*.

Label data from *Klug 3257* (F) state that the plant is used medicinally: “A preparation from this plant is taken as a drink for kidney troubles. The natives are acquainted with ‘Foster’s Pills,’ used for the same disorders, whence the name Wild Foster.” The gathering and transport of this species for sale in local markets may explain the occasional plant found outside its usual distributional range at lower elevations. In Peru, it is known by the following common names: *coronilla-sacha*, *huira-huira*, *huira huayo*, *Foster-sacha*.

AMAZONAS. **Bongará:** between Río Utcubamba and Shipasbamba, 4 km from Campamento Ingenio, 1520 m, *Hutchison & Wright 3954* (F, MO, NY, UC). **Rodríguez de Mendoza:** Mendoza, 1500 m, *Woytkowski 8115* (GH, MO). **CUZCO.** **La Convención:** mountains between Potocusi and Sahuayacu, 1000–1100 m, *Weberbauer 7946* (F, GH, MO, US). **HUANUCO.** **Huánuco:** Cotirarda to Mercedes, 1875 m, *Mexia 8194* (F, GH, MO, NY, US). **Leónico Prado:** Pampayacu, hacienda at mouth of Río Chinchao, 3500 ft, *Macbride 5039* (F, GH, US), *Kanehira 287* (GH). **JUNÍN.** **Tarma:** Chuyquishunca, 2 km arriba de Huacapistana, entre Tarma y San Ramón, 2000–2400 m, *Ferreya 466* (USM); Chanchamayo Valley, 1200–1500 m, *Schunke 365, 1074, 1536, 1622* (F). **PUNO.** **Sandia:** along Río Tambopata in vicinity of San Juan del Oro, 1900 m, *Wasshausen & Salas 1231* (US); Sandia, 2250 m, *Vargas 14800* (US). **SAN MARTÍN.** **Huallaga:** cerca a Bellavista, 250–350 m, *Ferreya 10080* (MO, USM). **Lamas:** Lamas, below English Evangelical Mission, *Belshaw 3447* (F, GH, MO, NY, US); San Roque, 1350–1500 m, *Williams 7282* (F). **Moyobamba:** Zepelacio, near Moyobamba, 1200–1600 m, *Klug 3257* (F, MO, NY, US). **San Martín:** Tarapoto, 400 m, *Schunke 6420* (F); prope

Tarapoto, *Spruce 4174* (GH, NY). **Rioja:** Rioja, *Woytkowski 6169* (GH, MO, US). **NO EXACT LOCALITY.** 1862, *Matthews s.n.* (NY p.p.).

II. Antennaria

Antennaria Gaertn., *Fruct. Sem. Pl.* 2: 410. 1791.

TYPE: *Gnaphalium dioicum* L. \equiv *Antennaria dioica* (L.) Gaertn.

Dioecious or polygamo-dioecious, perennial **herbs**; stems simple, ascending or erect, tomentose or lanate. Basal **leaves** rosulate, oblanceolate to spatulate, entire; cauline leaves alternate, smaller. **Capitulescences** cymose-corymbose, racemose, or glomerulate, terminal, occasionally of a solitary head. **Capitula** discoid or rarely disciform; involucre ovoid or campanulate; phyllaries imbricate, scarious, the outer gradually narrowing, the inner prolonged into a petaloid lamina; receptacles convex to plane, epaleaceous; pistillate florets with corollas filiform, white or lilac, truncate or subdentate; staminate florets with corollas tubular, 5-lobed or 5-dentate, the anther bases sagittate, caudate, the terminal appendages ovate, the styles undivided or briefly bifid, the branches truncate. **Achenes** cylindrical or ellipsoidal, rounded or subcompressed; pappus bristles uniseriate, scabrid, barbellate, fused at base or free, apices clavellate (staminate) or acute (pistillate). Chromosome numbers: $x = 14$.

A genus of some 50 species distributed principally in arctic to temperate regions of the Northern Hemisphere. Three species are known from South America and only one from Peru. In many species, masculine individuals are rare or completely absent, suggesting apomictic seed production.

Reference

CABRERA, A. L. 1957. Una nueva especie del género *Antennaria* (Compositae). *Notas Mus. La Plata, Bot.*, 19: 73–79.

1. *Antennaria linearifolia* Wedd., *Chlor. And.* 1: 150. 1856. **TYPE:** Peru, no exact locality, *J. Dombey* or *J. Pavón* (syntypes probably P, not seen). (Two syntype collections were cited by Weddell, but no lectotype will be chosen until the type material can be studied.) **Figure 2.**

Leontopodium linearifolium (Wedd.) Benth. & Hook., *Gen. Pl.* 2: 303. 1873.

Gnaphalium linearifolium (Wedd.) Franchet, *Bull. Soc. Bot. France* 39: 135. 1892.

Gnaphalium sedoides F. W. Klatt, *Linnaea* 42: 135. 1878–79. **TYPE:** Peru, *J. Dombey 252* (holotype, P, not seen, F neg. 37609; isotype, GH).

Dioecious or rarely polygamo-dioecious, perennial **herbs**, rhizomatous; stems unbranched, 3–21 cm tall. **Leaves** basal, rosulate, sessile; blade oblanceolate-linear, 2–8 cm long, 1.5–3 mm wide, the lower surface densely tomentose, midrib prominent, the upper surface glabrescent, the margins entire. **Capitulescences** glomerulate, subtended by foliaceous bracts. **Capitula** 5–7 mm high, 3–5 mm wide, discoid, homogamous, rarely disciform and heterogamous; involucre campanulate; phyllaries 4–5-seriate, the outer ovate, 3–4 mm long, ca. 2.5 mm wide, apex obtuse, the inner obovate to oblong-lanceolate, 4–5 mm long, 1–2 mm wide, the apex prolonged into a white, petaloid lamina; masculine capitula with 40–50 functionally staminate florets, the corollas narrowly tubular, 3–3.5 mm long; feminine capitula with 50–60 pistillate florets, the corollas filiform, 2.5–3 mm long; heterogamous capitula disciform with 50–60 pistillate florets, the corollas filiform, 2.5–3 mm long, functionally staminate florets 6–8, the corollas narrowly tubular, 3.5–4 mm long. **Achenes** cylindrical, 0.5–0.7 mm long, pubescent with sessile, biseriate, capitate-glandular trichomes; pappus bristles ca. 3.5 mm long, apices clavellate (staminate) or acute (pistillate).

Antennaria linearifolia is distributed throughout the Andean Cordillera from southern Ecuador to Bolivia. In Peru it occurs from Amazonas to Cuzco at elevations of 2700–4000 m.

Collections of this species are commonly annotated as *Gnaphalium*; however, the dioecious or polygamo-dioecious reproductive system and dimorphic pappus bristles clearly place these taxa in *Antennaria*. Masculine, feminine, and occasionally individuals with heterogamous capitula are encountered within Peruvian populations.

In Peru *A. linearifolia* is known as *champto*, a name applied to many rosulate or cespitose species of Asteraceae.

AMAZONAS. Chachapoyas: Cerros Calla Calla, E side, 19 km above Leimebamba on road to Balsas, 3100 m, *Hutchison & Wright 5560* (F, MO, NY, US); Puma-urcu, SE of Chachapoyas, 3100–3200 m, *Wurdack 1135* (US); Cerro Campanario NNE of Diosan, 3200–3500 m, *Wurdack 1603* (US). **ANCASH. Bolognesi:** Chiquián, 3840–



FIG. 2. *Antennaria linearifolia*. A, habit; B, masculine capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, masculine floret; G, stamen; H, achene. (Drawn from Sagástegui et al. 11588, HUT.)

3860 m, *Ferreya 5766* (US, USM). **Huaráz:** Cerro San Cristóbal, NE of Huaráz, 3800 m, *Evangelista s.n.* (HUT). **Huari:** Huascarán National Park, 1 km below Manto Mina, 4300 m, *Smith & Buddensiek 11010* (F p.p.), 14.8 km NE of Tuel Cahuish along road between Catac and

Chavín de Huantar, 3000–4000 m, *Stevens 21965* (MO). **CAJAMARCA.** **Cajamarca:** ca. 27 km NNW of Cajamarca on road to Hualgayoc, Pampa de Cerro Negro, 3600 m, *Dillon & Molau 3023A* (F). **Celendín:** ca. 57 km NE of Cajamarca along road to Celendín, 3650 m., *Dil-*

lon & Turner 1611 (F). **Contumazá:** above Contumazá, 2700 m, *Sagástegui & Fukushima 6098* (HUT, US); Pozo Kuán, 3600–3800 m, *Sagástegui et al. 10086* (HUT), *12451* (HUT, MO). **San Miguel:** Taulis Alto (jalca), 3100 m, *Sagástegui et al. 9543* (F, HUT). **CUZCO. Paucartambo:** Tres Cruces, 3330–3500 m, *Gentry et al. 23439* (F, MO); Corihuayrachina, Callanga, 3800 m, *Woytkowski 565* (MO). **Urubamba:** Machu Picchu, on the Palcay side of the Salcantay-Palcay pass, 3500 m, *Peyton & Peyton 711* (MO). **HUÁNUCO. Dos de Mayo:** Probresco, 12 mi E of Huallanca, ca. 10,500 ft, *Macbride & Featherstone 2463* (F, US). **Huánuco:** Pillao, 2700 m, *Woytkowski 34041* (F). **JUNÍN. Concepción:** 6 mi S of Mito, ca. 11,000 ft, *Macbride & Featherstone 1819* (F, US). **Huancayo:** Huancayo, 4000 m, *Soukup 1870* (US); Laguna Huacracocho, 5000 m, *Soukup 3612* (F). **LA LIBERTAD. Huamachuco:** ca. 20 km W of Huamachuco, ca. 3400 m, *Dillon et al. 2809* (F, USM); Cacana, 3300–3400 m, *Ricchio & La Rosa 3564* (US). **Otuzco:** Cerro Sango, Motil-Shorey, 3300–3400 m, *López 968* (US), *1950* (HUT); *Sagástegui et al. 11588* (HUT, MO). **Patáz:** Quebrada Rangia, Taya-bamba-Huancaspata, 3600 m, *López & Sagástegui 8208* (HUT, MO, NY). **Sánchez Carrión:** ca. 10 km N of Laguna Saucacocho, ca. 20 km NE of Huamachuco, ca. 3370 m, *Dillon et al. 2845* (F, MO, TEX, USM). **LIMA. Chancay:** Aquimarca, 4000 m, *Abdon 3271* (F). **PASCO. Pasco:** Cerro de Pasco, 4135 m, *Ellenberg 4123* (US). **NO EXACT LOCALITY.** *Weberbauer 7004* (F).

III. *Belloa*

Belloa Remy in Gay, Fl. Chil. 3: 336. 1848. TYPE: *Lucilia chilensis* Hook. & Arn. = *Belloa chilensis* (Hook. & Arn.) Remy.

Perennial herbs, pulvinate or erect, generally lanate or tomentose. Leaves alternate or rosulate, rarely distichous, the margins entire. Capitulescences pseudospicate, glomerulate, or of solitary heads, terminal and axillary. Capitula disciform; involucre ovoid, campanulate, or narrowly cylindrical; phyllaries 3–5-seriate, imbricate, scarious, hyaline at margin, concave, stramineous, the inner gradually longer; receptacles plane, naked, alveolate; pistillate florets 1–6-seriate, the corollas filiform, lacerate, the styles exerted; hermaphroditic florets (1–)10–15, the corollas narrowly tubular, 5-lobed, the anther bases caudate, the terminal appendages ovate to oblong, the style branch apices obtuse or rounded, dorsal surfaces papillose. Achenes obovoid or ellipsoid, pubescent with biseriate, multicellular, capitate-glandular trichomes; pappus bristles 40–80, scabrid, white to lutescent, the bases fused, deciduous together as a unit, apical cells acute or rounded. Chromosome number: $n = 12$ (Fernández Casas & Fernández Piqueras, 1981).

Belloa consists of 18 species distributed in high-elevation habitats throughout the Andes from Venezuela to Chile and Argentina. Peru appears to be a center of diversity for the genus, with eight species represented.

Freire (1986) expanded the generic limits of *Lucilia* to include all taxa previously accorded to *Belloa* (Cabrera, 1958; Sagástegui & Dillon, 1985) with the statement that the presence or absence of trichomes on the achenes was not sufficient for recognition of the genus. She did recognize the monophyletic nature of *Belloa* and chose to place its component species into section *Lucilioides* DC. She subsequently (Freire, 1987) continued her assault on the genus by placing two recently described species (Sagástegui & Dillon, 1985) into synonymy (see discussion under individual species). We have chosen to maintain *Belloa* and remain in agreement with Cabrera (1958) and Ariza (1989), who both recognized the genus as a distinct, easily distinguishable, entity. In addition to the strikingly different pubescence of the achenes, several other important characteristics separate these two genera, including the apices of the style branches of hermaphroditic florets, pappus characteristics, and overall distribution and ecology. Initial cytological evidence also points to fundamental differences between these two genera: $n = 12$ for *Belloa punae* (Cabr.) Cabr., the only *Belloa* counted thus far, and $n = 14$ for all *Lucilia* species counted (Freire, 1986b).

Belloa is recognized by the following suite of characteristics: heterogamous capitula, pappus bristles fused at the base, style branches of hermaphroditic florets rounded or obtuse, achenes glandular with biseriate, multicellular, capitate-glandular trichomes, and probable chromosome base of $n = 12$. Suites of similar characters have been used to establish the monotypic genus *Novenia* (Freire, 1986a). In our view, *Belloa* is perhaps more closely related to *Gamochoaeta* than it is to *Lucilia*. A few highly reduced *Belloa* species approach *Mniodes* in general habit; however, that genus is strictly dioecious.

A more detailed analysis and discussion of these and other differences will be published in a future work dealing with generic relationships among South American Inuleae.

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Key to Species of *Belloa*

1. Plants with stems erect or ascending, not cespitose, pulvinate, or acaulescent 2
 2. Foliaceous stems compressed; leaves distichous, orbicular to suborbicular, folded upward, subamplexicaul *B. plicatifolia*
 2. Foliaceous stems terete; leaves alternate or rosulate, oblanceolate to linear-lanceolate, plane, attenuate, and sessile 3
 3. Capitulescences glomerulate with 2–5 capitula sessile in upper leaf axils . . . *B. lopezmirandae*
 3. Capitulescences pseudospicate, bracteate *B. turneri*
1. Plants with stems prostrate to decumbent, generally cespitose or pulvinate, or rarely acaulescent with rosulate basal leaves 4
 4. Acaulescent perennial herbs; leaves all basal, rosulate; capitula solitary, sessile or shortly pedunculate 5
 5. Leaves oblanceolate, 2–5 cm long, 6–10 mm wide, upper surfaces usually glabrescent *B. longifolia*
 5. Leaves spatulate, 2–3.5 cm long, 2–4 mm wide, both surfaces densely silvery-tomentose ... *B. spathulifolia*
 4. Caulescent, prostrate to decumbent, cespitose or pulvinate perennial herbs; leaves basal, rosulate and/or caulescent; capitula in glomerules or solitary, usually sessile 6
 6. Compact, cespitose habit; leaves 4–10 mm long 7
 7. Capitula solitary; leaves 4–4.5 mm long *B. schultzei*
 7. Capitula in glomerules; leaves 6–10 mm long *B. piptolepis*
 6. Branched, loosely cespitose, prostrate habit; leaves 10–50 mm long 8
 8. Leaves alternate, congested, obovate to spatulate, 10–20 mm long; capitula solitary *B. pickeringii*
 8. Leaves rosulate, oblong-linear to spatulate, (10–)20–50 mm long; capitulescences pseudospicate, capitula sessile in upper leaf axils *B. subspicata*

1. *Belloa longifolia* (Cuatr. & Aristeg.) Sagást. & Dillon, Phytologia 58: 396. 1985. **Figure 3.**

Lucilia longifolia Cuatr. & Aristeg., Fl. Venezuela 10: 367. 1964. TYPE: Venezuela, Edo. Mérida, camino a Pico Bolívar, 15 km al sudeste de Mérida, 4100–4300 m, Oct 1953, *E. L. Little 15725* (holotype, VEN, not seen).

Cespitose, perennial **herbs**; rhizomes oblique to horizontal; roots filiform. **Leaves** rosulate, sessile; blade oblanceolate, 2–5 cm long, 6–10 mm wide, marcescent, base attenuate to a winged petiole, apex obtuse, mucronate, the margins entire, lower surface silvery-tomentose, upper surface densely lanate. **Capitulescences** of solitary heads, terminal, sessile or pedunculate, the peduncles to 5 mm long. **Capitula** 7.5–10 mm high, 4.5–8 mm wide; in-

volucres cylindrical to narrowly campanulate; phyllaries 4–5-seriate, the outer ovate, 4–5.5 mm long, 2.5–3 mm wide, apex obtuse, dorsally lanuginous, the inner linear, 7.5–10 mm long, 2.5–3 mm wide, apex obtuse, glabrous; pistillate florets ca. 80, the corollas 6–7 mm long; hermaphroditic florets ca. 12, the corollas ca. 6 mm long. **Achenes** obovate to oblong, 1–1.2 mm long, glandular; pappus bristles 6–8 mm long, lutescent.

Belloa longifolia is distributed from Venezuela to southern Peru. In Peru, it is known from *jalca* and *puna* formations (3600–4000 m) in the Departments of Ancash, Cajamarca, Cuzco, and La Libertad.

ANCASH. Huaráz: Parque Nacional de Huascarán, Quebrada Alpamayo, 4600–4750 m, *Smith et al.* 9733

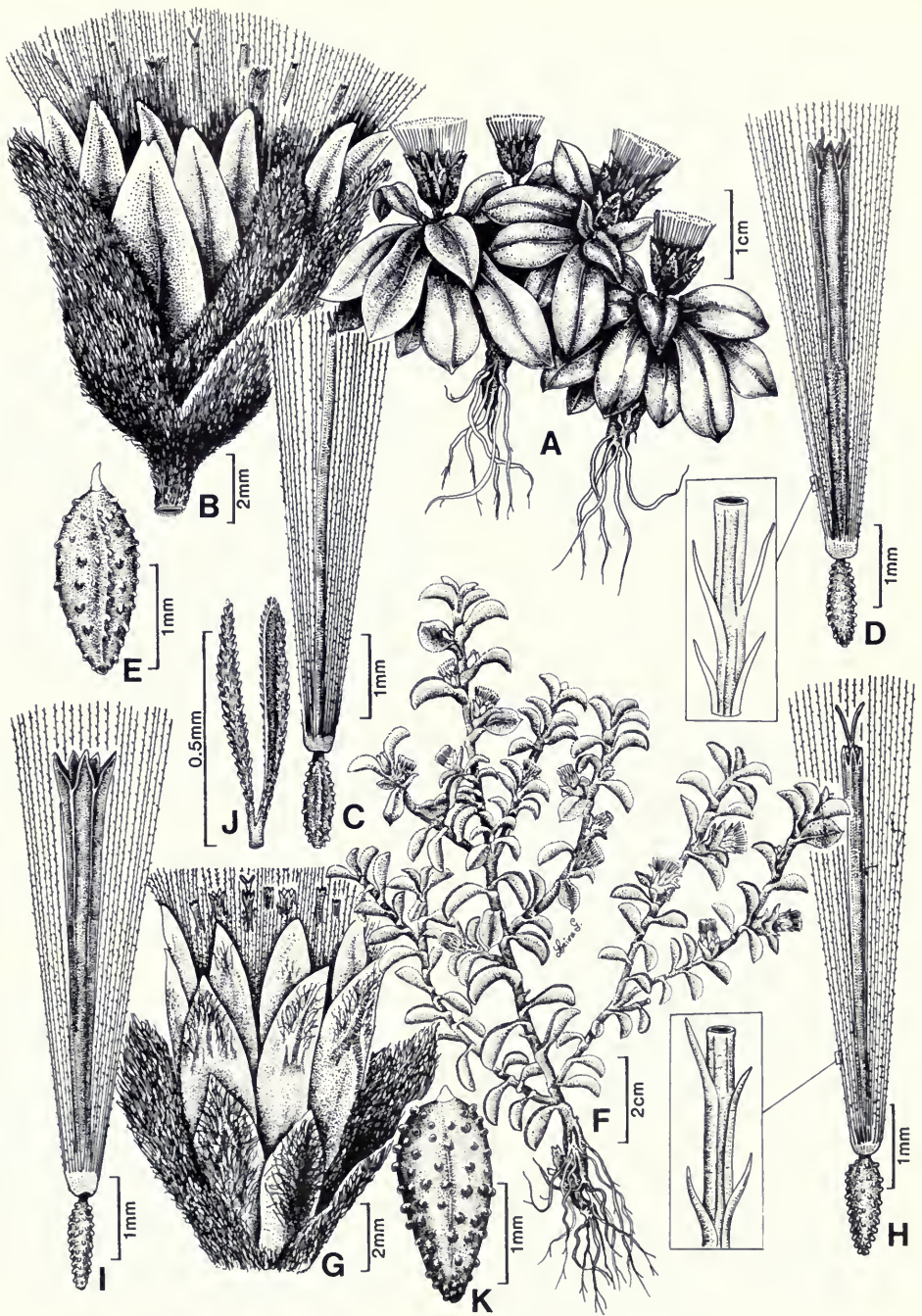


FIG. 3. *Belloa longifolia*. A, habit; B, capitulum; C, pistillate flower; D, hermaphroditic flower; E, achene. (Drawn from Sagástegui et al. 10060, HUT). *Belloa plicatifolia*. F, habit; G, capitulum; H, pistillate flower; I, hermaphroditic flower; J, style branches of pistillate flower; K, achene. (Drawn from Sagástegui et al. 10117, HUT.)

(HUT, MO, USM), *Smith 10376* (HUT, MO). **Huari:** Huascarán National Park, Quebrada Pucaraju, a lateral valley to Quebrada Rurichinchay, 3900–4200 m, *Smith et al. 12708* (F, MO). **Santa:** Laguna Capao, 4350 m, *Mostacero*

et al. 1932 (F, HUT). **AYACUCHO. Prov. Unknown:** *Aucasime 10* (USM). **CAJAMARCA. Contumazá:** alrededores del Pozo Kuán, 3600–3800 m, *Sagástegui et al. 10060* (F, HUT); Jalca del Pozo Kuán, 4000 m, *Sagástegui*

et al. 10763 (F, HUT). **San Miguel:** Taulís Alto (jalca), 3100 m, *Sagástegui et al. 9546* (F, HUT). **CUZCO. Urubamba:** Machupicchu, along Inca Trail in the pass of Huarmihuañusca, 4205 m, *Peyton & Peyton 279* (MO). **JUNÍN. Yauli:** near Atocsayco, ca. 4200 m, *Pearsall 837* (F). **Prov. Unknown:** Patarcocha, 4300 m, *Aguilar s.n.* (MO, USM). **LA LIBERTAD. Patáz:** Paso de Alaska (Retamas-La Paccha), 4000 m, *López & Sagástegui 3560* (HUT, US). **Santiago de Chuco:** alrededores de Laguna El Toro (Jalca de Quiruvilca), 4000 m, *Sagástegui & Bernal 3019* (HUT, US). **Chota:** Motil-Shorey (jalca), 3200 m, *Sagástegui et al. 11697* (F, HUT); Jalca de Coipín, 4000 m, *Sagástegui et al. 11981* (F, HUT). **LAMBAYEQUE. Ferreñafe:** Sinchigual-Laguna Tembladera, 3100 m, *Sagástegui et al. 12853* (F, HUT, MO, K).

2. ***Belloa lopezmirandae*** Cabr., Bol. Soc. Argent. Bot. 7: 83. 1958. TYPE: Peru, Dept. La Libertad, Prov. Otuzco, Agallpampa, 3100 m, 22 May 1952, *A. López M. 858* (holotype, LP; isotype, HUT).

Lucilia lopezmirandae (Cabr.) Freire, Darwiniana, 28: 409. 1987.

Perennial herbs to 20 cm tall; stems unbranched, ascending, cylindrical, leafy to the apices. Leaves alternate, sessile; blade oblanceolate, 1–3 cm long, 3–5 mm wide, base attenuate, apex acute, mucronate, lower surface tomentose, upper surface lanuginous or glabrescent. Capitulescences glomerulate with 2–5 heads sessile in upper leaf axils. Capitula 7–7.5 mm high, 1–1.5 mm wide; involucre cylindrical; phyllaries 12–15, ca. 5-seriate, the outer ovate, 3–4 mm long, 1–1.5 mm wide, dorsally lanuginous, apex acute, the inner linear, ca. 7 mm long, ca. 1 mm wide, glabrous, apex acute to subacute; pistillate florets ca. 20, the corollas 6.5–7 mm long; hermaphroditic florets 1–2, the corollas 5–6 mm long. Achenes obovoid, ca. 1 mm long, brown, glandular; pappus bristles 5.5–6 mm long, white.

Belloa lopezmirandae is known from two collections from open grassy sites in the region of the type locality (3100 m). Freire (1987) placed *B. turneri* Sagást. & Dillon into the synonymy of this species and chose to dismiss the numerous qualitative and quantitative characteristics that clearly separate these two entities.

LA LIBERTAD. Otuzco: Agallpampa, 3100 m, *López 1864* (F, HUT).

3. ***Belloa pickeringii*** (A. Gray) Sagást. & Dillon, Phytologia 58: 396. 1985.

Lucilia pickeringii A. Gray, Proc. Amer. Acad. Arts 5: 138. 1862. TYPE: Peru, Dept. Junín, Prov. Yauli, Baños-Alpamarca, *Capt. Wilkes s.n.* (holotype, GH; isotype, US).

Lucilia pickeringii var. *β. minor* A. Gray, Proc. Amer. Acad. Arts 5: 138. 1862. TYPE: Peru, Dept. and Prov. Unknown, Casa Cancha, *Capt. Wilkes s.n.* (holotype, GH p.p.).

Prostrate perennial herbs to 5 cm tall; stems 2–8 cm long, branched, ascending to decumbent. Leaves alternate, sessile, congested; blade obovate to spatulate, 1–2 cm long, 3–6 mm wide, base attenuate, apex rounded, both surfaces densely lanate, incanous. Capitulescences usually of solitary heads, terminal, sessile, rarely with 2–4 heads in terminal glomerules. Capitula 8–9 mm high, 3–4 mm wide; involucre cylindrical; phyllaries ca. 24, 4–5-seriate, the outer ovate, 4–5 mm long, 2–3 mm wide, dorsally lanuginous, acute, the inner linear, 7–9 mm long, 1–2 mm wide, glabrous, subacute to obtuse; pistillate florets 40–60, the corollas 4–5 mm long; hermaphroditic florets ca. 10, the corollas 3–4 mm long. Achenes (immature) oblong, 0.8–1 mm long, brownish, glandular; pappus bristles ca. 5 mm long, white.

Belloa pickeringii is found infrequently in high-elevation puna formations (3600 m) from central to southern Peru.

CUZCO. Cuzco: Cuzco, 3600 m, *Herrera 2397* (F). **JUNÍN. Tarma:** 25 km W of Tarma, 4100 m, *Hutchinson 659* (UC). **LIMA. Huarochiri:** Rio Blanco, 12,000 ft, *Macbride & Featherstone 705* (F, US).

4. ***Belloa piptolepis*** (Wedd.) Cabr., Bol. Soc. Argent. Bot. 7: 81. 1958.

Merope piptolepis Wedd., Chlor. And. 1: 162. 1856. SYNTYPES: Peru, Dept. Puno, Maravillas, *H. A. Weddell 4514* (lectotype, P, designated by Cabrera, 1978). Bolivia, Dept. Potosí: “aux environs des lagunas,” *A. C. V. d’Orbigny 1371* (paralectotype, P, not seen, fragment, F; isoparalectotype, G, not seen, F neg. 28611).

Lucilia piptolepis Wedd., Chlor. And. 1, t. 26 B, 1855. *Gnaphalium piptolepis* (Wedd.) Griseb., Abh. Königl. Ges. Wiss. Göttingen. 24: 186. 1879.

Compact cespitose, perennial herbs to 5 cm tall; rhizomes oblique, roots filiform; stems 5–40 cm long, decumbent, tomentose to glabrate. Leaves rosulate, sessile; blade obovate-spatulate to obovate-oblong, 6–10 mm long, 3–4 mm wide, marcescent, base attenuate, apex obtuse, mucronulate, both surfaces tomentose, incanous. Capitules-

cences glomerulate, sessile, terminal, occasionally of solitary heads. **Capitula** ca. 6 mm high, ca. 4 mm wide; involucre narrowly campanulate; phyllaries ca. 18, ca. 3-seriate, the outer ovate-oblong, 3–4 mm long, 1–1.5 mm wide, lanuginous, obtuse, the inner linear, ca. 6 mm long, ca. 1 mm wide, glabrous, obtuse; pistillate florets 18–20, the corollas ca. 4 mm long; hermaphroditic florets 2–5, the corollas 3.5–4 mm long. **Achenes** ellipsoid, 0.7–0.8 mm long, brown, glandular; pappus bristles ca. 5 mm long, white.

Belloa piptolepis is distributed from Venezuela to northwestern Argentina. In Peru it occupies a wide range of habitats within *puna* and *jalca* formations and is normally found above 3500 m.

The overall habit varies considerably with the smallest individuals found in southern Peru, and the larger, to the north. *Belloa piptolepis* most closely resembles *B. subspicata*, but the former generally has a more compact habit, smaller leaves, slightly broader capitula, and smaller achenes. In addition, the capitulescence of *B. piptolepis* is composed of terminal capitula subtended by foliaceous bracts, whereas that of *B. subspicata* is pseudospicate, with axillary capitula subtended by the upper leaves. Individuals from northern Peru (e.g., *Dillon & Skillman 4127*) often have a more open habit that approaches *B. subspicata*, but conform in all other characters to the species delineation presented here. Further sampling in this region will be necessary to assess variability in habit.

ANCASH. Bolognesi: Chiquián, 3840–3860 m, *Ferreyra 5768* (US, USM). **Carhuáz:** Huascarán National Park, Quebrada Ishinca, 4730–4930 m, *Smith et al. 9459* (MO, USM); Quebrada Ulta, 4400–4600 m, *Smith 11354* (F, MO). **Huaráz:** Huascarán National Park, Quebrada Lla-ca, 4400–4600 m, *Smith et al. 10806* (F, MO). **Huari:** Tunel Kahuish, 4250 m, *López et al. 7569* (HUT, MO); Huascarán National Park, Quebrada Rurichinchay between Mina Esparta at Quebrada Pachachaca, 3700–4060 m, *Smith et al. 12658* (F, MO). **AYACUCHO. Huanta:** Pampalca, between Huanta and Río Apurímac, ca. 3200 m, *Killip & Smith 23265* (NY). **Santa:** Laguna Capao, 4400 m, *Mostacero et al. 1942* (F, HUT, MO). **CAJAMARCA. Chota:** Laguna Yahuarococha, arriba de Incahuasi, 3600 m, *Sagástegui et al. 12906* (F, HUT, K, LP, MO). **Contumazá:** Jalca del Pozo Kuán, 4000 m, *Sagástegui et al. 10764, 10791* (F, HUT, MO). **CUZCO. Cuzco:** 5 km N of Cuzco, 3700 m, *West 7165* (GH, UC). **JUNÍN. Junín:** between Tarma and Jauja, ca. 4500 m, *Killip & Smith 21962* (NY). **Yauli:** Yauli, ca. 13,500 ft, *Macbride & Featherstone 931* (F, GH). **Prov. Unknown:** Patarcocha, 4300 m, *Aguilar s.n.* (USM). **LA LIBERTAD. Patázi:** Huancaspata-Tayabamba, 3900 m, *López & Sagástegui 8267* (HUT, MO). **Santiago de Chuco:** Jalca de Coipín,

4000 m, *Sagástegui et al. 11980* (F, HUT, MO, NY, US). **LAMBAYEQUE. Ferreñafe:** ca. 7 km NW of Incahuasi; near Cerro Punamachay on trail to Laguna Hualtaco, 3300–3550 m, *Dillon & Skillman 4127* (F). **MOQUEGUA. Mariscal Nieto:** ca. 77 km NE of Moquegua on road to Carumus (Km 80), ca. 4050 m, *Dillon et al. 4812* (F, USM). **PUNO. Azángaro:** Arapa, 3900 m, *Aguilar s.n.* (USM p.p.); Arapa, *Aguilar 130* (MO p.p.); Tequena, 20 km N de Arapa, *Aguilar 418* (USM p.p.). **Huancané:** Moho, 4000 m, *Aguilar s.n.* (USM); Granja Salcedo, Cañón Vis-cachani, 4500 m, *Mexia 4262* (GH, MO, UC); **Melgar:** Chu- quibambilla, 3900–4000 m, *Pennell 13368* (GH, F, NY); Araranca, 4100–4300 m, *Pennell 13437* (F, NY). **Puno:** Amantani, 3900 m, *Aguilar 427* (MO p.p., USM).

5. ***Belloa plicatifolia* Sagást. & Dillon**, *Phytologia* 58: 394. 1985. TYPE: Peru, Dept. Cajamarca, Prov. Contumazá, Cascabamba, arriba de Contumazá, ladera, 3200 m, 14 Jun 1981, *A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10117* (holotype, HUT; isotype F, HUT, K, MO). **Figure 3.**

Lucilia plicatifolia (Sagást. & Dillon) Freire, *Darwiniana*, 28: 411. 1987.

Perennial **herbs** to 5–20 cm tall; stems branched, erect to ascending, leafy to the apex. **Leaves** alternate, distichous, sessile; blade orbicular to suborbicular, 5–14 mm long, 3–7 mm wide, marcescent, folded, base attenuate, subamplexicaul, apex rounded, both surfaces densely lanate, the margins entire. **Capitulescences** of solitary heads in upper leafaxils, subsessile. **Capitula** (6–)7–8(–) mm high, 3–4 mm wide; involucre cylindrical; phyllaries 15–20, 4–5-seriate, the outer ovate, 4–6 mm long, 3–4 mm wide, apex subacute, dorsally lanuginous, the inner linear to lanceolate, 7–8 mm long, 1–1.5 mm wide, apex acute, glabrous; pistillate florets 12–14, the corollas 4–5 mm long; hermaphroditic florets ca. 10, the corollas 4–5 mm long. **Achenes** obovate to oblong, 1–1.5 mm long, brown, glandular; pappus bristles 5–6 mm long, white.

Belloa plicatifolia is found frequently among sheltered rocky sites in *jalca* formations of northern Peru (Departments of Cajamarca and La Libertad, 3000–3500 m).

This species is morphologically distinct and has no apparent close relatives. Its erect lanate branches with folded, distichous leaves give the stems a flattened appearance unknown elsewhere in the genus.

CAJAMARCA. Cajabamba: Cajabamba-Luchubamba, 3800 m, *Sagástegui et al. 11199* (F, HUT, K, MO, NY,

USM). **Cajamarca:** Cumbemayo, 3200 m, *Sagástegui & Tellez 12686* (F, HUT, MO). **Contumazá:** Cascabamba, 3050 m, *Sagástegui et al. 9022* (F, HUT, MO); Cascabamba, 3100 m, *Sagástegui et al. 10010* (F, HUT, K, MO); Cascabamba, 3000 m, *Sagástegui et al. 10719* (F, HUT, K, MO). **LA LIBERTAD. Otuzco:** Salpo, Cerro Ragache, 3500 m, *Sagástegui et al. 11631* (F, HUT, K, MO).

6. ***Belloa schultzi*** (Wedd.) Cabr., *Revista Invest. Agríc.* 11: 404. 1957.

Merope schultzi Wedd., *Chlor. And.* 1: 163. 1856. TYPE: Peru, Dept. Puno, Prov. Carabaya, Aya-pata, *W. Lechler 1984* (holotype, P, not seen, F neg. 37608).

Compact, cespitose, perennial herbs; stems much-branched, 2–3 cm long, compacted. Leaves sessile, densely imbricate; blade obovate, 4–4.5 mm long, 2–2.5 mm wide, marcescent, base attenuate, subamplexicaul, apex rounded, both surfaces densely lanate, gray. Capitulescences of solitary heads, terminal, sessile. Capitula 4–4.5 mm high, 1.5–2 mm wide; involucre cylindrical; phyllaries ca. 18, 4-seriate, the outer ovate, 2–3 mm long, 1–1.5 mm wide, dorsally lanuginous, acute, the inner linear, 4–4.5 mm long, 1–1.5 mm wide, glabrous, apex subacute, purplish; pistillate florets 9–11, the corollas 3–3.5 mm long; hermaphroditic florets 1–3, the corollas 2.5–3 mm long. Achenes (immature) oblong, 0.6–0.8 mm long, brown, sparsely glandular; pappus bristles ca. 4 mm long, white.

Belloa schultzi is distributed from southern Peru to northern Chile and adjacent northwestern Argentina in dry puna habitats usually above 4000 m. It is distinctive among the Peruvian members of the genus in possessing a tightly compact habit, densely imbricate leaves, capitula only 4–4.5 mm high, and sparsely glandular achenes. Superficially, its overall habit approaches that of *Mniodes*, but it is readily distinguished by its heterogamous capitula.

Freire (1987) placed *Mniodes cerratei* Ferreyra under the synonymy of *B. schultzi* (as *Lucilia*). Sagástegui and Dillon (1985) recognized the type as a species of *Belloa* and will follow Freire's suggestion until further material can be examined.

AREQUIPA. Arequipa: Nevado de Chachani, 4300–4600, *Pennell 13310, 13311* (F, NY); Pichupichu, 13,500 ft, *Stafford 697* (F). **CUZCO. Quispicanchis:** Auzangate, 4300–4600, *Rauh & Hirsch P1190* (NY). **JUNÍN. Yauli:** Tucto, cerca a Morococha, 4800–4900 m, *Weberling 5915* (USM). **LIMA. Huarochiri:** ca. 1 km from Casa-

palca-Marcapomacocha, ca. 15,000 ft, *Saunders 807* (NY). **MOQUEGUA. Mariscal Nieto:** between Torata and Carumas, Km 75-76 from Moquegua to Puno, ca. 3600 m, *Dillon et al. 3346A* (F, HUT, K, MO, NY, US, USM). **PUNO. Puno:** San Antonio de Esquilache, 15,500 ft, *Stafford 746* (F). **Prov. Unknown:** Casa Cancha, *Wilkes s.n.* (GH p.p., NY).

7. ***Belloa spathulifolia*** Sagást. & Dillon, *Phytologia* 58: 394. 1985. TYPE: Peru, Dept. La Libertad, Prov. Santiago de Chuco, entre Chota Motil y Shorey, jalca, 3200 m, 6 Dec 1984, *A. Sagástegui A., J. Mostacero L. & M. Diestra Q. 11695* (holotype, HUT; isotypes, F, MO, NY). **Figure 4.**

Cespitose, perennial herbs to 3 cm tall; rhizomes oblique, roots filiform. Leaves rosulate, sessile; blade spatulate to oblanceolate-spatulate, 2–3.5 cm long, 2–4 mm wide, coriaceous, marcescent, the base expanded and partially sheathing the stem, both surfaces densely silvery-tomentose, the margins entire. Capitulescences 2–3-headed, sessile glomerules or, rarely, of solitary heads. Capitula 7–8 mm high, ca. 5 mm wide; involucre narrowly campanulate; phyllaries ca. 24, 4-seriate, the outer ovate, ca. 4 mm long, ca. 2 mm wide, lanuginous, apex obtuse, the inner linear-oblong, 7–8 mm long, ca. 2 mm wide, glabrous, apex obtuse; pistillate florets 15–16, the corollas ca. 4 mm long, the style branches exserted; hermaphroditic florets ca. 10, the corollas ca. 5 mm long. Achenes obovate to oblong, ca. 1 mm long, brown, glandular; pappus bristles ca. 4 mm long, white.

Belloa spathulifolia is known only from the type locality in open spaces between clumps of *Stipa ichu* within the jalca formation (ca. 3200 m). Among the Peruvian species, it most closely resembles *B. longifolia* with its cespitose, rosulate habit; however, the latter has much wider leaves (6–10 mm) and larger capitula with more pistillate florets (ca. 80). Freire (1987) placed *B. spathulifolia* under the synonymy of *Lucilia (Belloa) santanica* (Cabr.) Freire, choosing to ignore the differences in habit, capitulescence, floral number, and ecological and geographic preferences (Sagástegui & Dillon, 1985).

8. ***Belloa subspicata*** Wedd., *Chlor. And.* 1: 159. 1855. TYPE: Bolivia, Dept. Potosí, "aux environs de Potosí," *A. C. V. d'Orbigny 1373, 1374* (holotype, P, not seen, F neg. 38022).

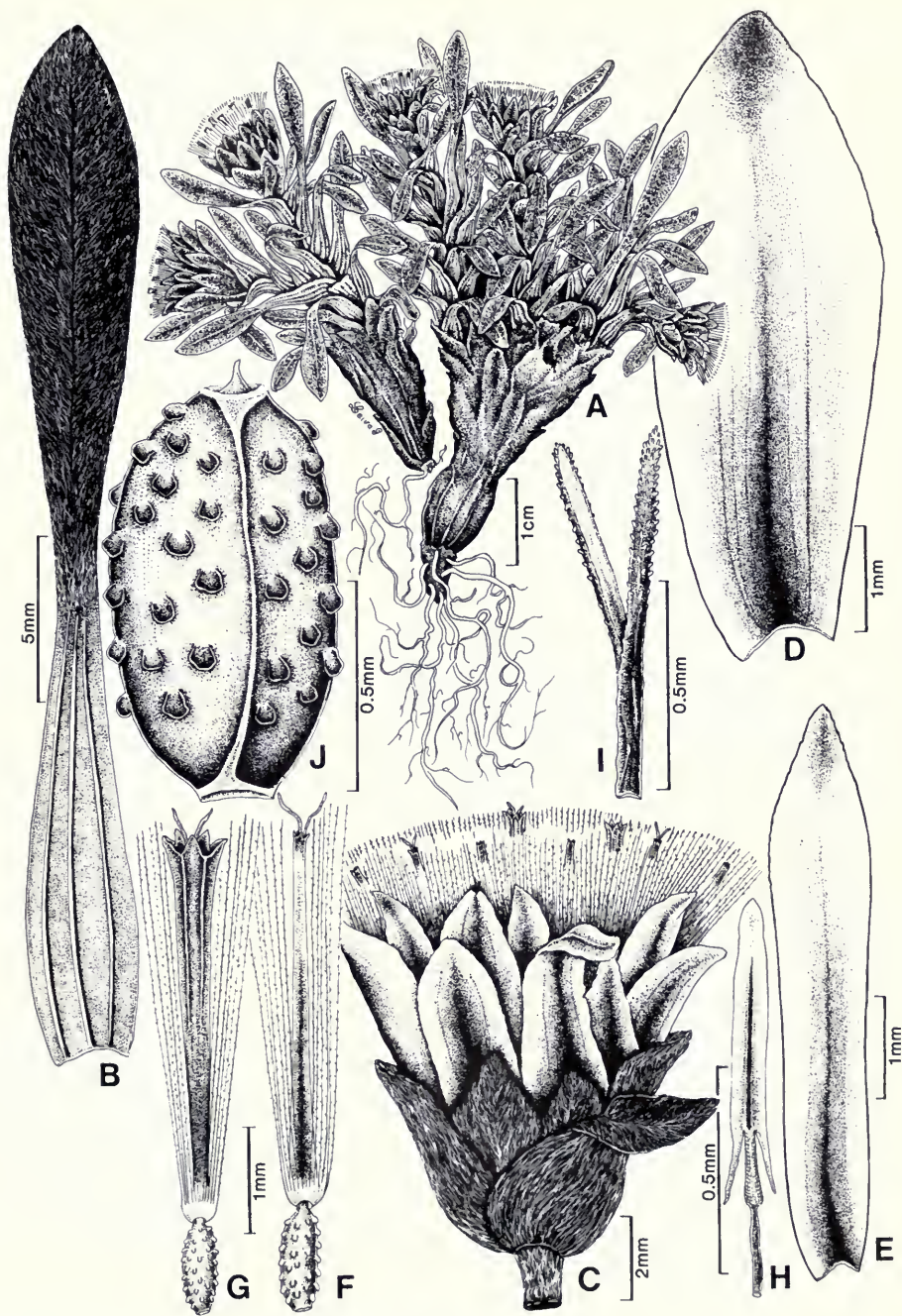


FIG. 4. *Belloa spathulifolia*. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, anther; I, style branches of pistillate floret; J, achene. (Drawn from Sagástegui et al. 11695, HUT.)

Prostrate, perennial herbs to 5 cm tall; roots fibrous; stems numerous from caudex, 2–7 cm long, prostrate, decumbent, or ascending, lanulose. Basal leaves sessile, rosulate, oblong-linear to spatu-

late-oblong, (1–)2–5 cm long, 2–7 mm wide, base attenuate, apex acute to obtuse, lower surface densely tomentose, upper surface lanuginous, the cauline leaves gradually smaller. Capitulescences

pseudospicate, heads sessile in upper leaf axils or, rarely, of terminal, solitary heads. **Capitula** 6–8 mm high, 2–3 mm wide; involucre cylindrical; phyllaries ca. 14, 4-seriate, the outer ovate, 3–4 mm long, 1–1.5 mm wide, lanuginous, acute to subacute, the inner oblong-linear, 7–8 mm long, 1–1.5 mm wide, glabrous, acute to obtuse, brownish; pistillate florets 14–20, the corollas 4–5 mm long; hermaphroditic florets 3–6, the corollas ca. 5 mm long. **Achenes** oblong, ca. 1 mm long, brownish, glandular; pappus bristles ca. 6 mm long, white.

Belloa subspicata is distributed from northern Peru to northwestern Argentina. Within its range this species is polymorphic for leaf shape: collections from the north usually have spatulate to oblong leaves with obtuse to rounded apices (rarely acute), and those from the south have more oblong-linear leaves and acute apices. These morphs may prove to be worthy of taxonomic recognition; however, further collections and field observations are needed.

This species most closely resembles *Belloa pip-tolepis*; however, it may be separated by the former's larger leaves, cylindrical involucre, and more pseudospicate capitulescences. The overall size of the achenes varies considerably, but those in *B. pip-tolepis* tend to be smaller than those of *B. subspicata*.

CAJAMARCA. Contumazá: El Granero, 2800 m, *Sagástegui & López 10640* (F, HUT, MO). **CUZCO.** Canas: San Andrés de Checca, 3870 m, *Vargas 11002* (F, UC), *Vargas 1479* (GH p.p.). **HUÁNUCO.** Huánuco: San Carlos Mines, estación 6 mi W of Huallanca, *Macbride & Featherstone 2467* (F). **JUNÍN.** Jauja: Muquiyayuyo, Río Mantaro, 3500 m, s.d. (F, USM). **Tarma:** road from Huan-cayo to Tarma, 3000–3300 m, *Sullivan, et al. 1043* (F, MO). **LA LIBERTAD.** Santiago de Chuco: Laguna El Toro, 4100 m, *Sagástegui 3020* (HUT, US). **LIMA.** Huarochiri: Viso, ca. 9000 ft, *Macbride & Featherstone 614, 615* (F); Río Blanco, ca. 12,000 ft, *Macbride & Featherstone 704, 741* (F), *742* (F, US). **PUNO.** Carabaya: between Santa Rosa and Ayaviri, ca. 3500 m, *Dillon et al. 1070* (F, MO, USM). **Melgar:** Chuquibambilla, 3900–4000 m, *Pennell 13369* (F); Araranca, 4100–4300 m, *Pennell 13471* (F). **NO EXACT LOCALITY.** *Ellenberg 613* (USM).

9. *Belloa turneri* Sagást. & Dillon, *Phytologia* 58: 392. 1985. TYPE: Peru. Dept. Cajamarca. Prov. Contumazá: alrededores del Pozo Kuán, ladera, 3600–3800 m, 13 Jun 1981, *A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10087* (holotype, HUT; isotypes, F, HUT, MO, TEX). **Figure 5.**

Perennial **herbs** to 20 cm tall; stems erect, unbranched, cylindrical, densely sericeous-lanose. **Basal leaves** rosulate, sessile; blade oblong-lanceolate to linear-lanceolate, 2–4 cm long, 3–5 mm wide, coriaceous, marcescent, discolorous, base attenuate, apex acute, mucronulate, parallel-nerved, lower surface silvery-tomentose, upper surface lanuginous; cauline leaves alternate, sessile; blade linear to lanceolate, 1–3 cm long, 1.5–3 mm wide. **Capitulescences** spiciform, bracteate. **Capitula** 5–6 mm high, 5 mm wide; involucre campanulate; phyllaries ca. 25, ca. 4-seriate, the outer ovate, 3.5–4.5 mm long, 2.5–3.5 mm wide, lanuginous, apex acute, the inner linear to oblong-linear, 5–6 mm long, 1–2 mm wide, apex acute, glabrous; pistillate florets 25–40, the corollas ca. 3.5 mm long; hermaphroditic florets (7–)10–12, the corolla 3–3.5 mm long. **Achenes** oblong, ca. 1 mm long, brownish, glandular; pappus bristles ca. 4 mm long, white.

Belloa turneri occurs frequently in open areas within *jalca* formations in northern Peru (Departments of Ancash and Cajamarca, 3100–3800 m) and southern Ecuador (Province of Loja, 2400–2600 m).

This species is distinctive within the genus, bearing rosulate basal leaves and robust, erect, spiciform capitulescences. It most closely resembles *B. lopezmirandae* Cabr. of Department La Libertad; however, the latter has smaller capitula with cylindrical involucre and fewer florets (ca. 20 pistillate, 1–2 hermaphroditic). It is known by the local name of *champlito* in Ancash.

ANCASH. Huaráz: Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, HUT, MO); **Huari:** Huascarán National Park, passing Manto Mina, 4.8 km from Catac-Chavin road, 4410 m, *Smith & Buddensiek 10988* (MO); 1 km below Manto Mina, 4300 m, *Smith & Buddensiek 11011 p.p.* (F). **CAJAMARCA.** Contumazá: Pampa de la Sal, 3500 m, *Sagástegui et al. 10731* (F, HUT, MO); **San Miguel:** Taulis Alto (jalca), 3100 m, *Sagástegui et al. 9547* (F, HUT, MO). **LA LIBERTAD.** Santiago de Chuco: Chota (Motil-Shorey), 3200 m, *Sagástegui et al. 11693* (F, HUT, MO).

IV. *Blumea*

Blumea DC., *Arch. Bot. (Paris)* 2: 514. 1833, nom. cons. TYPE: *Conyza balsamifera* L. ≡ *Blumea balsamifera* (L.) DC.

Annual or perennial or rarely biennial **herbs** or **shrubs**; stems erect, ascending or occasionally pro-



FIG. 5. *Belloa turneri*. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, style branches of hermaphroditic floret; I, achene. (Drawn from Sagástegui et al. 10087, HUT.)

cumbent or climbing. **Leaves** alternate, simple; petiole wanting or short, sometimes decurrent on the stem; blade base rounded, amplexicaulous, or attenuate, often glandular-pubescent, the margins entire, toothed, or pinnately or runcinately lobed.

Capitulescences paniculate or of solitary heads (rarely glomerulate), terminal or axillary, sessile or pedunculate, bracteolate or not. **Capitula** disciform, 3–18 mm in diameter; involucre hemispherical to cylindrical; phyllaries imbricate, mul-

tiseriate, dorsally pubescent, the margins scarious; receptacles flat or convex, epaleaceous, puberulent to pilose; pistillate florets numerous, the corollas filiform, mostly yellowish white, apex 2–4-lobed or bilabiate, the style sometimes conspicuously exerted; hermaphroditic florets fertile or functionally staminate, the corollas tubular, the limb slightly expanded, (4–)5-lobed, the anther bases sagittate, caudate, the terminal appendages variously shaped, the styles bifid, the branches slender, strigose to papillose. **Achenes** small, brown, oblong, 5–10-ribbed, plump, terete or obscurely 4-angled; pappus bristles scabrid, barbellate, uniseriate. Chromosome numbers: $n = 9, 10, 11, 18, 22, 27$.

Blumea is a tropical and subtropical genus containing some 75 species, from Africa, Asia, Australia, and the Pacific Islands. Only the following species is known from the New World. *Blumea* is placed within the Plucheinae, which is characterized by alternate leaves, heterogamous capitula (either ligulate or disciform) with predominantly yellow corollas, and sagittate or caudate anthers (Randeria, 1960). Its nearest Peruvian relative is *Pluchea*, a genus possessing a more shrubby habit, corymbose capitulescences, more coriaceous phyllaries, and functionally staminate central florets with undivided styles.

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- MCVAUGH, R. 1972. Nomenclatural and taxonomic notes on Mexican Compositae. *Rhodora*, 54: 495–516.
- RANDERIA, A. J. 1960. The composite genus *Blumea*, a taxonomic revision. *Blumea*, 10: 176–317.

1. ***Blumea viscosa*** (Miller) Badillo, *Revista Fac. Agron. (Maracay)* 7(3): 9. 1974. **Figure 6.**

Conyza viscosa Miller, *Gard. Dict.*, ed. 8. 1768. TYPE: Mexico, Veracruz, *W. Houston s.n.* (holotype, BM, not seen).

Conyza lyrata Kunth, *Nov. Gen. Sp. (fol.)* 4: 55. 1820. TYPE: Ecuador, Guayaquil, *A. Humboldt & A. Bonpland 3812* (holotype P, not seen, IDC microfiche 6209. 95: II. 5; isotype, B, probably destroyed, F neg. 14934).

Eschenbachia lyrata (Kunth) Britton & Millsp., *Fl. Baham.* 444. 1920.

Blumea lyrata (Kunth) Badillo, *Bol. Soc. Venez. Ci. Nat.* 10: 257. 1946.

Ernstia lyrata (Kunth) Badillo, *Cat. Fl. Venez.* 505. 1947, genus ined.

Pseudoconyza lyrata (Kunth) Cuatr., *Ciencia (Mexico)*. 21: 31. 1961.

Pseudoconyza viscosa (Miller) D'Arcy, *Phytologia* 25: 281. 1973.

Blumea viscosa (Miller) D'Arcy, *Phytologia* 30: 5. 1975, redundant comb.

Herbs to 8 dm tall; stems erect, terete, striate, sparsely pilose and glandular-puberulent, viscid. **Leaves** sessile, simple or divided into stipuleform auricles; blade obovate to spatulate, 1–3(–7) cm long, 0.5–1(–3.5) cm wide, base attenuate, apex acute, mucronate, the margins dentate, the teeth mucronate, both sides sparsely pilose and glandular-puberulent. **Capitulescences** cymose-paniculate, subtended by a foliaceous bracts; peduncles 1–4 cm long, glandular-puberulent, usually bracteolate. **Capitula** 5–7 mm high, 4–5 mm wide; involucre narrowly campanulate; phyllaries 3–4-seriate, the outer lanceolate, 1.5–3 mm long, ca. 0.5 mm wide, pilose and glandular-puberulent, apex acute, the inner to 6 mm long, ca. 0.7 mm wide, glandular-puberulent, apex acuminate, strigulose; receptacle flat to depressed-hemispheric, 3–4 mm in diameter, puberulent to glabrescent; pistillate florets 50–300, the corollas ca. 3.5–4 mm long, yellowish-white, slightly expanded at the base, apex 3-notched, the style 4–4.5 mm long, the branches filiform, 0.4–0.5 mm long; hermaphroditic florets 2–12, fertile, the corollas white or pinkish, tubular, 5–5.5 mm long, the limb slightly expanded, 5-lobed, the lobes ca. 0.4 mm long, narrowly triangular, the anthers ca. 1.2 mm long, caudate, the terminal appendages oblong, apex rounded, the style 5–5.8 mm long, the branches cylindrical, 0.2–0.3 mm long, strigillose. **Achenes** fusiform, 0.8–1 mm long, ribbed, strigillose, dark brown; pappus of ca. 10 bristles, ca. 4.5 mm long, white, persistent, not deciduous together as a unit.

Blumea viscosa is distributed in litoral habitats throughout the Caribbean region and along the western coast of South America from Colombia to northern Peru. It is apparently rare in Peru and represented by only two recent collections.

This species superficially resembles *Conyza* (Astereae), but is readily distinguished from all Peruvian members of that genus by its dentate leaves, tailed anthers, and coastal habitat preference.



FIG. 6. *Blumea viscosa*. A, flowering branch; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, style branches of hermaphroditic floret; H, stamen; I, achene. (Drawn from Sagástegui & Mostacero 11361, HUT.)

McVaugh (1972) recognized two varieties of *Blumea viscosa*, a pale-pilose form, based on Mexican material (Veracruz, Houston, BM), and a much less hairy form with more conspicuous glands, based

on Ecuadorian material (Guayaquil, Humboldt & Bonpland, P). Badillo (1974) considered this taxon to be one highly variable species, and this concept is followed in the present treatment.

CAJAMARCA. *Contumazá*: Ascope-San Benito, 500 m, *Sagástegui & Mostacero 11361* (HUT, MO). LAMBAYEQUE. *Lambayeque*: Motupe (Anchoviera), 50 m, *Llatas 1012* (F, PRG).

V. *Chevreulia*

Chevreulia Cass., Bull. Soc. Philom. Paris 1817: 69. 1817. TYPE: *Tussilago sarmentosa* Pers. = *Chevreulia sarmentosa* (Pers.) Blake.

Perennial herbs; stems rhizomatous. Leaves rotate or opposite, the margins entire. Capitulescences of solitary heads, long-pedunculate at maturity. Capitula disciform; involucre cylindrical to campanulate; phyllaries 3–5-seriate, imbricate, scarious, hyaline, the outer gradually smaller; receptacles plane, naked; pistillate florets 1–2-seriate, the corollas filiform, white or violet, apex truncate or dentate; disc florets hermaphroditic, the corollas narrowly tubular, 5-lobed, the anthers sagittate, caudate, the terminal appendages ovate, the style branches truncate, dorsally papillose. Achenes fusiform, contracted into a filiform rostrum, asperous; pappus bristles capillary, scabrid, barbellate, 1–2-seriate, the bases fused. Chromosome number: $n = 14$.

A genus of some six species distributed throughout South America. Only the following species is recorded for Peru.

1. *Chevreulia acuminata* Less., *Linnaea* 5: 261. 1830. TYPE: Brazil, Rio de Janeiro, Serra dos Orgaos, Jan 1828, *H. K. Beyrich s.n.* (P, holotype, not seen). Figure 7.

Chevreulia filiformis Hook. & Arn., *Companion Bot. Mag.* 1: 102. 1836. TYPE: Brazil, St. Catherine's, *J. Tweedie s.n.* (holotype, GL, not seen).

C. longipes Wedd., *Chlor. And.* 1: 157. 1856. TYPE: Peru, Dept. Cuzco, 1839–40, *C. Gay s.n.* (holotype, P, not seen).

Creeping, perennial herbs; stems to 8 cm long, much-branched, densely foliaceous, procumbent, laxly lanate. Leaves decussate, sessile; blade oblong-lanceolate, 5–15 mm long, 1–4 mm wide, apex acuminate, mucronate, the lower surface densely lanate, the upper surface lanuginous to glabrescent, the margins revolute. Capitulescences of sol-

itary heads at tips of branches, sessile during anthesis, the peduncles elongating with maturity of fruit, to 6(–12) cm long. Capitula 8–10 mm high, ca. 3 mm wide; involucre cylindrical; phyllaries ca. 3-seriate, the outer lanceolate 3–5 mm long, ca. 1 mm wide, dorsally lanuginous, apex acute, the inner linear-oblong to linear, 7–8 mm long 0.4–0.6 mm wide, glabrous, apex obtuse; pistillate florets 10–12, the corollas ca. 3.5 mm long; hermaphroditic florets ca. 4, the corollas ca. 4 mm long. Achenes ca. 2 mm long; pappus bristles ca. 3.5 mm long.

Chevreulia acuminata is distributed from Ecuador to northern Argentina and Brazil. In Peru, it is represented by only three collections. It is a distinctive species with greatly elongating peduncles and rostrate achenes, features unknown in any other Peruvian Inuleae.

AMAZONAS. *Rodríguez de Mendoza*: Mendoza, 1700 m, *Woytkowski 8082* (MO). HUÁNUCO. *Huánuco*: Mito, ca. 9000 ft, *Macbride & Featherstone 1723* (F, GH); Chasqui, ca. 10,500 ft, *Macbride & Featherstone 2457* (F).

VI. *Cuatrecasasiella*

Cuatrecasasiella H. Robinson, *Flora Neotropica* 39: 14. 1986. TYPE: *Luciliopsis isernii* Cuatr. = *Cuatrecasasiella isernii* (Cuatr.) H. Robinson.

Annual or perennial herbs, dioecious; stems cespitose or prostrate. Leaves opposite, decussate, sessile to subsessile; blade oblong, apex rounded or subtruncate, the margins entire. Capitulescences of solitary heads, terminal on branchlets. Capitula discoid; involucre ovoid or campanulate to cylindrical; phyllaries 2–3-seriate, imbricate, hyaline; receptacles plane, naked; florets in masculine capitula 5–14, the corolla tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the ovary sterile, the style branches rounded; florets in feminine capitula 8–15, the corolla filiform, 2–4-lobed. Achenes cylindrical, brown, glabrous; pappus bristles scabrid, barbellate, uniseriate, the bases fused, deciduous together as a unit, white to reddish brown.

A genus of four species distributed from Ecuador to Argentina in high-elevation habitats. Only one species is known from Peru.

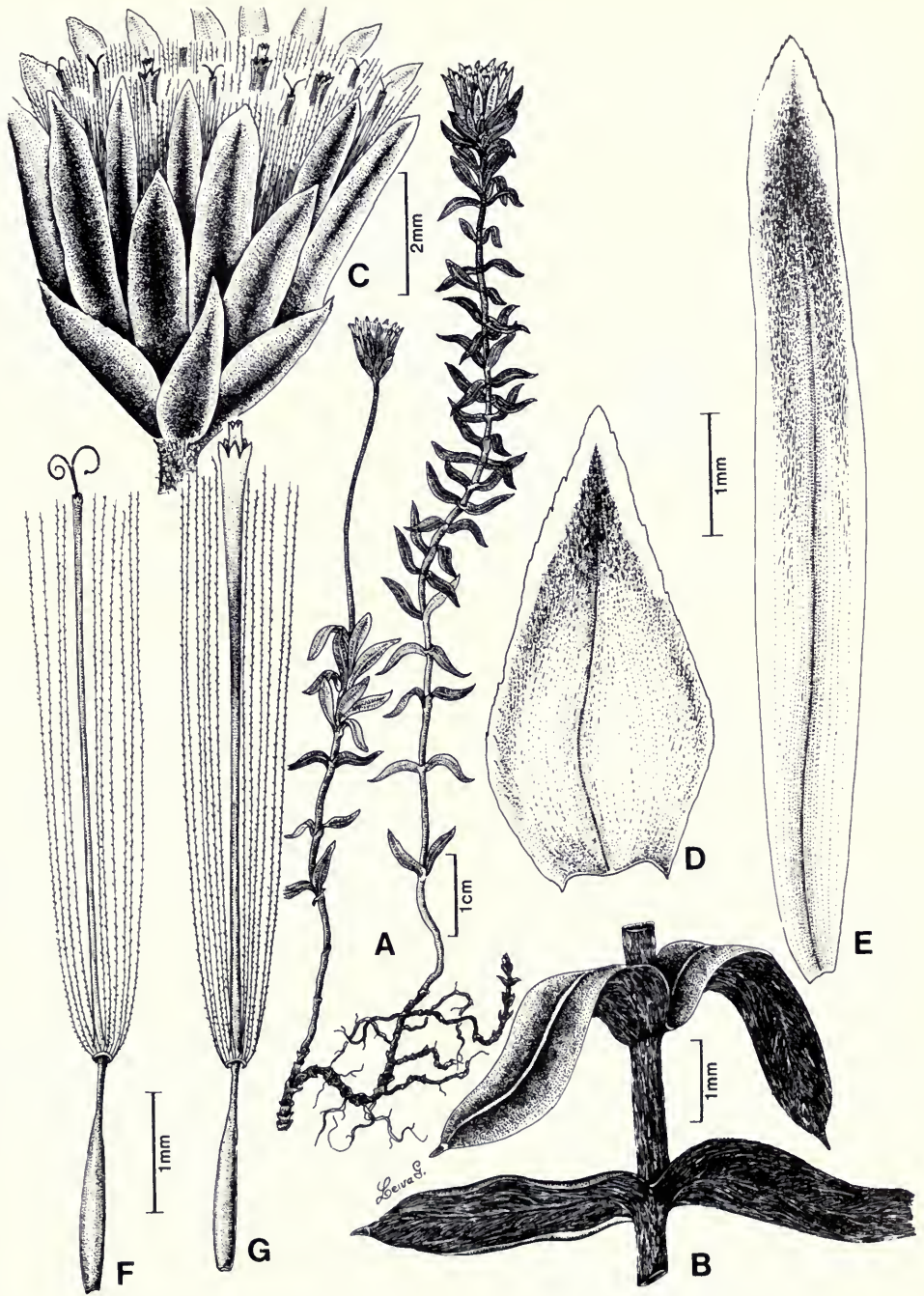


FIG. 7. *Chevreulia acuminata*. A, habit; B, enlargement of stem section; C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret. (Drawn from Macbride & Featherstone 1723, f.)

Robinson (1986) established *Cuatrecasasiella* for species previously placed in *Luciliopsis* Weddell (Chloris Andina 1: 159-160. 1856; pl. 26A. 1855). He observed that the type species of *Lu-*

ciliopsis is not dioecious and lacks opposite leaves throughout, and suggested that *Luciliopsis perpusilla* Wedd. is based on a small individual of *Facelis plumosa* (Wedd.) Schultz-Bip.

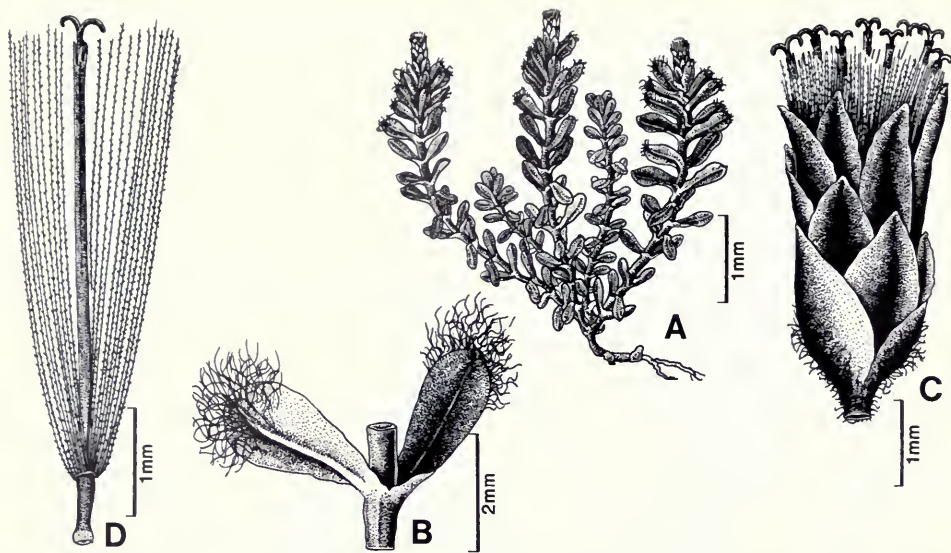


FIG. 8. *Cuatrecasasiella isernii*. A, habit; B, enlargement of leaves; C, feminine capitulum; D, pistillate floret. (Drawn from Dillon 2517, HUT.)

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1. *Cuatrecasasiella isernii* (Cuatr.) H. Robinson, *Flora Neotropica*, 39: 15. 1986. **Figure 8.**

Luciliopsis isernii Cuatr., *Anal. Univ. Madrid* 4: 28. 1935. TYPE: Ecuador, Prov. Napo, páramo Jacupampa, Cerro Antisana, Jan 1865, *J. Isern* 70 (probably MA, not seen).

Perennial **herbs**; stems much-branched, 3–5 cm long. **Leaves** sessile; blade oval to ovate or oblong, 2–3 mm long, 0.6–2 mm wide, marcescent, apex obtuse to rounded, often with a tuft of tomentum persisting, lower surface arachnoid-tomentose to glabrescent, upper surface glabrous. **Capitula** 3–5 mm high, 1–1.5 mm wide; involucre cylindrical; phyllaries 3-seriate, stramineous, hyaline, the outer ovate, ca. 2 mm long, 0.5–0.7 mm wide, arachnoid-tomentose dorsally, apex obtuse, the inner oblong to linear, ca. 4 mm long, ca. 1 mm wide, glabrous, apex acute to obtuse; florets in masculine capitula ca. 8, the corolla ca. 3 mm long, the anthers ca. 1 mm long; florets in feminine capitula ca. 15, the corolla 3.2–3.5 mm long. **Achenes** (immature), 0.5 mm long, brown, glabrous; pappus bristles ca. 4 mm long.

This species is known from high-elevation localities in Ecuador and Peru, 4100–4700 m. The collection from Junín (Dillon 2517) was found growing within moist hummocks of a *Distichia muscoides* moor at the south end of Lago Junín. No male individuals were found in this population. Conversely, the two collections from Ancash (Bernardi *et al.* 16591, Smith 11431) appear to contain only male individuals. Additional field observations are necessary to ascertain if entire populations are actually unisexual or what sex ratios exist.

ANCASH. Huaráz: Carpa, 4100–4300 m, Bernardi *et al.* 16591 (us). **Recuay:** Huascarán National Park, moraine below Nevado Pasto Ruri, 4700 m, Smith 11431 (F, MO). **JUNÍN.** Junín: ca. 9 km N of Junín on road to Cerro de Pasco, 4160 m, Dillon 2517 (F, HUT, MO, US, USM); Mount La Juntay, near Huancayo, ca. 4700 m, Killip & Smith 22105 (us).

VII. Facelis

Facelis Cass., *Bull. Soc. Philom.* Paris 1819: 94. 1819. TYPE: *Gnaphalium retusum* Lam. ≡ *Facelis retusa* (Lam.) Schultz-Bip.

Annual **herbs**; stems simple or branched, erect to decumbent. **Leaves** alternate, the margins en-

tire. **Capitulescences** of solitary heads, axillary or terminal, occasionally glomerulate in axils of the upper leaves. **Capitula** disciform; involucre cylindrical to ovoid or campanulate; phyllaries 3–5-seriate, imbricate, the outer foliaceous, the inner membranous, hyaline; receptacle plane, naked; pistillate florets 1–2-seriate, the corollas filiform; disc florets hermaphroditic, the corollas narrowly tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the style branches linear, apex acute, dorsal surfaces pubescent. **Achenes** turbinate, densely sericeo-velutinous; pappus bristles plumose, uniseriate, the bases fused, deciduous together as a unit.

Key to Species of *Facelis*

- 1. Herbs with stems generally simple, erect, 5–35 cm high; leaves 15–25 mm long; capitula 5–7 mm high, 2–3 mm wide *F. lasiocarpa*
- 1. Herbs with stems generally much-branched from the base, ascending or decumbent, 2–7 cm high; leaves 5–10 mm long; capitula 4–5 mm high, ca. 1.5 mm wide *F. plumosa*

- 1. ***Facelis lasiocarpa*** (Griseb.) Cabr., Physis 10: 280. 1931. **Figure 9.**

Filago lasiocarpa Griseb., Abh. Königl. Ges. Wiss. Göttingen. 19: 180. 1874. TYPE: Argentina, Prov. Tucumán, Ciénaga, Sierra de Tucumán, 13/31 Mar 1872, P. G. Lorentz 123 (holotype, GOET, not seen; isotype, CORD, not seen).

Facelis schultzi Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 219. 1913. TYPE: Bolivia, Dept. La Paz, Prov. Larecaja, “viciniis Sorata, clivosis collis Catarguata, in dumosis, 2700 m,” G. Mandon 177 (holotype, G-BOIS, not seen).

Annual **herbs**, 5–35 cm tall; stems simple or sometimes branched from the base, slender, lanate, foliaceous to the apex. **Leaves** sessile; blade narrowly linear, 15–25 cm long, ca. 1 mm wide, apex attenuate, mucronate, lower surface densely lanate, upper surface laxly lanate, the margins revolute. **Capitulescences** glomerulate or of solitary heads in the axils of the upper leaves, sessile. **Capitula** 5–7 mm high, 2–3 mm wide; involucre ovoid; phyllaries 3–4-seriate, the outer lance-ovate to lanceolate, 2.5–4 mm long, 0.5–1.5 mm wide, foliaceous, lanate, apex acute, mucronate, the inner ovate to oblong, 5–6 mm long, 0.8–1 mm wide, scarious, apex obtuse to rounded, glabrous; pistillate florets 4–8, the corollas ca. 2.5 mm long; hermaphroditic florets 2–5, the corollas ca. 3 mm long. **Achenes** 1–1.5 mm long; pappus bristles 5–6 mm long.

Facelis consists of four species distributed throughout South America. This genus is readily distinguished by its densely sericeo-pubescent achenes and pappus of plumose bristles, both characteristics not found elsewhere in the Peruvian Inuleae. Two species are known from Peru.

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Facelis lasiocarpa is distributed throughout the Andean Cordillera from Ecuador to northern Argentina, 1800–3800 m. It is very similar to *F. plumosa*, differing only in its non-branching habit and larger capitula and with a greater number of pistillate florets. Further study may show it to be conspecific with *F. plumosa*.

ANCASH. Bolognesi: Cerros al E de Chiquián, 3500–3600 m, *Cerrate* 542 (F, MO, USM). CAJAMARCA. Contumazá: Ventarrón (Trinidad-Totorillas, 3000 m, *Sagástegui et al.* 8988 (F, HUT, MO); Las Campanillas (Guzmango), 2700 m, *Sagástegui & Mostacero* 9159 (F, HUT, MO); El Mojón (Las Quinuas-Huatum), 3000 m, *Sagástegui et al.* 10125 (F, HUT, MO); Yetón-Guzmango, 1800 m, *Sagástegui et al.* 10326 (F, HUT, MO), *Sagástegui et al.* 10559 (F, HUT). LA LIBERTAD. Otuzco: desvío a Otuzco-Agallpampa, 2800 m, *Sagástegui et al.* 11534 (F, HUT, MO). LIMA. Huarochiri: Matucana, ca. 8000 ft, *Macbride & Featherstone* 446 (F, US).

- 2. ***Facelis plumosa*** (Wedd.) Schultz-Bip., Linnæa 34: 532. 1866. **Figure 9.**

Lucilia plumosa Wedd., Chlor. And. 1: 155. 1856. TYPE: Peru, “Cordilleres du Perou, entre Puno et Arequipa, 4000 m,” H. A. Weddell s.n. (holotype, P, not seen, F neg. 37819).

Facelis weddelliana Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 217. 1913. (*nomen novum* based upon *Lucilia plumosa* Wedd.).

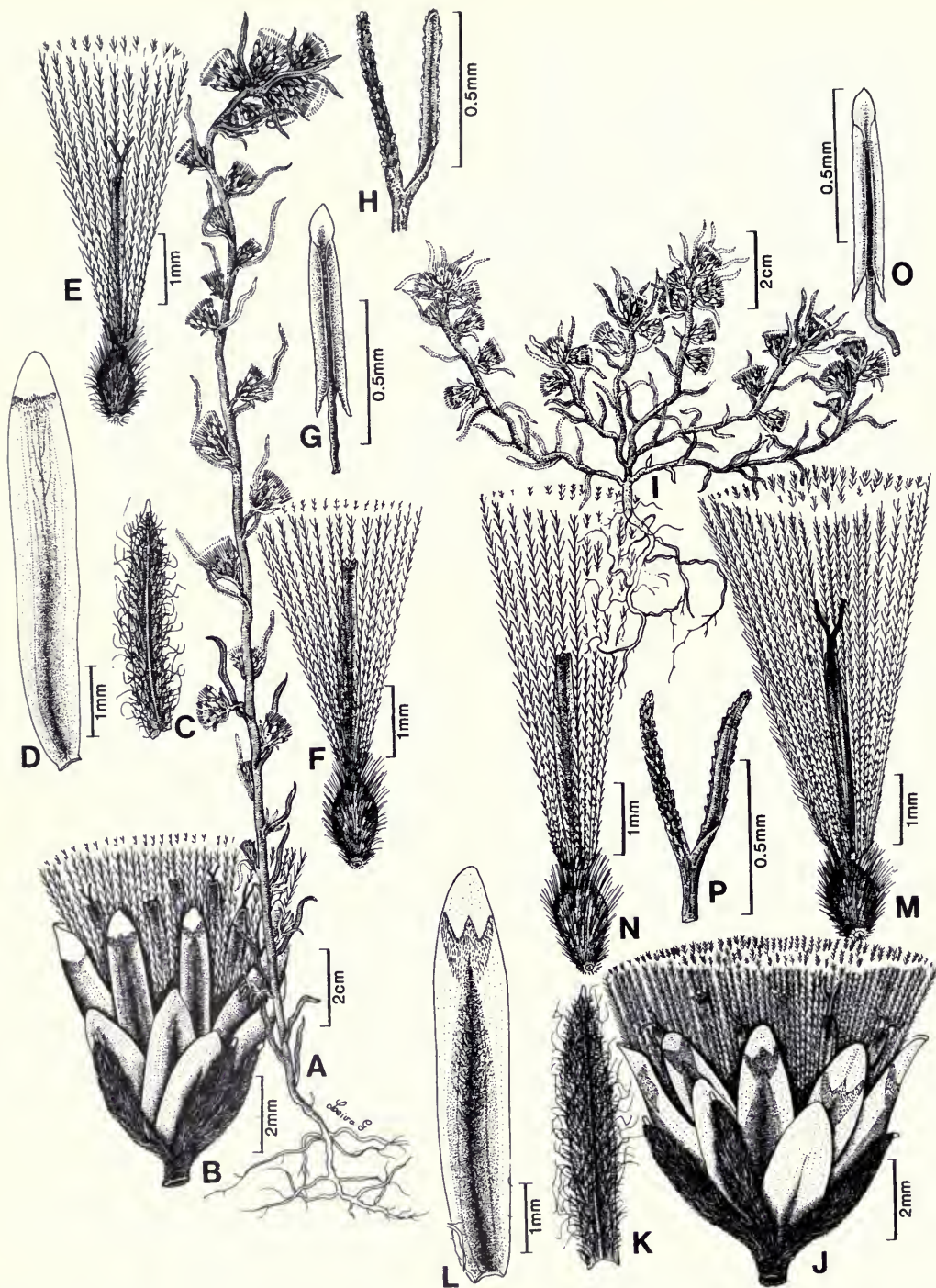


FIG. 9. Left side: *Facelis lasiocarpa*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, stamen; H, style branches of hermaphroditic florets. (Drawn from *Sagástegui 3802*, HUT.) Right side: *Facelis plumosa*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, stamen; H, style branches of hermaphroditic florets. (Drawn from *Sagástegui 4508*, HUT.)

Annual **herbs**, 2–7 cm tall; stems usually branched from the base, slender, lanate, foliaceous to the apex. **Leaves** sessile; blade narrowly linear, 5–10 mm long, ca. 1 mm wide, apex attenuate, mucronate, lower surface densely lanate, upper surface laxly lanate, the margins revolute. **Capitulescences** of 1–3 heads glomerulate in the axils of the upper leaves, sessile. **Capitula** 4–5 mm high, ca. 1.5 mm wide; involucre ovoid-cylindrical; phyllaries 3–4-seriate, the outer lanceolate to linear, 2.5–3 mm long, 0.5–1 mm wide, foliaceous, lanate, apex acute, mucronate, the inner ovate to oblong, 4–5 mm long, 0.5–1 mm wide, scarious, apex obtuse to rounded, glabrous; pistillate florets 3–6, the corollas ca. 2.5 mm long; hermaphroditic florets 2–4, the corollas ca. 2.5 mm long. **Achenes** 1–1.5 mm long; pappus bristles 3–4 mm long.

Facelis plumosa is distributed from central Peru to northern Argentina, 2800–4300 m. It is similar to *F. lasiocarpa* but is distinguished from the latter by its more branched habit and smaller capitula with fewer pistillate florets.

AREQUIPA. Arequipa: above Arequipa, 2800 m, Pennell 13251 (F, GH, US); Pampa de Arrieros, 3750 m, Pennell 13326 (F). **AYACUCHO.** Huanta: Pampalca, between Huanta and Río Apurímac, ca. 3200 m, Killip & Smith 23291 (us). **LIMA.** Lima: Río Blanco, 12,000 ft, Macbride & Featherstone 738 (F, US). **JUNÍN.** Yauli: Yauli, ca. 13,500 ft, Macbride & Featherstone 915 (F). **PUNO.** Melgar: Araranca, 4100–4300 m, Pennell 13459 (F, GH, US).

VIII. Gamochaeta

Gamochaeta Wedd., Chlor. And. 1: 151. 1856.

TYPE: *Gnaphalium americanum* Miller = *Gamochaeta americana* (Miller) Wedd.

Gnaphalium section *Gamochaeta* (Wedd.) O. Hoffm.

Annual or perennial **herbs**, usually tomentose or lanate. **Leaves** alternate, simple, often with a basal rosette; blade oblanceolate to spatulate, the margins entire or crenulate, lanate or tomentose, occasionally discolored. **Capitulescences** glomerulate, spiciform, or paniculate. **Capitula** disciform, heterogamous; involucre cylindrical to conical, rarely campanulate; phyllaries 3–4-seriate, imbricate, scarious, stramineous to dark brown or occasionally reddish, the margins usually hyaline; receptacles flat, glabrous; pistillate florets 35–100, the corollas filiform, 5-dentate, the style branches

slender; hermaphroditic florets 1–5, the corollas tubular, yellowish, 5-lobed, the anthers tailed, the terminal appendages obtuse, the style branches truncate, penicillate. **Achenes** obovoid to ellipsoid, surface with sinuate-reticulate sculpturing, glandular with bicelled, sessile papillae or trichomes, mucilaginous when wet, stramineous to brown; pappus bristles scabrid, barbellate, uniseriate, the bases fused into a ring, lacking basal cilia, deciduous together as a unit, white. Chromosome number: $n = 14$.

Gamochaeta is a genus of some 80 species distributed primarily in the warmer regions of the New World, but with several species adventive in the Old World. The taxonomy of *Gamochaeta* and its close relatives is extremely difficult because easily observable or quantifiable characters are lacking. *Gamochaeta* is here accepted on the strength of the suite of characteristics that allows for the recognition of its constituent elements: obovate to spatulate leaf form, usually spiciform capitulescence, involucre cylindrical to conical, number and ratio of masculine to feminine florets per capitulum, pappus bristles fused at the base, and achenal surface sculpturing and pubescence.

The discrimination of species within *Gamochaeta* poses additional problems. Many species exhibit considerable morphological plasticity, presumably in response to environmental and edaphic influences. This treatment should be considered provisional; extensive biosystematic study is beyond the scope of the present work.

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Key to Species of *Gamochaeta*

1. Leaf surfaces discoloured, lower surfaces white or silvery tomentose, upper surfaces glabrescent, gray or green *G. americana*
1. Leaf surfaces ± similar in color and pubescence, lower and upper surfaces tomentose or lanuginose 2
 2. Erect annual or biennial herbs, stems never caespitose, generally greater than 12 cm tall *G. purpurea*
 2. Caespitose perennial herbs, generally less than 12 cm tall 3
 3. Leaves generally obovate, 4–22 mm long, 1.5–4 mm wide; capitula ca. 4.5 mm high, ca. 4 mm wide *G. humilis*
 3. Leaves generally oblanceolate, 10–40 mm long, 4–7 mm wide; capitula ca. 4 mm high, ca. 2.5 mm wide *G. oreophila*

1. *Gamochaeta americana* (Miller) Wedd., *Chlor. And.* 1: 151. 1856.

Gnaphalium americanum Miller, *Gard. Dict.*, ed. 8. 1768. TYPE: Jamaica, 1731, *W. Houston s.n.* (holotype, BM, not seen).

Gamochaeta spicata (Lam.) Cabr., *Bol. Soc. Argent. Bot.* 9: 380. 1961.

Gnaphalium spicatum Lam., *Encycl.* 2: 757. 1788. TYPE: Uruguay, Montevideo, (? “Des environs de Buenos Ayres”) *P. Commerson s.n.* (lectotype, P, designated by Cabrera (1961), not seen, F neg. 37573, fragment, F). Non Miller (1768).

Annual or biennial herbs to 60 cm tall; stems branched, decumbent or erect. Basal leaves rosulate, sessile; blade linear- to oblong-spatulate, 3–10 cm long, 8–20 mm wide, marcescent, base truncate and clasping the stem, apex obtuse to rounded, rarely acute, apiculate, strongly discoloured, lower surface tomentose, upper surface glabrescent or more commonly glabrous and bright green, the margins entire, sometimes undulate distally; cauline leaves linear, apex acute, gradually smaller upwards, pubescence similar to basal leaves. **Capitulences** spiciform, terminal and axillary. **Capitula** 4–4.5 mm high, 2.5–3 mm wide; phyllaries ca. 24, 3–4-seriate, the outer ovate, 2–3 mm long, 1–1.2 mm wide, apex obtuse to acute, the inner linear-oblong, 3.5–4 mm long, 0.8–1 mm wide, glabrous, apex acuminate, apiculate; pistillate florets ca. 80, the corollas ca. 2 mm long; hermaphroditic florets 3–4, the corollas ca. 2.2 mm long. **Achenes**

0.5–0.6 mm long; pappus bristles ca. 2.5 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984; Turner et al., 1967, as *G. spicata*).

Gamochaeta americana is distributed throughout Central and South America and is adventive in the United States and New Zealand. In Peru, it is distributed in a wide range of habits and is quite variable in overall size. Its common names include *lengua de perro*.

There has been considerable disagreement as to the specific boundaries of *Gamochaeta americana*. Adams (*Flowering Plants of Jamaica*, 1972), and followed by D’Arcy (*Flora of Panama*, 1975), placed *G. spicata* into synonymy under *G. americana*. Cabrera (1961), Godfrey (1958), and Drury (1971) all maintained *G. americana* and *G. spicata* and distinguished them by differences in the upper leaf pubescence and phyllary shape. Both Hillard and Burt (1981b) and Nesom (1990) have pointed out that Lamarck’s *Gnaphalium spicatum* is illegitimate as a later homonym of Miller’s species which possibly represents *Pterocaulon virgatum* (L.) DC. We have adopted a broad concept for *G. americana* and include taxa with acute to obtuse phyllaries and grabrous to glabrescent upper leaf surfaces.

AMAZONAS. Bagua: 48 km NW of Chachapoyas on road to Bagua, 1280 m, *Gentry et al. 23210* (F, MO, USM). **Mendoza de Rodriguez:** Mendoza, 1700 m, *Woytkowski 8086* (MO). **ANCASH.** Yungay: Quebrada de Llanganuco, 3900 m, *López et al. 8347* (HUT, MO); Huascarán National Park, Llanganuco sector, 3580–3850 m, *Smith*

& *Goodwin 8838* (F). **APURIMAC. Abancay:** Sayhuite, Km 45 E of Abancay, 3600 m, *Hutchison 1736* (F, NY US). **CAJAMARCA. Cajamarca:** ca. 43 km E of Cajamarca, 27 km N of San Marcos, 2765 m, *Dillon et al. 2861* (CPUN, F, HUT, MO, NY, TEX, US, USM). **Celendín:** Pumarume, 2800 m, *Mostacero et al. 0999* (F, HUT). **CUZCO. Paucartambo:** Km 141 of Kosñipata road, 16 km below Pillahuata, 2050 m, *Stein 2525* (F, MO, USM). **HUANCAVELICA. Huancavelica:** entre Huancavelica y Lachoj, 3800 m, *Tovar 3080* (USM). **HUANUCO. Huánuco:** between Huánuco and Tingo María, ca. Km 443.5, 2010 m, *Croat 57825* (MO); ca. 47 km NNE of Huánuco on road to Tingo María, Carpish Pass, *Dillon 2599* (F); Carpish, entre Huánuco y Tingo María, 2700–2900 m, *Ferreya 2344* (USM). **JUNÍN. Tarma:** 28–32 km NE of Tarma on road to San Ramón, ca. 2480 m, *Dillon & Turner 1350* (F, MO, USM); ca. 35 km NE of Tarma along road to San Ramón, ca. 2300 m, *Dillon & Turner 1407* (F, MO, USM); Huacapistana, entre Tarma y San Ramón, 1800–1900 m, *Ferreya 287a* (USM). **Prov. Unknown:** Yaupi, 1580 m, *Woytkowski 6426* (MO), 6428 (MO). **LA LIBERTAD. Otuzco:** Chota (Yamobamba-Shorey), 2900 m, *Sagástegui et al. 11081* (F, HUT). **Sánchez Carrión:** Laguna Sausacochoa, 3000 m, *Sagástegui 9444* (F, HUT, MO). **LAMBAYEQUE. Lambayeque:** Km 28 W of Olmos, 1150–1200 m, *Hutchison & Wright 3474* (F, MO, US). **LIMA. Canta:** Canta, 2942 m, *López 3297* (US). **MOQUEGUA. Mariscal Nieto:** between Torata and Carumas, km 75–76 from Moquegua to Puno, 3600 m, *Dillon et al. 3357* (F). **PASCO. Oxapampa:** Oxapampa, *Esposito s.n.* (USM #19319). **PIURA. Huancabamba:** Cuello del Indio (ruta Huancabamba), 2800 m, *López et al. 8889* (F, HUT, MO). **PUNO. Carabaya:** across Río San Gabán from Ollachea, *Boeke & Boeke 3053* (US). **SAN MARTÍN. Lamas:** Alonso de Alvarado, Cerro Blanco (carretera a Moyobamba), 1000 m, *Schunke 6192* (NY, US); San Roque, 1350–1500 m, *Williams 7445* (F, GH p.p., US).

2. *Gamochaeta humilis* Wedd., *Chlor. And.* 1: 153. 1856. TYPE: Bolivia, Dept. La Paz, Chiquiaguillo, 4500 m, *H. A. Weddell s.n.* (holotype, P, not seen, F neg. 37600).

Perennial herbs to 12 cm tall; stems branched, cespitose to decumbent or erect. Basal leaves rosulate, sessile; blade obovate to oblanceolate or spatulate, 4–22 mm long, 1.5–4 mm wide, marcescent, base attenuate to a pseudopetiole, apex obtuse to rounded, rarely acute, slightly discolored, lower surface canescent-tomentose, upper surface incano-lanate, the margins entire; cauline leaves oblanceolate to spatulate, often subfalcate, 5–20 mm long, 2–5 mm wide, base attenuate, apex acute, pubescence similar to basal leaves. Capitulescences laxly spiciform or terminally glomerulate. Capitula ca. 4.5 mm high, ca. 4 mm wide; involucre campanulate; phyllaries ca. 24, 4-seriate, stramineous, the outer ovate, 1.5–2.2 mm long, 0.5–1 mm wide, dorsally lanate, apex acu-

minate, the inner oblong-linear, 2.8–3 mm long, 0.4–0.8 mm wide, lanate to glabrous, apex acute; pistillate florets 35–40, the corollas ca. 2 mm long; hermaphroditic florets ca. 3, the corollas ca. 2 mm long. Achenes 0.5–0.7 mm long, sparsely glandular to glabrous; pappus bristles ca. 2 mm long.

Gamochaeta humilis is distributed from the Department of Ancash in central Peru to northern Bolivia. In Peru, it occurs in open areas of puna vegetation, 3560–4600 m.

This species is characterized by its short, cespitose habit (usually less than 12 cm tall), mostly falcate leaves, and more glomerulate capitulescences. In general habit, *Gamochaeta humilis* approaches the form of various *Belloa* species, but *G. humilis* may be distinguished by the truncate style branches of the hermaphroditic florets. *Gamochaeta humilis* appears most closely related to *G. oreophila*, which occurs in central and northern Peru, and it appears that the distributional ranges of the two overlap to some degree in Ancash and La Libertad. Further sampling is necessary to determine if these two species occur sympatrically or occupy different microhabitats.

ANCASH. Huaráz: Huascarán National Park, Quebrada Llaca, 4400–4600 m, *Smith et al. 10807* (F). **AYACUCHO. Huanta:** between Huanta and Hacienda Pargora, 4150 m, *Killip & Smith 22192* (F, NY). **CUZCO. Quispicanchis:** Auzangate, 4600 m, *Rauh & Hirsch P1244* (NY). **Paucartambo:** Tres Cruces, 1–13 km NW of Paucartambo-Pilcopata road, 3330–3500 m, *Gentry et al. 23470* (F p.p., MO, USM); paso de Tres Cruces, Cerro de Cusilluyoc, 3800–3900 m, *Pennell 13869* (F p.p., NY p.p.). **Paruro:** Cerro Sullcan, Hda. Ayusbamba, 4020 m, *Vargas 845* (F). **Urubamba:** Pampacahuana, 4100 m, *Peyton & Peyton 77* (MO). **JUNÍN. Tarma:** Oroya-Tarma, 4200 m, *Rauh & Hirsch P269* (NY). **Yauli:** Yauli, ca. 13,500 ft, *Macbride & Featherstone 930* (F). **LA LIBERTAD. Santiago de Chuco:** Jalca de Coipin, 4000 m, *Sagástegui et al. 11982* (F, HUT). **MOQUEGUA. Mariscal Nieto:** between Torata and Carumas, Km 75–76 from Moquegua to Puno, ca. 3600 m, *Dillon et al. 3356* (F). **PUNO. Azángaro:** Arapa, 3900 m, *Aguilar s.n.* (USM p.p.). **Carabaya:** Macusani-Condorquina, 4400 m, *Vargas 17630* (US). **Huancané:** Majachi, 3950 m, *Aguilar s.n.* (F, USM); Moho, 3950 m, *Aguilar 414* (USM). **Melgar:** La Raya-Sicuani, 4300 m, *Rauh & Hirsch P678* (NY). **Prov. Unknown:** Lago Titicaca, 4000 m, *Monheim M102* (NY).

3. *Gamochaeta oreophila* Dillon & Sagást., *nomen novum*. Figure 10.

Gamochaeta monticola Dillon & Sagást., *Phytologia* 59: 227. 1986. TYPE: Peru, Dept. La Libertad, Prov. Santiago de Chuco, entre Chota y Shorey,

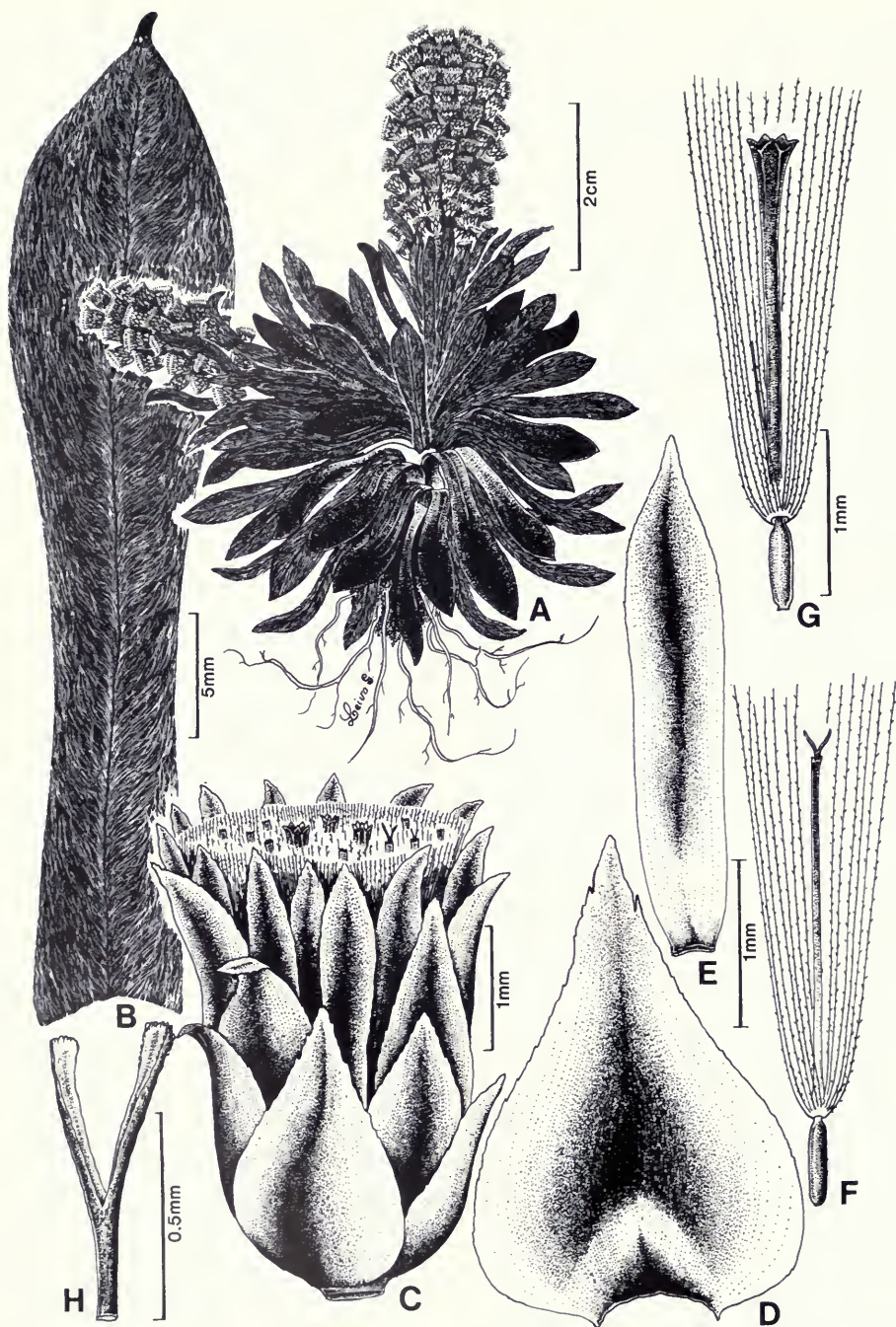


FIG. 10. *Gamochaeta oreophila*. A, habit; B, leaf (underside); C, capitulum, D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, style branches of hermaphroditic floret. (Drawn from *Sagástegui et al. 11100*, HUT.)

ladera, 3250 m, 15 Nov 1983, A. Sagástegui A. et al. 11100 (holotype, HUT; isotypes, F, MO). A new specific epithet is required because of the discovery of the earlier homonym *Gamochaeta*

monticola (Phil.) Cabrera, Bol. Soc. Argent. Bot. 9: 374. 1961.

Cespitose, perennial herbs; stems simple or

branched, 1–6 cm tall. Basal leaves densely rosulate, sessile; blade oblanceolate, 1–4 cm long, 4–7 mm wide, base attenuate to a winged petiole, apex acute to rounded, mucronate, discolorous, lower surface tomentose, upper surface lanate, the margins entire, the cauline leaves gradually smaller. Capitulescences spiciform. Capitula 3.5–4 mm high, 2–2.5 mm wide; involucre campanulate; phyllaries ca. 22, 3–4-seriate, stramineous, the outer ovate, ca. 2.2 mm long, ca. 1.2 mm wide, dorsally lanate, apex acuminate, the inner oblong-linear, 2.9–3.2 mm long, 0.4–0.7 mm wide, glabrous, apex acute; pistillate florets 42–45, the corollas ca. 2 mm long; hermaphroditic florets 2–3, the corollas ca. 2 mm long. Achenes 0.5–0.7 mm long; pappus bristles ca. 2.5 mm long.

Gamochaeta oreophila is infrequent in open areas within *jalca* formations of northern and central Peru (Departments of Ancash, Cajamarca, and La Libertad, 3100–4870 m). It is a distinctive member of the genus, possessing densely rosulate, canescent, basal leaves and erect, compressed spiciform capitulescences. It most closely resembles *G. humilis* of central and southern Peru and northern Bolivia; however, the latter species normally has a more branched, decumbent habit, smaller spatulate and falcate leaves, and an open capitulescence.

ANCASH. Carhuáz: Huascarán National Park, Quebrada Ishinca, 4380–4500 m, *Smith et al. 9486* (F, MO, USM). Huaráz: Huascarán National Park, Quebrada Shallap, 3690–4100 m, *Smith et al. 9650* (F, MO). Huaylas: Huascarán National Park, Quebrada Alpamayo, 4350–4500 m, *Smith et al. 9801* (USM), *9849* (F). Yungay: Huascarán National Park, Quebrada Ancosh, *Smith & Goodwin 8886* (MO, USM). CAJAMARCA. Celendín: ca. 57 km NE of Cajamarca along road to Celendín, ca. 3650 m, *Dillon & Turner 1614* (F); Sendamal, 3100 m, *Sagástegui et al. 12228* (F, HUT, K, MO). San Miguel: Taulís Alto (*jalca*), ladera, 3100 m, *Sagástegui et al. 9548* (F, HUT, MO). LA LIBERTAD. Otuzco: Motil-Shorey, 3500 m, *Sagástegui & Fernández 4914* (HUT, US), *Sagástegui et al. 11698* (F, HUT, MO); Cerro Ragache, Salpo, 3500 m, *Sagástegui et al. 11627* (HUT, MO). LAMBAYEQUE. Ferreñafe: ca. 7 km NW of Incahuasi, near Cerro Punamachay on trail to Laguna Hualtaco, 3300–3550 m, *Dillon & Skillman 4128* (F), *Sagástegui et al. 12842* (F, HUT, MO), *Sagástegui et al. 12865* (F, HUT), *Sagástegui et al. 12914* (F, HUT, MO, K).

4. *Gamochaeta purpurea* (L.) Cabr., Bol. Soc. Argent. Bot. 9: 377. 1961.

Gnaphalium purpureum L., Sp. Pl. 2: 854. 1753. TYPE: United States, "habitat in Carolina, Virginia,

Pensylvania [Pennsylvania]," *P. Kalm s.n.* (holotype, LINN, not seen, IDC Microfiche 117. 572. III: 2.).

Annual or biennial herbs to 40 cm tall; stems branched, decumbent or erect. Basal leaves rosulate, sessile; blade spatulate to oblanceolate, 1.5–3 cm long, 5–15 mm wide, marcescent, base truncate and clasping the stem, apex obtuse to rounded, rarely acute, apiculate, discolorous, lower surface tomentose, upper surface glabrescent or more commonly glabrous and bright green, the margins entire, sometimes undulate distally; cauline leaves linear, apex acute, gradually smaller upwards, pubescence similar to basal leaves. Capitulescences spiciform, terminal. Capitula ca. 3.5 mm high, ca. 2.5 mm wide; phyllaries ca. 24, 3–4-seriate, stramineous, the outer ovate, 2–2.5 mm long, 1–1.5 mm wide, apex obtuse to acute, the inner linear-oblong, 3–3.5 mm long, 0.5–0.8 mm wide, glabrous, apex acute; pistillate florets 70–80, the corollas ca. 2.2 mm long; hermaphroditic florets 3–4, the corollas ca. 2 mm long. Achenes ca. 0.5 mm long; pappus bristles ca. 2 mm long. Chromosome number: $n = 14$.

Gamochaeta purpurea has a wide distribution, including North and South America and Europe, and is adventive in New Zealand. In Peru, it is a common, weedy species and occupies a wide range of habitats, from coastal *lomas* formations to high-elevation Andean sites, 5–4300 m.

Three collections from southern Peru (*Vargas 844, 845, & 9812*) possess more narrowly linear leaves with denser, lanate-tomentose pubescence and congested, glomerulate capitulescences. While these collections are quite distinct, we are hesitant to give them formal taxonomic status until this genus is better understood.

Common names include *gheto gheto*, *lengua de perro*, *allucupa callun*, and *lling-llicha del cerro*.

ANCASH. Bolognesi: cerca a Chiquián, 3240–3300 m, *Cerrate 785* (MO, USM); *Ferreya 7586* (MO, USM). Huarí: Huascarán National Park, Quebrada Pucaraju, 3900–4200 m, *Smith et al. 12705* (USM); 14.8 km NE of Tunel Cahuish, 3000–4000 m, *Stevens 21964* (MO). Huaylas: carretera a Laguna Parón, ca. 24 km de Caráz, 3100 m, *López 1865* (US); Huascarán National Park, Quebrada Santa Cruz, 4300 m, *Smith et al. 9321* (F, MO, USM). APURÍMAC. Abancay: between Saywite and Chachora, 4000 m, *Vargas 9812* (F). AREQUIPA. Arequipa: southern slopes of Chachani, N of Arequipa, *Hinkley 6* (F); Nevado de Chachani, 4100–4200 m, *Pennell 13290* (GH, NY); Tiabaya, 2100–2200 m, *Pennell 13094* (F, NY). Camaná: Lomas de Camaná, ca. 32 km SE of Camaná, ca. 1000 m, *Dillon & Dillon 3878* (F, HUT, K, MO, NY, USM);

Lomas de Camaná, 600 m, *Ferreyra 11688* (USM). **Islay**: Lomas de Mejía, ca. 8 km N of Mejía, 500–600 m, *Dillon & Dillon 3725* (F, HUT, MO, NY, USM); Lomas de Mollendo, ca. 8 km NW of Islay, ca. 510 m, *Dillon & Dillon 3941* (F, HUT, MO, NY, USM); bajando la Jolla a Matarani, 500 m, *Ferreyra 6381* (USM); Mollendo, *Hitchcock 22411* (US); 7 km NE de Matarani, 450 m, *López 046* (MO). **CAJAMARCA**. **Cajamarca**: ca. 24 km SW of Cajamarca on road to Cumbemayo, ca. 3600 m, *Dillon et al. 2918* (F, USM) Namora, 2600 m, *Sagástegui 7738* (HUT, MO); Santa Apolonia-Cumbe Mayo, 3000 m, *Sagástegui et al. 11276* (F, HUT). **Celendín**: Pumarrume, 28850 m, *Mos-tacero et al. 1002* (F, HUT). **Chota**: Laguna Yahuarcocha, arriba de Incahuasi, 3600 m, *Sagástegui 12897* (F, HUT). **Contumazá**: Yetón, 2200 m, *Sagástegui et al. 9742* (F, HUT, MO); *Sagástegui & López 10551* (F, HUT, MO); El Granero, 2800 m, *Sagástegui & López 10651* (F, HUT), *10652* (F, HUT). **CUZCO**. Cuzco: Kaira, 3200 m, *Vargas 659* (F). **Paucartambo**: Tres Cruces, 3600 m, *Marín 1245* (F); Acanacu, 3500 m, *West 7040* (GH). **Paruro**: cerro Sullccan, Hda. Ayusbamba, 4020 m, *Vargas 844* (F), *845* (MO). **Urubamba**: Ollantaytambo, 3000 m, *Cook & Gilbert 707* (US); summit of Antakillqua, 4500 m, *Davis et al. 1712* (F); Vilcanota Valley, 3000 m, *Herrera 1068* (US). **HUANCAVELICA**. **Huancavelica**: Caniorcoona, a 3 km SE de Conaica, 3560–3590 m, *Tovar 96* (US). **HUÁNUCO**. **Huánuco**: Mito, 9000 ft, *Macbride & Featherstone 1750* (F, US), *1814* (F, US); Huánuco, *Macbride & Featherstone 2446* (F, US). **JUNIN**. **Tarma**: Aco-bamba, *Isern 2029* (F). **Yauli**: Oroya, *Kalenborn & Kalenborn 65* (NY); near Atocscay, ca. 4200 m, *Pearsall 1149* (F). **LA LIBERTAD**. **Otuzco**: Plazapampa, 1800 m, *Cevasco s.n.* (MO); Chota (Yamobamba-Shorey), 2900 m, *Sagástegui et al. 11081* (F, HUT); Cerro Ragache (Salpo), 3200 m, *Sagástegui et al. 11572* (F, HUT, MO). **Patáz**: Huancaspata-Tayabamba, 3800 m, *López & Sagástegui 8260* (HUT, MO). **Santiago de Chuco**: Santiago de Chuco, 2800 m, *Sagástegui et al. 11725* (F, HUT, MO). **Trujillo**: between Trujillo and Salaverry, 5 m, *Eyerdám 9052* (GH); Cerro Cabezón, 600 m, *Sagástegui & López 11328* (F, HUT); Cerro Campana, 500 m, *Sagástegui 4041* (HUT, US), *Sagástegui & López 10416* (F, HUT, K, MO); Barraza, 60 m, *Sagástegui 7802* (F, HUT, MO, NY). **LAMBAYEQUE**. **Chiclayo**: Cerro Reque, 540 m, *Llata 358* (F, HUT). **Ferreñafe**: Laguna Tembladera, Distrito Incahuasi, 3150 m, *Sagástegui et al. 12800* (F, HUT), *12822* (F, HUT). **Lambayeque**: Abra de Porculla, km 45 E of Olmos, 1920 m, *Plowman et al. 14267* (F, HUT). **LIMA**. **Cañete**: Lomas de Quilmaná, entre Mala y Cañete, 300–480 m, *Ferreyra 4006* (US, USM); Lomas de Grandos, 12 km N of Huaral, 600 m, *Stork & Vargas 9330* (GH); hills of Asia, 300 m, *Vargas 9302* (GH). **Canta**: ca. 1.5 km NE of Canta, ca. 3000 m, *Dillon et al. 3195* (F). **Chancay**: Lomas de Lachay, entre Chancay y Huacho, 560 m, *Cerrate 3826* (USM); Lomas de Lachay, ca. 105 km N of Lima, 300–500 m, *Dillon et al. 3618* (F, HUT, MO, USM); Lomas de Granados, cerca a Huaral, 250–300 m, *Ferreyra 19417* (US, USM). **Huarocharí**: Matucana, 8000 ft, *Macbride & Featherstone 184* (F, US); Río Blanco, 12,000 ft, *Macbride & Featherstone 739* (F, US). **Lima**: Lomas de Amancaes, 400 m, *Cerrate 2081* (MO, USM); Lomas de Pachacamac, 360 m, *Cerrate 3552* (F, USM); Lomas de Amancaes, 300–400 m, *Ferreyra 4042* (US, USM); Lomas de Lurín, 400–500 m, *Ferreyra 9546* (MO, USM). **MOQUEGUA**. **Mariscal Nieto**: Lomas de Ilo, ca. 20 km E of Ilo, ca. 620 m, *Dillon et al. 3326* (F, HUT, K, MO, NY,

US, USM), *Dillon & Dillon 3649* (F, MO, USM), *Ferreyra 12568* (MO, USM). **PIURA**. **Ayabaca**: Ayabaca, 2742 m, *Soukup 4341* (US). **Huancabamba**: 40–43 km E of Olmos on road to Pucara, 1600–1850 m, *Gentry et al. 22661* (F, HUT, MO, USM). **PUNO**. **Azángaro**: Tequena, 20 km N de Arapa, *Aguilar 418* (USM p.p.). **Melgar**: Nañoa, 3900–4000 m, *Vargas 16254* (US). **Puno**: Amantani, 3900 m, *Aguilar 439* (MO, USM); Puno, 3900 m, *Aguilar s.n.* (MO, USM); Lampa, 4000 m, *Rauh & Hirsch P650* (NY). **TACNA**. **Tacna**: Lomas cerca al Morro Sama, 500–600 m, *Ferreyra 12551* (MO, USM).

IX. Gnaphalium

Gnaphalium L., Sp. Pl. 850. 1753. LECTOTYPE: *G. uliginosum* L., designated by Hitchcock & Green (1929).¹

Annual or perennial herbs, rarely suffrutescent, usually lanate or tomentose. Leaves alternate, simple, sessile or petiolate, at times decurrent upon the stem; blade lanate or tomentose, occasionally glandular-puberulent, the margins entire or crenulate. Capitulescences corymbose to paniculate or cymose, open or dense, terminal and axillary, rarely of solitary heads, bracteolate. Capitula disciform, heterogamous; involucre ovoid to campanulate; phyllaries 3–4-seriate, imbricate, scarious, white, stramineous, brown, or sometimes reddish, the margins usually hyaline; receptacles flat, glabrous or sometimes with rudimentary caducous paleae; pistillate florets, (25–)40–130, the corolla filiform, the base slightly expanded, apex contracted, minutely 3–4-lobed, the style branches slender; hermaphroditic florets functionally staminate, 5–10(–25), the corolla tubular, yellow, white, or purple, 3–5-lobed, the lobes usually pubescent with multicellular, stalked, capitate-glandular trichomes, the anthers sagittate, caudate, the terminal appendages obtuse, the style branches truncate, penicillate, the nectary conspicuous. Achenes oblong, subterete, glabrous, or papillose, rarely sparsely pubescent with multicellular, biseriata trichomes; pappus of smooth to scabrid, barbellate bristles, uniseriate, free, usually caducous, white. Chromosome numbers: $n = 7, 14, 21, 28$.

Gnaphalium contains over 150 species and has a cosmopolitan distribution, with centers of diversity in Africa, Mexico, and upland South

¹ For a discussion of the choice of lectotype, see Jeffrey (1979).

America. The genus is represented by seven species in Peru occurring in a wide variety of habitats.

The generic limits between *Gnaphalium* and its close relatives, *Achyrocline* and *Helichrysum*, are ill-defined and often arbitrary. *Gnaphalium* is here considered to include those species with campanulate involucre, truncate style branches (hermaphroditic florets), free pappus bristles, and a large ratio of pistillate (25–120) to hermaphroditic (5–25) florets).

Hilliard and Burt (1981) have provided evidence to support the acceptance of the segregate genus *Pseudognaphalium* Kirpichnikov. This genus was based upon the Mexican species, *Gnaphalium oxyphyllum* DC., and they expanded it to include 40 to 50 taxa from Africa, Asia, and several from South America. Furthermore, they maintain that *Pseudognaphalium* has little affinity with *Gnaphalium (sensu stricto)* (Hilliard & Burt, 1981, p. 202) and suggest greatest affinity with *Helichrysum*. Only one South American species, *Gnaphalium cheiranthifolium* Lam., has been transferred, and numerous other American species need to be reclassified and transferred to *Pseudognaphalium*. While we recognize this genus, it is beyond the scope of this study to provide the transfers necessary to accept the genus in practice.

Species boundaries in *Gnaphalium* are often ill defined. McVaugh (Flora Novo-Galiciana 12: 447, 1984) has discussed the problem of specific boundaries in *Gnaphalium* and his remarks are applicable to the genus in Peru:

Most of the species, even the ones that are pretty surely native plants with well-defined natural ranges, behave as weeds when their surroundings are disturbed. Under these circumstances they exhibit a great deal of vegetative variability, making identification

difficult without prolonged study. The treatment offered below is a provisional one, as the diagnostic characters employed are quite empirical, and the observed variation (e.g., in number of phyllaries, relative numbers of perfect and pistillate flowers, etc.) should be interpreted anew in the light of field study and experimentation.

With these words of caution, the treatment presented here should be regarded as provisional, for many taxonomic and nomenclature problems remain to be solved within South American *Gnaphalium*.

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Key to Species of *Gnaphalium*

1. Plants prostrate, decumbent, or suberect, often cushion-shaped; stems usually less than 12 cm long 2
2. Phyllaries milk-white, leaves subtending capitulescences linear-spatulate, apex rounded to obtuse *G. lacteum*
2. Phyllaries yellowish or brown, never milk-white; leaves subtending capitulescences spatulate to linear-lanceolate, apex acute to obtuse or rounded 3
3. Perennials; leaves densely and compactly white-tomentose, linear to narrowly spatulate, the margins often revolute and the leaves appearing cylindrical or thickened *G. polium*
3. Annuals; leaves laxly arachnoid-lanate and gray-tomentose, lanceolate to spatulate, the margins not revolute, the leaves appearing plane *G. badium*
1. Plants erect or rarely decumbent; stems usually 12 cm long or longer 4
4. Stoloniferous, single-stemmed, rosulate herbs; phyllaries with white, petaloid lamina at apex *G. antennarioides*

4. Multistemmed herbs, rarely with persistent, rosulate basal leaves; phyllaries lacking petaloid lamina at apex 5
5. Plants annual; capitula 2.5–3 mm high; achenes minutely pubescent with multicellular, biseriate trichomes *G. luteo-album*
5. Plants perennial; capitula 4–7 mm high; achenes imbricate-papillose, but lacking multicellular trichomes 6
6. Plants robust often to 1 m tall or greater; cauline leaves lanceolate to elliptic, 3.5–7 cm long, 5–20 mm wide, strongly discolorous; capitula 5–7 mm high; inner phyllaries usually acute or apiculate at apex; achenes ca. 0.6 mm long, 5-ribbed *G. elegans*
6. Plants usually 0.5 m tall or shorter; cauline leaves linear to lanceolate, (1–)2–5(–7) cm long, 2–5 mm wide, not strongly discolorous; capitula ca. 4 mm high; inner phyllaries usually obtuse at apex; achenes ca. 0.5 mm long, not obviously ribbed *G. dombeyanum*

1. *Gnaphalium antennarioides* DC., Prodr. 6: 224. 1838.

Helichrysum gnaphaloides Kunth, Nov. Gen. Pl. (fol.) 4: 68. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "crescit prope pagum Ayavacae Peruvianorum," *A. Humboldt* & *A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 97: I. 7, F neg. 37977). Non *H. gnaphaloides* Steud.

Antennaria monica Wedd., Chlor. And. 1: 150. 1856. TYPE: Based upon Kunth's *Helichrysum gnaphaloides*. Weddell also cited the following collections: Colombia, Dept. Tolima, Quebrada del Azufral, *J. Goudot* (P, not seen); Ecuador, Prov. Pichincha, Quito, *A. Humboldt* & *A. Bonpland s.n.* (P, not seen, F neg. 37700).

Rosulate herbs, (9–)12–30 cm tall, stoloniferous; stems erect, foliaceous, lanate. Basal leaves sessile; blade oblanceolate to spatulate, 2–5 cm long, 3–5 mm wide, densely lanate-tomentose; cauline leaves linear to narrowly spatulate, 1–4 cm long, 1.5–2.5 mm wide, sessile, discolorous, often falcate, densely lanate-tomentose. Capitulescences densely glomerulate, terminal, peduncles to 2 mm long, subtended by densely lanate-tomentose foliaceous bracts. Capitula 6–7 mm high, 3–4 mm wide; involucre narrowly campanulate; phyllaries ca. 3-seriate, the outer ovate to lanceolate, 3–3.5 mm long, 1–1.5 mm wide, the inner linear-lanceolate, 5.5–6 mm long, ca. 1 mm wide, all with apices prolonged into a petaloid lamina, white, rounded to acute; pistillate florets 50–75, the corollas 2.6–3 mm long, apex pink; hermaphroditic florets 7–15, the corollas 2.5–3.3 mm long, pink. Achenes 0.6–0.8 mm long; pappus bristles 3.5–4 mm long.

Gnaphalium antennarioides is a relatively uncommon species distributed from Colombia to Bolivia. In Peru, it is known from scattered collections in high-elevation sites from the Depart-

ments of Piura to Cuzco. It is characterized by its erect, white petaloid phyllaries, stoloniferous habit, and terminal congested capitulescences. It has been confused with *Antennaria linearifolia*, another species with white petaloid phyllaries, but *G. antennarioides* may be readily distinguished by its strictly heterogamous capitula.

Gnaphalium antennarioides appears most closely related to *G. paramorum* S. F. Blake, a species with a rosulate habit and white, petaloid phyllaries from Colombia and Venezuela.

AMAZONAS. **Bagua:** Cordillera Colán NE of La Peca, 10,800 ft, *Barbour 3428* (F, MO). CUZCO. **Paucartambo:** Tres Cruces, upper edge of Parque Nacional de Manu, 1–13 km NW of Paucartambo-Pilcopata Road, 3330–3500 m, *Gentry et al. 23439* (F, MO); Cerro de Cusilluyoc, 3800–3900 m, *Pennell 13869* (F p.p., GH, NY p.p.); Corihuaayrachina, Callanga, 3800 m, *Woytkowski 565* (MO, USM). **Urubamba:** Machu Picchu, on the Palcay side of the Salcantay-Palcay pass, 3500 m, *Peyton & Peyton 711* (F, MO).

2. *Gnaphalium badium* Wedd., Chlor. And. 1: 145. 1856. TYPE: Bolivia, Dept. Carangas, *A. C. V. d'Orbigny 1366* (lectotype, P, designated by Cabrera (1978), not seen, F neg. 37581; lectotype fragment, F).

Prostrate to decumbent, annual herbs; stems 5–15 cm long, much-branched. Leaves sessile; blade oblong-spatulate, 0.5–1.5 cm long, 3–5 mm wide, base attenuate, apex obtuse to rounded, both surfaces laxly arachnoid-lanate. Capitulescences corymbose or glomerulate with 2-many heads. Capitula 4–5 mm high, 4–5 mm wide, subtended by leaves; phyllaries ca. 3–5-seriate, the outer ovate, the inner oblong, apex brown; pistillate florets ca. 100, the corollas 2.5–2.9 mm long; hermaphroditic florets 12–25, the corollas 2.5–2.9 mm long.

Achenes ca. 0.5 mm long; pappus bristles ca. 3 mm long.

Gnaphalium badium is distributed from northern Argentina to central Peru (3200–4800 m). It is distinguished by its small, annual habit and spatulate leaves with lax, gray, arachnoid-lanate tomentum. Its capitulescences are often surrounded and obscured by the upper leaves. The majority of collections have been from moist areas near high-elevation lakes.

This species may be confused with *G. polium*, another high-elevation species with a reduced habit, but is distinguished from the latter by its annual habit and more arachnoid-tomentose leaves that engulf and obscure the capitulescences.

ANCASH. Carhuáz: Huascarán National Park, Quebrada Ishinca, 4250–4100 m, *Smith et al.* 9555 (F, MO). **AYACUCHO.** No Exact Locality: Valley Puquio, 4000 m, *Rauh & Hirsch P452* (NY). **JUNÍN.** Yauli: near Atocsayco, ca. 4200 m, *Pearsall 897* (F); Marcapomacocha, 4300 m, *Velarde 6593a* (us). **LIMA.** Huarochiri: Río Blanco, *Macbride & Featherstone 782, 3026* (F, US); Tliclo, 4700 m, *Rauh & Hirsch P255* (NY). **PUNO.** Huancané: Cerro Calvario, Conima, 3900 m, *Aguilar s.n.* (USM), 443 (MO). **Melgar:** Orurillo, *Soukup 554* (F). **Puno:** Amantani, 3900 m, *Aguilar s.n.* (USM).

3. ***Gnaphalium dombeyanum*** DC., Prodr. 6: 225. 1838. TYPE: Peru, *Dombey 38* (holotype, G-DC, not seen, IDC Microfiche 800. 1066: II. 4, F neg. 8223; isotype, F).

Erect or ascending herbs to 50 cm tall; stems densely lanate. Lower cauline leaves sessile to subamplexicaul, not decurrent on stems; blade linear-oblong to spatulate, (1–)2–5(–7) cm long, 2–5 mm wide, apex obtuse, lower surfaces white-tomentose, upper surfaces glandular-puberulent, the margins entire, often undulate; upper cauline leaves gradually smaller, base auriculate, amplexicaul, apex long acuminate. **Capitulescences** corymbose in semiglobose clusters of 4–12 heads. **Capitula** ca. 4 mm high, ca. 4 mm wide; involucre ovoid; phyllaries pale yellow to brown, glabrous, the outer broadly ovate, 3–4 mm long, ca. 1.5 mm wide, apex acute, the inner oblong, 3.6–4 mm long, 1.5–1.6 mm wide, apex obtuse, rarely mucronate; receptacles ca. 2 mm wide; pistillate florets 40–120 (–130), the corollas 2–3 mm long, 3-lobed, often reddish, glandular; hermaphroditic florets (4–)7–15(–20), the corollas 2–3 mm long, 5-lobed. **Achenes** ca. 0.5 mm long; pappus bristles 2–2.5

mm long. Chromosome number: $n = 7$ (as *G. chieranthifolium*).

Gnaphalium dombeyanum is a ubiquitous member of the genus in Peru and found in a wide range of habitats at various elevations. The concept adopted here recognizes a “species complex” that includes several previously recognized species; however, the pattern of morphological variability exhibited by these Andean elements makes application of names difficult. Populations are often morphologically heterogeneous with individuals having quite different character combinations found within a particular geographic area or environment. Characters that tend to exhibit the greatest variability include overall size of individuals, size and shape of the leaves, the density of pubescence, degree of expansion of the capitulescences, and color of phyllaries. Until a detailed biosystematic study of the genus is undertaken, this broad species delineation must be applied.

Label data indicate that *Gnaphalium dombeyanum* is occasionally used in folk medicine. It has the following common names: *botón de oro*, *huirahuirá*, *qheto qheto*, *vira-vira*, *wila wila*.

Gnaphalium dombeyanum Complex

Several species originally described from Peruvian material are here considered to belong to the *Gnaphalium dombeyanum* complex. Because these taxa, upon further study, may prove worthy of taxonomic recognition, they are not here placed into formal synonymy. Rather, their distribution and/or salient characters are discussed; their final disposition must await further study.

Gnaphalium peruvianum Sprengel, Syst. veg. 3: 473. 1826 and ***G. dysodes*** Sprengel, Syst. veg. 4: 776. 1827

These two species represent the oldest names for Peruvian material here placed under *G. dombeyanum*. Types of these species have not been located. *Gnaphalium dysodes* has occasionally been applied to Peruvian collections; no material annotated as *G. peruviana* was seen in this study.

Gnaphalium jelskii Hieron., Bot. Jahr. 36: 483. 1905. SYNTYPES: Peru, Dept. Cajamarca,

Cutervo, *K. Jelski* 707, 710, 711 (B, probably destroyed, not seen, syntype 707 = F neg. 15104).

This species appears to fall into the range of morphological variability of *G. dombeyanum*; however, no type material has been studied.

Gnaphalium helichrysoides Wedd., *Chlor. And.* 1: 146. 1856. SYNTYPES: Peru, Dept. Cuzco, Oct 1839–Feb 1840, *C. Gay s.n.* (P, not seen, F neg. 37598; fragment, F 971889; Bolivia, Prov. Caranges, *A. C. V. d'Orbigny* 1377 (P, not seen).

This species appears to differ from *G. dombeyanum* in possessing white phyllaries.

Gnaphalium melanosphaeroides Schultz-Bip. ex Wedd., *Chlor. And.* 1: 148. 1856. TYPE: Peru, Dept. Puno, Macusani, *W. Lechler* 1838 (holotype, P, not seen; isotype, W, not seen, F neg. 33150).

This species differs from *G. dombeyanum* in possessing dark brown phyllaries.

Gnaphalium nanum Kunth, *Nov. Gen. Sp.* (fol.) 4: 62. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "juxta pagum Ayavaca, alt. 1410 hex.," *A. Humboldt & A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 97: I. 1, F neg. 15111; isotype, B, probably destroyed).

The type consists of a single small stem and quite possibly represents a depauperate specimen of *G. dombeyanum*.

Gnaphalium lanuginosum Kunth, *Nov. Gen. Sp.* (fol.) 4: 65. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "juxta pagum Ayavaca, alt. 1410 hex.," *A. Humboldt & A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 96: III. 7, F neg. 37602).

This species was collected at the same locality as *G. nanum* and consists of a single stem (33 cm

long) with past bloom heads. No material resembling the specimen in the type photograph has been encountered in this study.

Material here placed under *Gnaphalium dombeyanum* has been previously annotated under additional names, including *G. cheiranthifolium* Lamour. and *G. graveolens* Kunth. A discussion of these two taxa is provided under **Doubtful and Excluded Names**.

AMAZONAS. Chachapoyas: ca. 43 km NE of Balsas ca. 2900 m, *Dillon & Turner* 1721 (F, USM); Chachapoyas 2700 m, *Williams* 7546 (F, US). **ANCASH. Bolognesi** abajo de Raquí, 1900 m, *Sagástegui et al.* 12296 (F, HUT, MO). **Huaráz:** 4 km N of Monterrey, ca. 8400 ft, *King & Collins* 9021 (F, US); Cachabamba, 2870 m, *Smith & Buddensiek* 10934 (F). **Huaylas:** Parque Nacional Huascarán, 4000 m, *Bernardi et al.* 16492 (US); Laguna Llanganuco, 3500–3800 m, *Gentry et al.* 37405 (F, MO); *Zardini* 1540 (MO). **APURÍMAC. Abancay:** Sayhuite Km 45 E of Abancay, 3600 m, *Hutchison* 1738 (F, NY, US, USM); 6–7 km NNW of Abancay, ca. 3100 m, *Illis & Ugent* 700 (MO, USM); Curahuasi, 2800 m, *Vargas* 1266 (F). **AREQUIPA. Arequipa:** ca. 40 km NNE of Arequipa on road to Nevado Chachani, 3500–4000 m, *Dillon et al.* 3277 (F); near Arequipa, 8000 ft, *Harrison s.n.* (GH); southern slopes of Chachani, 2700 m, *Hinkley & Hinkley* 45 (GH, US); Nevado de Chachani, 4100–4200 m, *Pennell* 13290 (F), 13294 (F, GH); Arequipa, campo de aviación, 2700 m, *Ponce* 109 (USM); Km 18 on road between Arequipa and Yura, 3300 m, *Solomon* 2847 (MO); Chilena Valley, 7500 ft, *Stafford* 563 (F). **Camaná:** 14 km on road S of Chala, 350–400 m, *Worth & Morrison* 15688 (GH). **Caraveli:** Lomas of Atiquipa, 150–200 m, *Dillon & Dillon* 3790 (F, USM); Lomas de Pongo, cerca a Acará, 700–800 m, *Ferrerya* 13426 (MO); Atico, 100 m, *Tovar* 2665 (USM). **Islay:** Lomas of Mollendo, ca. 8 km NW of Islay, ca. 510 m, *Dillon & Dillon* 3940 (F, USM); 10 km E of Islay, 300 m, *Worth & Morrison* 15722 (F, GH, MO). **AYAUCUCHO. La Mar:** 40–46 km NNE of Tambo, 2710–3050 m, *Luteyn & Lebrón-Luteyn* 6359 (NY, US). **Lucanas:** Aucará, *Chinchay* 3665 (US); entre Nazca y Puquio, 3200–3300 m, *Ferrerya* 5483 (MO); Marcahuasi, arriba de Puquio, 3400–3450 m, *Ferrerya* 7213 (MO, US). **CAJAMARCA. Cajamarca:** ca. 27 km NNW of Cajamarca on road to Hualgayoc, Pampa de Cerro Negro, 3600 m, *Dillon & Molau* 3017 (F); ca. 6.5 km SW of Cajamarca, 2980 m, *Dillon et al.* 2901 (F, USM); ca. 22.5 km S of Cajamarca on road to Chilete, 2740 m, *Dillon et al.* 3036A (F). **Celendín:** 31 km NE of Cajamarca, 2950 m, *Dillon & Turner* 1588, 1589 (F); Jalta de Kumulca, 3350 m, *Sagástegui et al.* 12038 (F, HUT, MO); Usnio, 3120 m, *Sánchez et al.* 2776 (MO). **Contumazá:** La Herilla (Guzmango), 3050 m, *Sagástegui et al.* 6456 (MO), 9696 (F, MO); Guzmango, 2600 m, *Sagástegui* 7726 (MO). **CUZCO. Paucartambo:** Llulluchayoc, 3100–3700 m, *Vargas* 4327 (F). **Quispicanchis:** 95 km above Quincemil on the Río Marcapata, 3480 m, *Madison* 1031 (GH). **Urubamba:** Chincheros, quebrada above Pojpoj waterfall, 3450–3550 m, *Davis et al.* 1474 (F, US); Chincheros, Taucca, 4050 m, *Davis et al.* 1575 (F); Chincheros, 3750 m, *King et al.* 120 (F, US); camino a Puyupatamarca, 3290 m, *Dreyer*

fus 12831 (MO); Machupicchu, 2500–2600 m, *Illis et al.* 1045 (US); Ollantaytambo, 3650 m, *Peyton & Peyton* 52 (F, MO p.p.); Machupicchu, 2675 m, *Peyton & Peyton* 201 (MO); Machupicchu, 2400 m, *Vargas* 819 (F). **HUANC-AVELICA. Huancavelica:** Orcon, arriba de Conaica, 3550–3580 m, *Tovar* 83 (US); Caniorconca, 3 km SE de Conaica, 3560–3590 m, *Tovar* 98 (US p.p.). **Tayacaja:** 3 km N of Salcabamba, 3500 m, *Stork & Horton* 10328 (F). **HUÁNUCO. Huánuco:** Carpish Pass, ca. 2750 m, *Allard* 20994 (F, US); Cerro Carpish, ca. 48.5 km N of Huánuco, 8600 ft, *Davidson & Jones* 9188 (US); Carpish, 2700–2900 m, *Ferreya* 2343 (USM); Mitotambo, arriba de Mito, 3000–3100 m, *Ferreya* 6678 (US, USM); Carpish, cumbre entre Huánuco y Tingo María, 2700–2900 m, *Ferreya* 8154 (F, MO, US); Yanano, ca. 6000 ft, *Macbride* 4944 (F, GH, US); Yanahuanca, *Macbride & Featherstone* 1192 (F, US); Mito, ca. 9000 ft, *Macbride & Featherstone* 1531 (F, US), 1801 (F, GH, US); N of Carpish Pass, 48.6 km NE of Huánuco, 2490 m, *Plowman & Rury* 11133 (F, US); Acomayo, *Ridout* 11499 (MO); Tumanga, 2400 m, *Woytkowski* 7958 (MO); Pillao, 2700 m, *Woytkowski* 34149 (F). **JUNÍN. Concepción:** Chicchi, 3500–3700 m, *Ochoa* 1989 (US). **Huancayo:** San Jerónimo, 3340 m, *Proano* 13 (MO, USM); Huancayo, cerca del Cementerio, *Ridout* 10318 (MO p.p.); Huancayo, 3317 m, *Soukup* 2955 (F, GH); Huancayo, 3800 m, *Velarde* 2342 (US). **Tarma:** 28–32 km NE of Tarma, ca. 2480 m, *Dillon & Turner* 1348A (F, USM); ca. 35 km NE of Tarma along road to San Ramón, ca. 2300 m, *Dillon & Turner* 1408 (F, USM); Chuquishunca, 2 km arriba de Huacapistana, 2000–2400 m, *Ferreya* 458 (MO, USM), 11242 (MO); Chanchamayo valley, 1000 m, *Schunke* 412 (F); Acobamba, 3500 m, *Woytkowski* 71 (F). **Yauli:** Oroya, *Kalenborn* 42 (GH, MO, US), *Kalenborn & Kalenborn* 83 (NY); La Oroya, ca. 12,000 ft, *Macbride & Featherstone* 979 (F, US); Baños, *Capt. Wilkes* s.n. (NY p.p.). **LA LIBERTAD. Huamachuco:** Río Colorado, 3215 m, *La Rosa & Riccio* 3519, 3520 (US); Marca Huamachuco, 3300–3400 m, *La Rosa & Riccio* 3601 (US). **Otuzco:** Cerro Ragache (Salpo), 3200 m, *Sagástegui et al.* 11595 (F, HUT, MO); Shorey, Trujillo-Huamachuco, 3300 m, *Smith & Vasquez* 3271 (F, MO). **Sánchez Carrión:** Jalca de Quespuenda-Huamachuco, 3800 m, *Sagástegui* 9432 (F, HUT, MO). **LAMBAYEQUE. Chiclayo:** Cerro Reque, 540 m, *Llatas* 313 (F, HUT, MO). **LIMA. Cañete,** Lomas de Quilmana, entre Mala y Cañete, 250–320 m, *Ferreya* 6317 (MO). **Canta:** La Florida, 2400–2500 m, *Ferreya* 18423 (USM); Ijadero, Canta-Lachoqui, 3700 m, *Meza* 108 (MO), 182 (USM); Llullum, 12 km arriba de Canta, 4100 m, *Meza* 210 (MO); near Antaicocha, Cerro Colorado, E of Canta, 3400–3800 m, *Pennell* 14631 (F); Huaros, 3400–3600 m, *Pennell* 14725 (F, GH, NY), 14726 (F); Purumarca, *Sánchez* 48 (USM). **Chancay:** Lomas de Lachay, entre Chancay y Huacho, 400–450 m, *Ferreya* 8774 (MO); Chancay, *Ridout* 12208 (MO). **Huarochari:** Surco, 3000–3200 m, *Ferreya* 676 (USM); Chicla, 3700 m, *Ferreya* 6518 (US, USM); Matucana, ca. 8000 ft, *Macbride & Featherstone* 298 (US), 360 (F, US p.p.); Río Blanco, ca. 12,000 ft, *Macbride & Featherstone* 740 (F, US); Matucana-San Mateo, 3000 m, *Rauh & Hirsch* P76 (NY p.p.); Chicla, 3733 m, *Riccio* 3716 (US). **Yauyos:** Huacracocha, 17 km N de Tupe, 4400 m, *Cerrate* 1225 (USM); Cruzpampa, 2950 m, *Cerrate & Tovar* 1105 (F, MO, US). **MOQUEGUA. Mariscal Nieto:** Quebrada de Torata, *Núñez* 38 (USM). **PIURA. Huancabamba:** Hacienda Porculla, 1800–2000 m, *Ferreya* 14175 (USM); Mitopampa,

Huancabamba-Cuello del Indio, 2650 m, *Sagástegui et al.* 8242 (MO, NY). **PUNO. Azángaro:** Amaniani, 3900 m, *Aguilar* 438 (MO); Isla Arapa, *Aguilar* s.n. (MO). **Huancané:** Miajachi, Isla Chirone, s.d. (MO). **Melgar:** Orurillo, *Soukup* 503 (F, GH); Araranca, 4100–4300 m, *Pennell* 13472 (F, GH, NY, US, USM). **Prov. Unknown:** Tahuaco, 3850–3900 m, *Tovar* 5196 (USM).

4. **Gnaphalium elegans** Kunth, Nov. Gen. Sp. (fol.) 4: 63. 1820. TYPE: Ecuador, Prov. Pichincha, “prope Chillo et Cachambamba, 1340 hex, Jun” *A. Humboldt & A. Bonpland* 3001 (holotype, P, not seen, IDC Microfiche 6209. 96: III. 1, F neg. 37591, fragment, F). **Figure 11.**

Gnaphalium poeppigianum DC., Prodr. 6: 227. 1838. TYPE: Peru, Dept. Huánuco, Cuchero, 1829, *E. Poeppig* 1368 (holotype, G-DC, not seen; IDC Microfiche 800. 1067: I. 1.; isotypes, B, probably destroyed, F neg. 15138, F, GH, W, not seen, F neg. 33151).

Perennial herbs to 1 m tall; stems densely lanate or tomentose. Leaves sessile, the base subamplexicaul; blade lanceolate to elliptic, 3.5–7 cm long, 5–20 mm wide, apex acute to attenuate, discolorous, lower surface densely lanate, upper surface glandular-puberulent, the margins entire to crenulate. Capitulescences corymbose, terminal and axillary. Capitula 5–7 mm high, 3–5 mm wide; involucre ovoid to campanulate; phyllaries 3–4-seriate, white or stramineous, the outer ovate, ca. 2.5 mm long, ca. 1.5 mm long, apex rounded to obtuse, the inner oblong to lanceolate, 4–7 mm long, apex acute to apiculate; receptacles 2–2.5 mm wide; pistillate florets 80–100, the corolla ca. 3 mm long, base slightly expanded, apex minutely 3–4-cleft; hermaphroditic florets 5–18, the corolla 2.5–3 mm long, yellowish, 3–5-lobed. Achenes ca. 0.6 mm long, 5-ribbed; pappus bristles 3–4 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984).

Gnaphalium elegans is distributed from Mexico to Panama and throughout the Andes of northern South America from Venezuela to southern Peru (1400–3000 m). It is readily recognized by its robust habit, strongly discolorous cauline leaves, and large capitula with white or rarely stramineous phyllaries.

Several collections from central and northern Peru are tentatively placed under this species (*Ferreya* 5730, p.p.; *Killip & Smith* 21844; *Sagástegui et al.* 11516; *Macbride & Featherstone* 271). Their leaves and bracts subtending the capitulescences



FIG. 11. *Gnaphalium elegans*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, achene. (Drawn from López *et al.* 9031, HUT.)

are more similar to material placed in *Gnaphalium dombeyanum*, but they have apiculate inner phyllaries and strongly 5-ribbed achenes of typical *G. elegans*. Further sampling in these regions may help to define the nature of this variation.

AMAZONAS. Chachapoyas: 2 kms along road W of Chachapoyas, ca. 7200 ft, King & Bishop 9177 (us). **AN-CASH.** Bolognesi: Chiquián, 3500–3600 m, Ferrerya 5730 (us p.p.). **CAJAMARCA.** Cajamarca: ca. 22.5 km S of Cajamarca on road to Chilete, 2740 m, Dillon *et al.* 3036 (F); Asunción-San Juan, 2500 m, Sagástegui *et al.*

10153 (F, HUT, MO). **Contumazá:** Tambo La Lima (Casca-Contumazá), 1650 m, *López et al.* 9031 (F, HUT, MO). **San Ignacio:** Maisgua (San Ignacio-Nueva Esperanza), *López et al.* 8996 (F, HUT, K, MO, NY). **CUZCO. Calca:** Lares-Manto, 2400 m, *Marín* 2289 (F). **La Convención:** Amaylamba, 1800 m, *Marín* 1514 (F, US). **Urubamba:** Río Urubamba, 2000 m, *Angulo* 1769 (HUT); Hacienda Santa Rita, *Dreyfus s.n.* (USM 12815); Machupicchu, 2400 m, *Ferreya* 2731 (US, USM), Machupicchu, 2400 m, *Vargas* 811 (F). **HUÁNUCO. Huánuco:** Carpish, 2650 m, *Asphund* 13119 (US); between Huánuco and Tingo María, 6 km N of Acomayo, 2450 m, *Croat* 57870 (F, MO). **Pachitea:** Piedra Grande, estación near Río Santo Domingo, ca. 5000 ft, *Macbride* 3688 (F, US). **JUNÍN. Tarma:** Huacapistana, 1800–1900 m, *Ferreya* 11306 (MO, USM); Tarma, 3000–3200 m, *Killip & Smith* 21844 (F, NY, US). **Prov. Unknown:** Agua Dulce, 1600 m, *Woytkowski* 7427 (GH, MO); Yucapata, 1400 m, *Woytkowski* 6622 (MO). **LA LIBERTAD. Otuzco:** Casmiche (Samne-Otuzco), 1700 m, *Sagástegui et al.* 11516 (F, HUT, K, MO, NY). **LIMA. Huarochiri:** Matucana, 8000 ft (2424 m), *Macbride & Featherstone* 271 (F, US). **PIURA. Huancabamba:** Cerro Porculla, 3–11 km W of Continental Divide down W slope, *Edwin & Schunke* 3764 (COL, F, NY, US); 37 km E of Olmos on road to Pucara, 1500 m, *Gentry et al.* 22626 (F, MO). **PUNO. Puno:** region of Puno, *Soukup* 518 (F). **NO EXACT LOCALITY.** “Peruvia,” 1862, *Matthews s.n.* (NY p.p.).

5. ***Gnaphalium lacteum* Meyen & Walpers**, Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19: 276. 1843. **TYPE:** Chile, Prov. Tarapacá, Tacora, *F. J. F. Meyen s.n.* (holotype, v, probably destroyed, F neg. 15105, fragment, GH).

Small, perennial **herbs**; stems prostrate, branched, densely white- to gray-tomentose, leafy to the apex, 5–10(–20) cm long. **Leaves** sessile; blade linear to spatulate, 3–15(–40) mm long, 2–3 mm wide, rarely decurrent, apex rounded, both surfaces densely white-tomentose, the margins entire. **Capitulescences** corymbose to corymbose-paniculate in semiglobose clusters of 3–8 capitula, terminal and axillary. **Capitula** 4–5 mm high, 3–4 mm wide; involucre campanulate; phyllaries white, the outer ovate, 2–3 mm long, 1.5–2 mm wide, apex obtuse to rounded, the inner oblong, ca. 4 mm long, 0.5–1.5 mm wide, apex rounded; receptacles ca. 2 mm wide; pistillate florets 75–100, the corollas 2.5–2.7 mm long; hermaphroditic florets ca. 12, the corollas ca. 3 mm long. **Achenes** ca. 0.6 mm long; pappus bristles ca. 3 mm long.

Gnaphalium lacteum is distributed from extreme northern Chile and adjacent Argentina and Bolivia to central Peru. It is distinguished by its small, predominately prostrate habit and pure

white phyllaries with obtuse to rounded apices. The overall size of individuals is variable, with some plants having quite long, multi-branched stems (e.g., *Hinkley & Hinkley* 3, GH). It superficially resembles other small prostrate species, e.g., *G. badium* and *G. polium*, and apparently occurs sympatrically with *G. polium* in one locality. A gathering by Pennell from Puno appears to be mixed; two duplicates of *Pennell* 13444 (GH, NY) are clearly *G. lacteum*, but the F sheet is clearly different, and here assigned to *G. polium*. Another collection from the same locality (*Pennell* 13470a, F) is also assigned to *G. polium* and indicates that these two species occur in the same geographic area.

Cabrera (1978) placed *Gnaphalium argyrolepis* Philippi under the synonymy of *G. lacteum*, and based on the type photograph and description, it appears that another species, *G. frigidum* Wedd., described from Tacora, Chile, may also be conspecific with *G. lacteum*.

ANCASH. Bolognesi: Chiquián, 4000 m, *Ferreya* 5825 (US, USM). **AREQUIPA. Arequipa:** southern slopes of Chachani, north of Arequipa, 3600 m, *Hinkley & Hinkley* 3 (GH); above Arequipa, 3000–3300 m, *Pennell* 13219 (F, GH, NY); Volcán Chachani, 3700 m, *Rauh & Hirsch* P530 (NY). **HUANCAVELICA. Castrovirreina:** near Córdova, 3050–3300 m, *Metcalfe* 30266 (GH, F, MO). **LIMA. Canta:** carretera Canta-Lachaqui, 3600 m, *Meza* 211 (MO). **PUNO. Melgar:** Araranca, 4100–4300 m, *Pennell* 13444 p.p. (GH, NY). **NO EXACT LOCALITY.** 1838–42, *Wilkes s.n.* (NY).

6. ***Gnaphalium luteo-album* L.**, Sp. Pl. 851. 1753. **TYPE:** Europe, no exact locality, (holotype, LINN, 900. 286–294, not seen).

Annual **herbs** to 30–50 cm tall; stems white-lanate pubescent, erect to decumbent. **Basal leaves** sessile; blade oblong-spatulate, ca. 6 cm long, ca. 6 mm wide, apex obtuse; cauline **leaves** sessile, subamplexicaul to subdecurrent; blade lanceolate, 1–5 cm long, 2–5 mm wide, apex acute, all arachnoid-tomentose. **Capitulescences** corymbose or subcymose, congested. **Capitula** 2.5–3(–4) mm high, 2.5–4 mm wide; involucre campanulate; phyllaries 2.5–3(–4) mm long, ca. 1 mm wide, oblong, apex obtuse; pistillate florets 100–120, the corollas ca. 2.5 mm long; hermaphroditic florets ca. 30, the corollas ca. 2.5 mm long. **Achenes** ca. 0.5 mm long, minutely pubescent with multicellular, biseriate trichomes; pappus bristles ca. 2.5 mm long. Chromosome number: $n = 7$ (Kockx-van Roon, M. & J. H. Wieferring, 1982).

Gnaphalium luteo-album is native to central and southern Europe and has been introduced infrequently in South America. In Peru, it is represented only by a few collections from the vicinity of Arequipa. It is readily distinguished from native members of the genus by its annual habit, small capitula, and achenes with multicellular, biseriate trichomes.

AREQUIPA. **Arequipa:** Cerrillo Savandia (Lavan-cha?) near Laspinas, 14 km N of Arequipa, 2200 m, *Eyerdam & Beetle 22147* (MO); vicinity of Arequipa, *Rose & Rose 18828* (GH, NY, US), *19011* (NY).

7. ***Gnaphalium polium*** Wedd., *Chlor. And.* 1: 147. 1856. TYPE: Peru, Dept. Cuzco, no exact locality, *C. Gay 1709* (holotype, P, not seen, F neg. 37605, fragment, F).

Prostrate to decumbent, perennial **herbs**; stems suffrutescent, much-branched at the base, 5–10(–20) cm long. **Leaves** sessile or slightly decurrent on stem; blade linear to spatulate, 5–15(–20) mm long, 2–2.5(–3.5) mm wide, apex rounded to acute, both surfaces densely tomentose. **Capitulescences** corymbose in globose clusters, terminal. **Capitula** ca. 4 mm high, ca. 4 mm wide; phyllaries 3–5-seriate, the outer ovate, 2.5–3 mm long, ca. 1.5 mm wide, apex acute, the inner oblong, 3.5–4 mm long, 1–1.5 mm wide, apex obtuse to rounded; pistillate florets ca. 100, the corollas ca. 2.2 mm long, 3–4-lobed; hermaphroditic florets 8–12, the corollas ca. 2.2 mm long, 5-lobed. **Achenes** 0.5–0.7 mm long; pappus bristles ca. 3 mm long.

Gnaphalium polium is a highly variable and possibly polyphyletic assemblage of small, high-elevation perennials distributed from northern Peru to Bolivia. Its thickened lignescent stems and dense, white-tomentose pubescence that gives the leaves a thickened circular or rounded form are its most readily observable characteristics. It is readily distinguished from the annual, *G. badium*, in not having its capitulescences immersed in the upper leaves as in that species.

ANCASH. **Huaráz:** Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, MO); Huascarán National Park, Quebrada Shallap, 3690–4100 m, *Smith et al. 9646* (F, MO); Quebrada Llaça, 4400–4600 m, *Smith et al. 10824* (F p.p., MO). **Recuay:** Km 125, Pativilca to Recuay, 3870 m, *Dillon et al. 3110* (F, HUT, MO, NY, TEX, US, USM). **CAJAMARCA.** **Contumazá:** Pozo Kuán, 3600–3800 m, *Sagástegui et al. 10053* (F, HUT, MO). **CUZCO.** **Quispican- chis:** Zangate, 4700 m, *Rauh & Hirsch P1149* (NY).

Urubamba: Machupicchu, 3350 m, *Peyton & Peyton 709* (F, MO); Salcantay, 4500 m, *Rauh & Hirsch P1424* (NY). **JUNÍN.** **Janja:** Hacienda San Juan, entre Janja y Matahuasi, 3200–3300 m, *Ferreyra 12901* (MO). **LA LIBERTAD.** **Santiago de Chuco:** Chota (Motil-Shorey), 3200 m, *Sagástegui et al. 11700* (F, HUT, MO). **LIMA.** **Huarochiri:** Casapalta [Casaplaca], *Ball s.n.* (GH); 20 km NE of San Mateo, 4050 m, *Gentry et al. 19197* (MO). **PUNO.** **Azángaro:** Tequena, 20 km N de Arapa, *Aguilar 417* (MO, USM). **Melgar:** Araranca, 4100–4300 m, *Pennell 13444* (F), *13470* (F), *13470a* (F).

Doubtful and Excluded Species of *Gnaphalium* in Peru

Gnaphalium cheiranthifolia Lam., *Encycl. Method.* 2: 752. 1786. TYPE: Uruguay, Montevideo, May 1767, *P. Commerson s.n.* (holotype, P-LAM, not seen, F neg. 37587, fragment, F).

Pseudognaphalium cheiranthifolia (Lam.) Hilliard & Burt, *J. Linn. Soc. Bot.* 82(3): 205. 1981.

Cabrera (1978) considered this species to be a southern South American element extending only into southern Bolivia, Brazil, Argentina, and Chile. It is a commonly used name throughout northern South America; the large basal rosette in the photograph of the holotype has not been observed in any Peruvian plants.

Gnaphalium frigidum Wedd., *Chlor. And.* 1: 147. 1856. TYPE: Bolivia, Dept. Botosí: A. C. V. *d'Orbigny 1372* (lectotype, P, designated by Cabrera (1978), not seen, F neg. 37594).

From an examination of the type photograph and the description, this species appears to be quite close to *G. lacteum*, and the two may prove to be conspecific. Material assigned to *G. frigidum* agrees with *G. lacteum* in most respects but lacks the pure white phyllaries associated with the latter species. It is not placed into formal synonymy pending examination of type material.

Gnaphalium glandulosum Klatt, *Linnaea* 42: 129. 1878. TYPE: Chile ["Peru"], Tacora, *F. J. F. Meyen s.n.* (holotype, B, probably destroyed, F neg. 15099, fragment, GH).

No material referable to this Chilean species has been examined in this study.

Gnaphalium graveolens Kunth, Nov. Gen. Sp. (fol.) 4: 64. 1820. TYPE: Ecuador, Prov. Chimborazo, Riobamba, *A. Humboldt* & *A. Bonpland* 3193 (holotype, p, not seen, IDC Microfiche 6209. 96: III. 2, F neg. 37586), non *G. graveolens* M. Bieb. (1808, 1819), nec *G. graveolens* Fenzl ex Schultz-Bip. (1835-1850), nec *G. graveolens* Henning (1823).

This is one of the most commonly applied names for Andean *Gnaphalium*; however, it is invalid due to an earlier homonym. The type photograph appears to show some characters of *G. elegans*, including its large discolorous leaves and large spreading capitulescences. Most of the material previously annotated under this name is here placed with *G. dombeyanum*.

X. *Helichrysum*

Helichrysum Miller, Gard. Dict., ed. 4, 1754.

TYPE: *Gnaphalium orientale* L. = *Helichrysum orientale* (L.) Gaertn.

Perennial **herbs** or **shrubs**, caespitose or suffrutescent, usually lanate, arachnoid, or glandular-pubescent. **Leaves** alternate, simple, sessile or subpetiolate, the margins entire to subentire. **Capitulescences** of solitary heads or compound corymbs or panicles. **Capitula** disciform or discoid, heterogamous, female florets fewer than hermaphroditic; involucre cylindrical-campanulate to hemispherical; phyllaries multiseriate, imbricate, persistent, scarious, white or colored distally; receptacles flat, glabrous; pistillate florets (2-)45-55(-850), the corollas narrowly tubular, rarely filiform; hermaphroditic florets 20-200(-700), the corollas tubular, yellow, 5-lobed, the anther bases sagittate, caudate, the terminal appendages oblong to lanceolate, obtuse to rounded, the styles bifid, the branches spatulate, flattened, apex deltoid, the nectary often prominent. **Achenes** cylindrical, glandular-papillose; pappus bristles scabrid, barbellate, uniseriate, free or united at the base, caducous, stramineous to white. Chromosome numbers: $n = 7, 8, 10, 11, 14, 15, 28, 38$.

Helichrysum is a genus of perhaps 500 species widely distributed in Eurasia, Africa, Madagascar, Australia, and New Zealand. It is closely allied to *Gnaphalium* and the latter is weakly distinguished

from it by the number of pistillate florets outnumbering the hermaphroditic florets. Several members are cultivated as ornamentals in the New World, the following throughout Latin America.

1. *Helichrysum bracteatum* (Vent.) Andrews, Bot. Rip. Sup. 1, t. 428. 1805.

Xeranthemum bracteatum Vent., Jard. Malm. t. 2. 1803. TYPE: not seen.

Perennial **herbs** to 1 m tall, glabrate or puberulent with short glandular trichomes and sparse, arachnoid hairs; stems striate. **Leaves** alternate, sessile or the base narrowed to an indistinct winged petiole; blade oblanceolate, to 12 cm long, 1.5-2 cm wide, the margins entire and undulate, both surfaces sparsely arachnoid-pubescent and glandular. **Capitulescences** of solitary heads, terminal and axillary, braceolate. **Capitula** ca. 2 cm high, 2.5-5 cm wide; involucre hemispheric; phyllaries multiseriate, subequal or the innermost shorter, oblong to lanceolate, 10-15 mm long, 3-5 mm wide, apex rounded to acute, variously red, orange, yellow, purple, or white, the innermost usually pale; receptacles flat, 15-25 mm in diameter; pistillate florets few or rarely absent; hermaphroditic florets usually over 500, the corollas tubular, 8-10 mm long, the limb slightly expanded, 5-lobed, the base expanded at the nectary. **Achenes** fusiform to cylindrical, ca. 2 mm long, striate, dark brown, apex dilated; pappus bristles ca. 8 mm long, stramineous to white. Chromosome numbers: $n = 12, 14$.

This species is widely cultivated as an ornamental in flower gardens and for sale in larger cities. It is known as "immortal." No herbarium specimens collected in Peru have been examined in the present study.

XI. *Jalcochila*

Jalcochila Dillon & Sagást., Brittonia 38: 162. 1986. TYPE: *Jalcochila peruviana* Dillon & Sagást.

Cespitose, perennial **herbs**; stems branched, densely compact. **Leaves** alternate, rosulate, sessile, marcescent in age, coriaceous; blades ovate-lanceolate to lanceolate or obdeltate, 3.5-9 mm long, 0.5-2 mm wide, lower surface tomentose-

arachnose, 3-costate, upper surface glabrous, 2-canaliculate, the margins entire. **Capitulescences** of solitary heads, sessile at anthesis, becoming pedunculate at maturity, the peduncles 1–5 mm long, sparsely arachnose. **Capitula** discoid, heterogamous; involucre ovoid to campanulate; phyllaries 2-seriate, equal to subequal, scarious, stramineous, ovate-lanceolate to lanceolate; receptacle plane; pistillate florets 4–6, the corollas filiform, the style branches linear, exserted; hermaphroditic florets 2–6, the corollas tubular, the limb slightly expanded, 4–5-lobed, the anther bases sagittate, the terminal appendage lanceolate, the style branches truncate to clavate, papillose, exserted, the stigmatic lines short and parallel. **Achenes** ovoid, 4-costate, appearing glabrous, scattered biseriate, multicellular, glandular trichomes; pappus bristles uniseriate, the bases fused.

Jalcophila contains two species and is known from high-elevation localities in the páramo of Volcán Galeras (Dept. Nariño) in southwestern Colombia, Páramo El Angel (Prov. Carchí) in northern Ecuador, the páramos of the Cordillera de los Llangantes (Prov. Napo) in central Ecuador, and Pampas de la Julia (Dept. La Libertad) in north-central Peru. This genus appears to lack close relatives among Central and South American Inuleae (Dillon & Sagástegui, 1986).

Reference

DILLON, M. O., AND A. SAGÁSTEGUI A. 1986. *Jalcophila*, a new genus of Andean Inuleae (Asteraceae). *Brittonia*, 38: 162–167.

1. *Jalcophila peruviana* Dillon & Sagást., *Brittonia* 38: 163. 1986. TYPE: Peru, Dept. La Libertad, Prov. Santiago de Chuco, arriba de Quiruvilca, Pampas de la Julia, 3800 m, 15 Nov 1983, A. Sagástegui A., J. Mostacero L., S. López M. & S. Leiva G. 11131 (holotype, HUT; isotype, F). **Figure 12.**

Cespitose **herbs**; stems 1–2 cm long. **Leaves** ovate-lanceolate to obdeltate, 3.5–5 mm long, 0.5–1.5 mm wide, apex rounded, often with tomentose tuft. **Capitulescences** of solitary heads, pedunculate, the peduncles 1–3 mm long. **Capitula** 2–2.5 mm high, 1–1.4 mm wide; involucre campanulate; phyllaries 8–13, subequal, the outer ovate-lanceolate, 2–2.3 mm long, 0.5–0.6 mm wide, apex acute to obtuse, lacerate, the inner lanceolate, 1.8–2.1

mm long, 0.4–0.5 mm wide, apex acute; pistillate florets ca. 4, the corollas ca. 1.25 mm long, the style branches ca. 0.2 mm long; hermaphroditic florets ca. 2, the corollas ca. 1.75 mm long, the limb 5-lobed, the lobes 0.25 mm long, the anthers ca. 1 mm long, the style branches truncate, ca. 0.1 mm long. **Achenes** ovoid, ca. 0.75 mm long, ca. 0.4 mm wide; pappus bristles 1.2–1.5 mm long.

Jalcophila peruviana is known only from the type and one additional locality in northern Peru. Its small, cespitose habit makes it an inconspicuous element within the *jalca* formation. It superficially resembles *Cuatrecasasiella isernii* in general habit; however, it is easily separable from the latter by having alternate leaves and heterogamous capitula. The achenes of this genus were originally described as gabrous; however, they do possess scattered biseriate, multicellular, glandular trichomes common in the tribe.

LA LIBERTAD. Santiago de Chuco: Chota-Shorey, 3250 m, Sagástegui et al. 11104 (F, HUT, MO, NY).

XII. Loricaria

*Loricaria*² Wedd., *Chlor. And.* 1: 165. t. 27. 1856.
TYPE: *Conyza thuyoides* Lam. = *Loricaria thuyoides* (Lam.) Schultz-Bip.

Shrubs or subshrubs, dioecious, stems erect, branched, densely foliaceous, laterally compressed, narrowly rhomboid to subterete in section. **Leaves** alternate, distichous, sessile; blade laterally compressed, coriaceous, often dorsally carinate, strongly imbricate, appressed to stems, the margins entire, involute. **Capitulescences** of solitary heads, axillary or terminal. **Capitula** discoid, homogamous, sessile; involucre campanulate to cylindrical; phyllaries 2–5-seriate, imbricate, subequal; receptacles paleaceous or naked; masculine florets functionally staminate, the corollas tubular, 5-dentate, the anther bases sagittate, caudate, the styles undivided or bifid, the ovary sterile, the pappus bristles uniseriate, the bases fused, the apices clavellate; feminine florets with corollas filiform, 5-fid, the style branches linear, acute, exserted, the ovary fertile, the pappus bristles uniseriate, the bases fused, the apices slender and acute. **Achenes** cylindrical, 4–5-costate,

² For additional synonymy, see Cuatrecasas (1954).

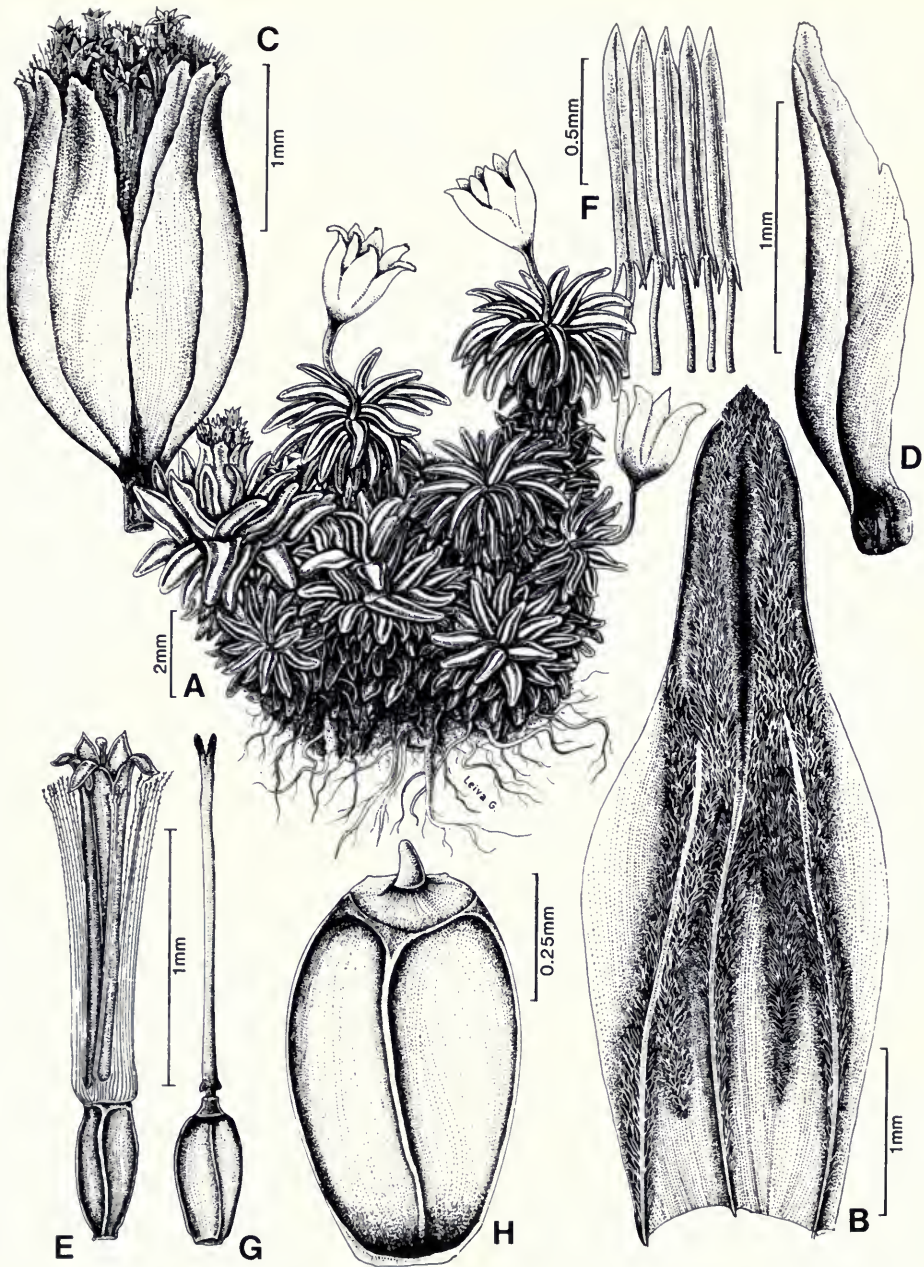


FIG. 12. *Jalcophila peruviana*. A, habit; B, leaf (lower surface); C, capitulum; D, phyllary; E, hermaphroditic floret; F, anthers; G, style and achene of pistillate floret; H, achene. (Drawn from Sagástegui et al. 11131, HUT.)

the surface reticulate, usually glabrous, rarely pubescent with bicellular, capitate-glandular trichomes (e.g., *L. graveolens*).

A genus with approximately 19 species distributed in high-elevation Andean habitats from Co-

lombia to Bolivia. Nine species and one variety are currently recognized from Peru.

Loricaria is distinctive among South American Inuleae in possessing a shrubby habit with laterally compressed, foliaceous stems and densely imbricate, involute, coriaceous leaves. The frequent occurrence of paleaceous receptacles is a character

not found in other Peruvian Inuleae. Cuatrecasas (1954) recognized three sections based primarily upon position of capitula, either terminal or axillary, the presence or absence of receptacular paleae, and achene pubescence.

References

CUATRECASAS, J. 1954. Synopsis der Gattung *Loricaria* Wedd. Feddes Repert. Spec. Nov. Regni Veg., **56**: 149–172.

DILLON, M. O., AND A. SAGÁSTEGUI A. 1986. New species and status changes in Andean Inuleae. *Phytologia*, **59**: 227–233.
 TURNER, B. L., A. M. POWELL, AND J. CUATRECASAS. 1967. Chromosome numbers in Compositae. XI. Peruvian Species. *Ann. Missouri Bot. Gard.*, **54**: 172–177.

Key to Species of *Loricaria*

- 1. Capitulescences of solitary, terminal heads 2
 - 2. Foliaceous stems slightly flattened, 2–2.5 mm wide (including leaves); leaves ovate in lateral view, 2–2.5 mm long, ca. 1 mm wide, apex obtuse *L. leptothamnoides*
 - 2. Foliaceous stems strongly flattened, 4–9 mm wide (including leaves); leaves triangular or linear in lateral view, 4–8 mm long, 1.5–2.5 mm wide, apex acute or subacute 3
 - 3. Leaves triangular or triangular-oblong in lateral view, apices acute 4
 - 4. Foliaceous stems 7–9 mm wide (including leaves); leaves 7–8 mm long, ca. 2 mm wide, vernicose-ferruginous *L. ferruginea*
 - 4. Foliaceous stems 4–5 mm wide (including leaves); leaves 5–8 mm long, 2–2.5 mm wide, olivaceous green *L. lycopodioides*
 - 3. Leaves linear-oblong in lateral view, apices subacute 5
 - 5. Foliaceous stems 5–7 mm wide (including leaves); leaves 5–8 mm long, 2–2.5 mm wide, lustrous, green to yellowish white *L. macbridei*
 - 5. Foliaceous stems 4–5 mm wide (including leaves); leaves 4–7 mm long, ca. 1.5 mm wide, brownish roseate *L. lucida*
- 1. Capitulescences of solitary, axillary heads, or thyriform 6
 - 6. Capitulescences thyriform *L. thyrsoides*
 - 6. Capitulescences of solitary heads, axillary 7
 - 7. Foliaceous stems subterete; leaves with dorsal surfaces tomentose; achenes pubescent with bicellular, capitate-glandular trichomes *L. graveolens*
 - 7. Foliaceous stems flattened; leaves with dorsal surfaces glabrous; achenes glabrous *L. thuyoides*

1. ***Loricaria ferruginea*** (Ruiz & Pavón) Wedd., *Chlor. And.* 1: 166. 1856. **Figure 13.**

Molina ferruginea Ruiz & Pavón, *Syst. Veget.* 211. 1798. TYPE: Peru, "Cordilleras et Punas per Tarmae Cantae et Huarocheri Provincias," *H. Ruiz & J. Pavón 28/10* (holotype, MA, not seen, F neg. 49225; isotype, F).

Shrubs to 80 cm tall, much-branched; stems 7–9 mm wide. **Leaves** triangular in lateral view, 7–8 mm long, ca. 2 mm wide, dorsally carinate, glabrous, vernicose-ferruginous, inner surface lanate. **Capitulescences** of solitary, terminal heads. Masculine **capitula** 6–7 mm high, 4–5 mm wide; involucre campanulate; phyllaries 15–22, ovate-oblong to oblong-linear, 3.5–5 mm long, 1–2 mm

wide, apex obtuse to rounded, glabrous; florets 17–20, the corollas ca. 4 mm long; pappus bristles clavellate, ca. 4 mm long; paleae ca. 6, linear, ca. 5 mm long, scarious, apex obtuse. **Feminine capitula** 6–7 mm high, 2.5–3 mm wide; involucre cylindrical; phyllaries 15–18, ovate-oblong to oblong-linear, 4–6.5 mm long, 1–2 mm wide, apex obtuse, lacerate; florets 12–22, the corollas 4–4.5 mm long; paleae ca. 12, lanceolate-linear, ca. 6 mm long, apex acute, lacerate. **Achenes** 1–1.5 mm long, glabrous; pappus bristles acute, ca. 5 mm long.

Loricaria ferruginea is distributed from central Ecuador to central Peru (3300–4800 m). It is readily distinguished by its vernicose, ferruginous leaves, terminal capitula, and paleaceous receptacles.

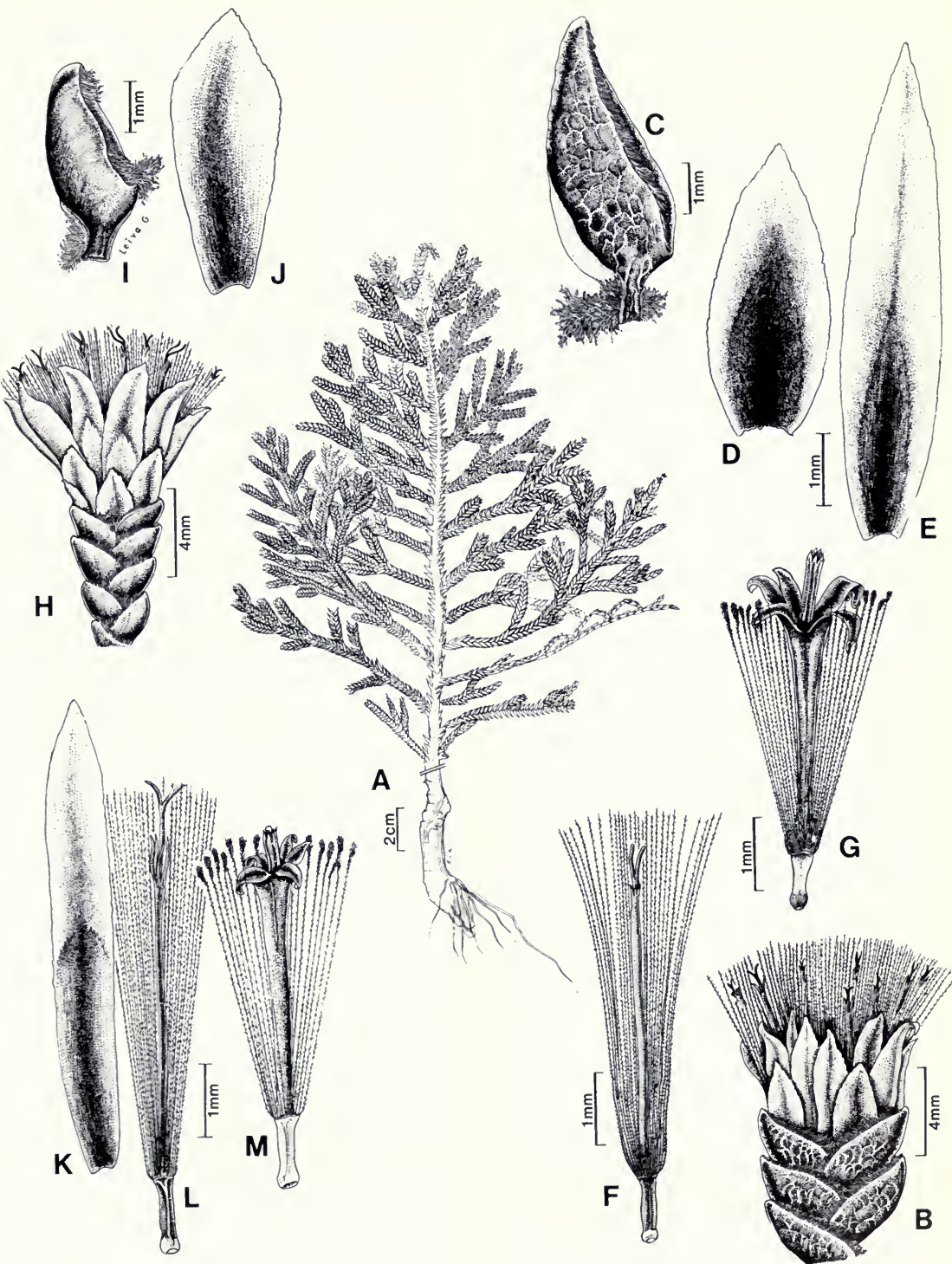


FIG. 13. *Loricaria lucida*. A, habit. (Drawn from Macbride & Featherstone 2171, F). *Loricaria leptothamna*. B, portion of stem with capitulum; C, lateral view of leaf; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, masculine floret. (Drawn from López & Sagástegui 3341, HUT). *Loricaria ferruginea*. H, portion of stem with capitulum; I, lateral view of leaf; J, outer phyllary; K, inner phyllary; L, pistillate floret; M, masculine floret. (Drawn from López 8076, HUT.)

This species is purported to have medicinal properties and is often sold in herb markets. Label data (*Sagástegui & Skillman 12782*) indicate that the "... entire plant is boiled in water and the liquid is then drunk. Used to change a person's character, to make him stronger." In Peru, it is known by the following common names: *chinchango*, *huallpapa-chaquin*, *palmilla blanca*, and *pata de gallo*.

ANCASH. Bolognesi: Cordillera Raura, 4300 m, *Rauh & Hirsch P1813* (NY). **Carhuáz:** Huascarán National Park, Quebrada Uta, 4700 m, *Smith 11324* (F, MO); Quebrada Ishinca, 4400 m, *Smith et al. 9534* (F, MO); Vinoyapampa, Quebrada Honda, 4200 m, *Smith et al. 11600* (F, MO). **Huaráz:** Laguna de Shurup, 3800 m, *Evangelista s.n.* (F, HUT, MO); Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, HUT, MO); Huascarán National Park, Quebrada Laca, 4500 m, *Smith et al. 8994* (F, MO). **Huari:** Huascarán National Park, 3–4 km below Cahuish Tunnel, 4500–4550 m, *Smith & Buddensiek 11120* (F, MO); 2 km from Cahuish Tunnel, 4400 m, *Smith & Goodwin 8746* (F, MO); Quebrada Pucaraju, 3900–4200 m, *Smith et al. 12673* (F, MO); Quebrada Rima Rima, 4200–4440 m, *Smith et al. 12302* (F, MO). **Huaylas:** Huascarán National Park, Parón Valley, E of lake, 4220–4600 m, *Smith 11518* (F, MO); Quebrada Alpamayo, 4600–4750 m, *Smith et al. 9755* (F, MO). **Recuay:** Huascarán National Park, Río Pachacoto drainage, Ojo de Puma spring, 4200 m, *Smith 11433* (F, MO); Quebrada Queshque, 4550–4600 m, *Smith et al. 11893* (F). **Yungay:** Laguna de Llac, 4200 m, *Antenez de Mayolo 321* (F, UC, US, USM); Parque Nacional Huascarán, Porta Chiello, *Bernardi et al. 16539* (F); Laguna Llanganuco, 4200–4800 m, *Gentry et al. 37430* (F, HUT, MO); Huascarán National Park, between Lake Llanganuco and Portachuelo, 4420–4620 m, *Smith 8257* (F, MO); Quebrada Ranincuray, 4000–4300 m, *Smith et al. 9143* (F, MO); Quebrada Demanda, 4800 m, *Smith & Cautivo 10271* (F, MO); Laguna Llanganuco-Portachuelo, 4000–5000 m, *Zardini 1553* (LP, MO). **CAJAMARCA. Cajamarca:** Km 45 Cajamarca-Bambamarca, 3640 m, *Antenez de Mayolo 364* (UC, US); lagunas de la Choclla, 3800 m, *Llatas & Vásquez 870* (F, PRG). **San Miguel:** La Quinua-Calquis (jalca), 3300 m, *Sagástegui et al. 8851* (F, HUT, MO). **LA LIBERTAD. Patáz:** Paso de Alaska, carretera a Tayabamba, 3900 m, *López & Sagástegui 8178* (GH, HUT, MO). **Santiago de Chuco:** Jalca de Quiruvilca, 4000 m, *López 8076* (F, GH, HUT, MO, NY); Pampas de la Julia (Quiruvilca-Huamachuco), 4000 m, *Sagástegui & Fabris 7572* (HUT, MO, NY), *Sagástegui et al. 11116* (HUT, MO). **PASCO. Pasco:** cerca de Huallay (Junín), ca. 4500 m, *Koepcke s.n.* (F, USM). **LAMBA-YEQUE. Ferreñafe:** Incahuasi, *Sagástegui & Skillman 12782* (F, HUT).

2. *Loricaria graveolens* (Schultz-Bip.) Wedd., Chlor. And. 1: 167. 1856.

Baccharis graveolens Schultz-Bip., Bonplandia 4: 51. 1856. TYPE: Peru, Dept. Cuzco, San Antonio, "rupium fissuris Cordiller. summ. pr. S. Anto-

nio," 17,000 ft, 1854, *W. Lechler 1815* (holotype, B, probably destroyed; isotypes, F, G-DEL, not seen, F neg. 28509, NY, P, not seen).

Shrubs to 30–50 cm tall, much-branched; stems subterete, ca. 1.5 cm wide (including leaves). **Leaves** broadly ovate, 5–6 mm long, 3–4 mm wide, dorsally rounded, dorsal surface tomentose, glandular, inner surface lanate. **Capitulescences** of solitary, axillary heads. Masculine **capitula** 4.5–5.5 mm high, 2–3 mm wide; involucre campanulate; phyllaries 12–14, obovate-oblong, 4–4.5 mm long, 1–1.5 mm wide, apex expanded and rounded, lacerate; receptacles epaleaceous; florets 6–14, the corollas 3–4 mm long; pappus bristles clavellate, 4–4.5 mm long. Feminine **capitula** 6–7 mm high, 1.5–2.5 mm wide; involucre cylindrical; phyllaries 13–15, linear, 5–7 mm long, 0.8–1.2 mm wide, apex obtuse or acute, lacerate; receptacles epaleaceous; florets 6–12, the corollas 3.5–4 mm long; pappus bristles acute, ca. 5 mm long. **Achenes** ca. 1 mm long, pubescent with bicellular, capitate-glandular trichomes.

Loricaria graveolens is endemic to Peru, occurring in *jalca* or *puna* formations from La Libertad to Puno (3900–4400 m). It is distinguished by its densely tomentose leaves, strictly axillary capitula, and achenes pubescent with bicellular, capitate-glandular trichomes.

This species is purported to have medicinal properties and is sold in herb markets, as indicated by label data (*Cerrate 2920*). In Peru, it is known by the following common names: *pata de gallo*, *palmita*, *hualcayo*, *tola*, and *quera*.

AREQUIPA. Arequipa: Charchani [Chachani], 16,400 ft, *Douglass 5* (F, GH, NY); *Rauh & Hirsch P544* (NY); Pichupichu, 13,500 ft, *Strafford 689* (F). **Cailloma:** Cailloma, *Schmidt s.n.* (F); Sumbay, *Schmidt s.n.* (F). **CUZCO. Canchis:** La Raya, 4400–4500 m, *Pennell 13517* (F, GH, NY, US). **Espinar:** Yauri, 3900 m, *Vargas 4380* (F). **LA LIBERTAD.** Santiago de Chuco, Quiruvilca, 4100 m, *López 1140* (F, USM). **LIMA. Yauyos:** Huacracocha, a 17 kms de Yauyos, 4350–4400 m, *Cerrate & Tovar 1227* (F, MO, USM). **PUNO. Azángaro:** Checayani [Checayane], 4000 m, *Ellenberg 548* (US). **Melgar:** Orurillo, *Soukup 578* (F, US); Lago Titicaca, *Monheim M45* (NY).

3. *Loricaria leptothamna* (Mattf.) Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 163. 1954. **Figure 13.**

Tafalla leptothamna Mattf., Notizbl. Bot. Gart. Berlin-Dahlem 10: 775. 1929. TYPE: Peru, Dept. La Libertad, Prov. Patáz, entre Tayabamba y Valle

de Mixiollo [Mishollo], afluente izquierda del Hualлага, 3600–3700 m, 2 Aug 1914, *A. Weberbauer 7027* (holotype, B, probably destroyed; isotypes, F, F neg. 49220, GH, F neg. 40754).

Shrubs to 80 cm tall, much-branched; primary stems ca. 1 cm in diameter, the foliaceous stems \pm flattened, 2–2.5 mm wide (including leaves). **Leaves** ovate in lateral view, ca. 2.5 mm long, ca. 1 mm wide, dorsally rounded, dorsal surface glabrous, brownish green, inner surface lanate. **Capitulescences** of solitary, terminal heads. **Masculine capitula** ca. 4 mm high, ca. 3 mm wide; involucre campanulate; phyllaries 12–13, obovate-oblong to oblong, 3–4 mm long, 0.5–1.5 mm wide, apex expanded and rounded, lacerate; receptacles epaleaceous; florets ca. 10, the corollas 2.5–3 mm long; pappus bristles clavellate, 3–3.5 mm long. **Feminine capitula** 5–6 mm high, ca. 3 mm wide; involucre cylindrical; phyllaries ca. 12, elliptic-oblong to oblong-linear, 3.5–5.5 mm long, 1–1.5 mm wide, apex acute, lacerate; receptacles epaleaceous; florets 3–9, the corollas 3.5–4 mm long; pappus bristles acute, ca. 4 mm long. **Achenes** 1–1.5 mm long, glabrous.

Loricaria leptothamna is endemic to Peru and known only from a few collections in Departments of Amazonas, Cuzco, and La Libertad. It has the shortest leaves of any Peruvian species, approached only by those of *L. thuyiodes* var. *microphylla* (Wedd.) Cuatr. and *L. ollgaardii* Dillon & Sagást. of Colombia and Ecuador, respectively. This character, combined with terminal capitula and epaleaceous receptacles, makes *L. leptothamna* a readily distinguishable member of the genus.

A series of collections from between Cajamarca and Hualgayoc superficially match *L. leptothamna*; however, they differ in several characteristics including: (1) leaves more ovate-oblong in lateral view and dorsally convex, and (2) masculine capitula with fewer florets (5 versus 12). Further study may prove these collections worthy of taxonomic recognition at subspecific rank in *L. leptothamna*.

AMAZONAS. Chachapoyas: ca. 30 km SW of Leimebamba on road to Balsas, 3540 m, *Dillon & Turner 1738* (F, HUT, MO, USM); *Jalca de Calla-Calla*, 3650 m, *Sagástegui 7480* (HUT, US); *Sánchez & Ruiz 548* (CPUN, F). **CAJAMARCA. Cajamarca:** La Pajuela (carretera Cajamarca-Hualgayoc), 3500 m, *López et al. 7832* (HUT, MO-2); ruta Cajamarca-Hualgayoc, 3500 m, *Sánchez 776* (CPUN, F). **Celendín:** cumbre Komulca, entre Cajamarca y Celendín, 3800–3850 m, *Ferrerya 13250* (USM). **LA LIBERTAD. Bolívar:** Travesía Laplap, 3600 m, *López*

& *Sagástegui 3341* (GH, HUT, MO, US). **CUZCO. La Convención:** Cordillera Vilcabamba, 3400 m, *Dudley 11185* (F, MO, USM).

4. ***Loricaria lucida*** Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 163. 1954. TYPE: Peru, Dept. Huánuco, Prov. Huánuco, 15 mi NE of Huánuco, about 15,000 ft, 12–22 Jun 1922, *J. F. Macbride & W. Featherstone 2171* (holotype, F, F neg. 40751; isotypes, GH, US). **Figure 13.**

Shrubs 50–80 cm tall, much-branched; stems flattened, 4–5 mm wide (including leaves). **Leaves** linear-oblong in lateral view, 4–7 mm long, ca. 1.5 mm wide, dorsally carinate, apex subacute to obtuse, dorsal surface glabrous, vernicose, reddish brown, inner surface lanate. **Capitulescences** of solitary, terminal heads. **Masculine capitula** 4.5–5 mm high, ca. 3 mm wide; involucre campanulate; phyllaries ca. 13, ovate to ovate-oblong, 3–4.5 mm long, 1.5–2 mm wide, apex obtuse, lacerate; florets 11–13, sterile, the corollas 3.5–4 mm long; pappus bristles clavellate, 3–3.5 mm long; paleae oblong, ca. 4 mm long, scarious, apex obtuse. (Feminine individuals not observed.)

Loricaria lucida is a rare Peruvian endemic known only from the type and one other collection from central Peru. It most closely resembles *L. ferruginea* but differs from that species in having much narrower stems (4–5 mm versus 7–9 mm) and linear-oblong leaves. Feminine individuals were not encountered by Cuatrecasas (1954) or in this study.

JUNÍN. Huancayo: Santo Domingo de Acobamba, 4300 m, *Ochoa 166* (F, USM).

5. ***Loricaria lycopodinea*** Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 164. 1954. TYPE: Peru, Dept. Huánuco, Prov. Dos de Mayo, San Carlos Mines, 6 mi W of Huallanca, ca. 9000 ft, *J. F. Macbride 2471* (holotype, F, F neg. 40750; isotypes, GH, US).

Shrubs to 80 cm tall, much-branched; stems flattened, 4–6 mm wide (including leaves). **Leaves** triangular-oblong in lateral view, 5–8 mm long, 2–2.5 mm wide, dorsally carinate, apex subacute, dorsal surface glabrous, olive-green, inner surface lanate. **Capitulescences** of solitary, terminal heads.

Masculine **capitula** 4–5 mm high, 3–3.5 mm wide; involucre campanulate; phyllaries 15–20, ovate to elliptic or oblong, 3–3.5 mm long, 1.2–2 mm wide, apex obtuse, lacerate; florets 16–22, the corollas 4 mm long; pappus bristles clavellate, ca. 4 mm long; paleae ca. 6, oblong-linear, 4–5 mm long, scarious, apex obtuse. Feminine **capitula** 6–7.5 mm high, ca. 4 mm wide; involucre cylindrical; phyllaries ca. 12, the outer oval to ovate, ca. 4 mm long, ca. 2 mm wide, the inner lanceolate, 6–6.5 mm long, 1–1.5 mm wide, apex acute; receptacles epaleaceous; florets 11–13, the corollas ca. 5 mm long; pappus bristles acute, ca. 5 mm long. **Achenes** ca. 1.3 mm long, glabrous.

Loricaria lycopodinea is a Peruvian endemic known from a few collections from north-central Peru. It most closely resembles *L. ferruginea* but differs in possessing narrower stems.

ANCASH. Yungay: Cordillera Blanca, Llanganuco, *Bathgate 16* (USM). LA LIBERTAD. Huamachuco: road to Huamachuco, 8 km E of Quiruvilca, 4100 m, *Hutchison et al. 6139* (F, GH, MO, NY, UC); El Portachuelo Pass, S of Cerro Huaylillas, 4000 m, *West 8136* (GH, MO, UC). JUNÍN. Yauli: Oroya, *Maisch s.n.* (USM).

6. *Loricaria macbridei* Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 164. 1954. TYPE: Peru, Dept. Junín, Prov. Junín, San José, ca. 13,000 ft, *J. F. Macbride & W. Featherstone 1093* (holotype, F, F neg. 40752; isotypes, GH, US).

Shrubs to 60 cm tall, much-branched; stems flattened, 5–7 mm wide (including leaves). **Leaves** linear-oblong in lateral view, 5–8 mm long, 2–2.5 mm wide, dorsally carinate, apex subacute, curved inward, dorsal surface glabrous, opaque, olive to ochraceous, inner surface densely lanate. **Capitulescences** of solitary, terminal heads. Masculine **capitula** 6–7 mm high, 3–4 mm wide; involucre campanulate; phyllaries 12–14, elliptic to oblong, (4–)5–6 mm long, 1–2 mm wide, apex obtuse, lacerate; florets 10–24, sterile, the corollas ca. 4 mm long; pappus bristles clavellate, ca. 4 mm long. Feminine **capitula** 5–6 mm high, 1.5–2.5 mm wide; involucre cylindrical; phyllaries 13–22, elliptic to oblong-linear, (3–)5–6 mm long, 1–2 mm wide, apex subacute; florets 20–26, the corollas 4–4.5 mm long; pappus bristles acute, ca. 4 mm long; paleae ca. 12, linear, ca. 6 mm long, 0.6–1 mm

wide, apex acute, lacerate. **Achenes** ca. 1.5 mm long, glabrous.

Loricaria macbridei is a Peruvian endemic known from three collections. This is the only species that possesses paleas within the feminine capitula, but lacks them in the masculine capitula.

CUZCO. Paucartambo: Dist. Marcachea, Escalerayoc, 3700–4200 m, *Vargas 11181* (F, UC). NO EXACT LOCALITY. *Soukup s.n.* (F).

7. *Loricaria thuyoides* (Lam.) Schultz-Bip., Bonplandia 8: 258. 1860.

Conyza thuyoides Lam., Encycl. 2: 90. 1786. TYPE: Peru, no exact locality, *J. de Jussieu 42* (holotype, P, not seen, F neg. 37760).

Molina incana Ruiz & Pavón, Syst. Veget. 211. 1794. TYPE: Peru, Dept. Huánuco, Prov. Pachitea, Pozuzo, *H. Ruiz & J. Pavón 28/18* (holotype, MA, not seen; isotype, F).

Shrubs to 1 m tall, much-branched; stems slightly to strongly flattened, 4–10 mm wide (including leaves). **Leaves** linear in lateral view, 5–10 mm long, 1–1.5 mm wide, dorsally carinate, apex subacute to obtuse, dorsal surface glabrous, green to gray-green, inner surface lanate. **Capitulescences** of solitary, axillary heads. Masculine **capitula** 4–5 mm high, 2–2.5 mm wide; involucre campanulate; phyllaries 7–10, oblong to oblanceolate, 3–4 mm long, 1–1.2 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 5 or 12–14, the corollas ca. 3 mm long; pappus bristles clavellate, ca. 3 mm long. Feminine **capitula** 4–5.5 mm high, 1–1.5 mm wide; involucre cylindrical; phyllaries 11–13, oblong, 4–5 mm long, ca. 1 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 5 or 10–12, the corollas 4–4.5 mm long; pappus bristles acute, ca. 5 mm long. **Achenes** 1–1.5 mm long, glabrous.

Loricaria thuyoides is widely distributed from Colombia to Bolivia and in Peru ranges from Amazonas to Cuzco, 3000–4500 m. This species possesses considerable morphological variability, especially in the width of the foliaceous stems and the number of florets per head. Several varieties have been recognized, including *L. thuyoides* var. *thyrsoides* Cuatr., a taxon here treated as a distinct species (Dillon & Sagástegui, 1986). Two morphological varieties are recognized.

Key to Varieties of *Loricaria thuyoides*

1. Foliaceous stems strongly flattened, narrowly rhomboid in section; masculine and feminine capitula with 10–14 florets var. *thuyoides*
1. Foliaceous stems slightly compressed, subterete in section; masculine and feminine capitula with ca. 5 florets var. *stuebelii*

7a. *Loricaria thuyoides* var. *thuyoides*

Foliaceous stems strongly flattened, narrowly rhomboid in section, 4–10 mm wide (including leaves). Leaves 5–10 mm long, 1–1.5 mm wide, apex obtuse to subobtuse. Masculine capitula 4–5 mm high, 2–2.5 mm wide; florets 12–14. Feminine capitula 5–5.5 mm high, 1–1.5 mm wide; florets 10–12. Chromosome number: $n = ca. 14$ (Turner et al., 1967).

Variety *thuyoides* has a wide distribution throughout the Andean Cordillera and is distinctive with its strongly flattened stems and axillary capitula with 10–14 florets.

AMAZONAS. Bagua: Cordillera Colán NE of La Peca, 10,400 ft, *Barbour 3546* (F, MO). **Chachapoyas:** Cerros de Calla-Calla, between Leimebamba-Balsas road pass and the “camino de herradura,” 3500–3750 m, *Wurdack 1189* (F, GH, NY, UC, US); ca. 30 km SW of Leimebamba on road to Balsas, ca. 3540 m, *Dillon & Turner 1738A* (F). **AYACHUCO. Huamanga:** above Sotorabamba, *Weberbauer 5460* (F, GH). **CUZCO. Quispicanchis:** Ampatuni, 4400–4500 m, *Vargas 12157* (US). **Urubamba:** Pumawanca, 3900–4350 m, *Vargas 13701* (US). **LA LIBERTAD. Bolivar:** Nevado de Cajmarquilla, *Ferreya 1291* (F, MO, USM); *Ferreya 1293* (MO, USM). **HUANUCO. Huánuco:** Sariapampa, 3600 m, *Woytkowski 34305* (F, HUT, MO, UC, US, USM). **Prov. Unknown:** Shishmay, ca. 3000 m, *Woytkowski s.n.* (F). **JUNÍN. Yauli:** cerca Tíclio, ferrocarril Lima-La Oroya, *Esposito s.n.* (F, USM). **PASCO. Oxapampa:** Cordillera Yanachaga, 3150–3300 m, *Smith 7701* (F, MO); between Santa Barbara and Lanurachi, 3000 m, *Smith 8196* (F, MO). **SAN MARTÍN. Mariscal Cáceres:** Puerto del Monte, 3500 m, *Young 1799* (F).

7b. *Loricaria thuyoides* var. *stuebelii* (Hieron.) Cuatr.

Loricaria stuebelii Hieron., Bot. Jahrb. Syst. 21: 346. 1896. TYPE: Peru, “prope Pishenuñuna, 3200 m, et prope Calle-Calle, 3400–3600 m, inter Pascasmayo et Moyobamba,” *A. Stuebel 53* (holotype, B, probably destroyed, F neg. 15139).

Foliaceous stems slightly flattened, subterete in section, 5–8 mm wide (including leaves). Leaves 7–10 mm long, ca. 1 mm wide, apex subacute.

Masculine capitula ca. 4 mm high, ca. 2 mm wide; florets ca. 5. Feminine capitula ca. 4 mm high, ca. 1.5 mm wide; florets ca. 5.

Variety *stuebelii* is readily distinguished from the typical variety by possessing heads with only 5 florets. This variety may, upon further study, prove to be worthy of specific status. It most closely resembles *L. pauciflora* Cuatr. of Ecuador, a species with only four (4) female florets per head.

LA LIBERTAD. Bolivar: Las Quínuas, 3350 m, *López & Sagástegui 3345* (HUT, MO). **HUANUCO. Huánuco:** Pachitea, Tambo de Vaca, 13,000 ft, *Macbride 4385* (F, GH, US).

8. *Loricaria thyrsoides* (Cuatr.) Dillon & Sagást., Phytologia 59: 230. 1986.

Loricaria thuyoides var. *thyrsoides* Cuatr., Feddes Rept. Spec. Nov. Regni Veg. 56: 170. 1954. TYPE: Peru, Dept. Lima, Prov. Canta, near Antaicocha, Cerro Colorado, E of Canta, 4000–4100 m, 20 Jun 1925, *F. W. Pennell 14685* (holotype, F; isotypes, GH, NY, US).

Shrubs to 1 m tall, much-branched; primary stems 7–8 cm in diameter, the foliaceous stems flattened, 5–7 mm wide (including leaves). Leaves triangular-oblong in lateral view, 5–7 mm long, 1.5–2 mm wide, dorsally carinate, apex obtuse, dorsal surface glabrous, vernicose, greenish, inner surface lanate. Capitulescences thyriform, terminal and axillary. Masculine capitula 5–7 mm high, 3–4 mm wide; involucre campanulate; phyllaries 20–22, obovate-oblong to oblanceolate, 4.5–5.5 mm long, 1–2 mm wide, apex rounded, lacerate; receptacles epaleaceous; florets 16–20, the corollas 4–4.5 mm long; pappus bristles clavellate, 4.5 mm long. Feminine capitula 7–8 mm high, 2–3 mm wide; involucre cylindrical; phyllaries 17–21, oblong to oblong-linear, 4–5.5 mm long, 1–1.5 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 12–15, the corollas ca. 4 mm long; pappus bristles acute, ca. 5 mm long. Achenes 1–1.5 mm long, glabrous.

Loricaria thyrsoides is distributed from central to southern Peru. The thyrsoid capitulescences of this species are unique for the genus and quite unlike those of all other members. In the Department of Lima, it is known by the common name of *matara*.

CUZCO. Quispicanchis: Marcapata, 10,000 ft, *Staford 988* (F). **JUNÍN. Yauli:** Tucto, cerca a Morococha, 4800–4900 m, *Weberling 5907* (USM). **LIMA. Canta:** cerca Canta, *Sánchez 043* (F, USM). **Huarochirí:** Dist. San Mateo, Río Blanco, ca. 15,000 ft, *Macbride 2985* (F, GH); *Saunders 388* (GH, NY). **Prov. Unknown:** Auquimarca, 5000 m, *Geraldo 3274* (F).

XIII. *Lucilia*

Lucilia Cass., Bull. Soc. Philom. Paris 1817: 32. 1817. TYPE: *Serratula acutifolia* Poir. = *Lucilia acutifolia* (Poir.) Cass.

Perennial herbs, erect or ascending, less often caespitose, generally lanate or tomentose. Leaves alternate and imbricate or rosulate, the margins entire. Capitulescences glomerulate, few-headed or of solitary, terminal heads. Capitula disciform; involucre cylindrical to ovoid; phyllaries 4–6-seriate, imbricate, scarious, hyaline at margins, the inner gradually longer; receptacle plane, naked; pistillate florets 10–155, multiseriate, the corollas filiform; hermaphroditic florets 3–23, the corollas narrowly tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the style branches rounded, dorsal surfaces puberulent. Achenes obovoid to turbinate, sericeo-pubescent; pappus bristles scabrid, barbellate, the bases fused, deciduous together as a unit. Chromosome number: $n = 14$ (Freire, 1986b).

Key to Species of *Lucilia*

1. Leaves spatulate, plane to falcate, 10–20 mm long, 1–2 mm wide *L. kunthiana*
 1. Leaves linear, pleated or canaliculate, 5–15 mm long, 0.8–1 mm wide *L. conoidea*

1. *Lucilia conoidea* Wedd., Chlor. And. 1: 154. 1856. TYPE: Peru, Dept. Cuzco, “cordilleres du departement de Cuzco,” *C. Gay s.n.* (holotype, P, not seen, fragment, F). Figure 14, A–G.

Cespitose, perennial herbs; stems much-

A genus of perhaps 12 species distributed throughout South America, but with a center of diversity in Argentina, southeast Brazil, Uruguay and Paraguay; two are known from Peru.

There has been considerable difference of opinion as to the generic limits between *Lucilia* and *Belloa* (see discussion under *Belloa*). The gross appearance of some members of each genus is quite similar and especially those which occupy high-elevation Andean habitats. Cassini’s original description of *Lucilia* described sericeous achenes; however, Freire (1986, 1987) expanded the genus and transferred several species possessing achenes with biseriate, multicellular, glandular trichomes to the genus. Sagástegui and Dillon (1985) removed from *Lucilia* all members with glandular achenes (e.g., *L. longifolia*) and placed them in *Belloa*. In the present treatment, only those taxa with consistently sericeous achenes are included in *Lucilia*.

The monotypic genus *Novenia* was established by Freire (1986a) to accommodate one species previously placed in *Lucilia* as *L. tunariense* (Kuntze) K. Schumann (= *N. acaulis*).

References

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 FREIRE, S. E. 1986a. *Novenia*: Nuevo género de Inuleae (Compositae). Bol. Soc. Argent. Bot., 24: 295–304.
 ———. 1986b. Números cromosómicos en el género *Lucilia* (Compositae, Inuleae). Bol. Soc. Argent. Bot., 24: 411–413.
 ———. 1986c. Revisión del género *Lucilia* (Compositae, Inuleae). Darwiniana, 27: 431–490.
 SAGÁSTEGUI-ALVA, A., AND M. O. DILLON. 1985. New species and combinations in *Belloa* (Inuleae-Asteraceae). Phytologia, 58: 392–400.
 ZARDINI, E. 1987. A new combination in *Lucilia* (Compositae-Inuleae). Ann. Missouri Bot. Gard., 74: 431.

branched, decumbent. Leaves imbricate, sessile; blade linear to spatulate, 5–15 mm long, 0.8–1 mm wide, marcescent, the base slightly expanded and clasping stem, pleated or canaliculate, apex obtuse, mucronate, lower surface arachnoid-tomentose, glabrescent, upper surface densely silvery-tomentose. Capitulescences of solitary heads, terminal.

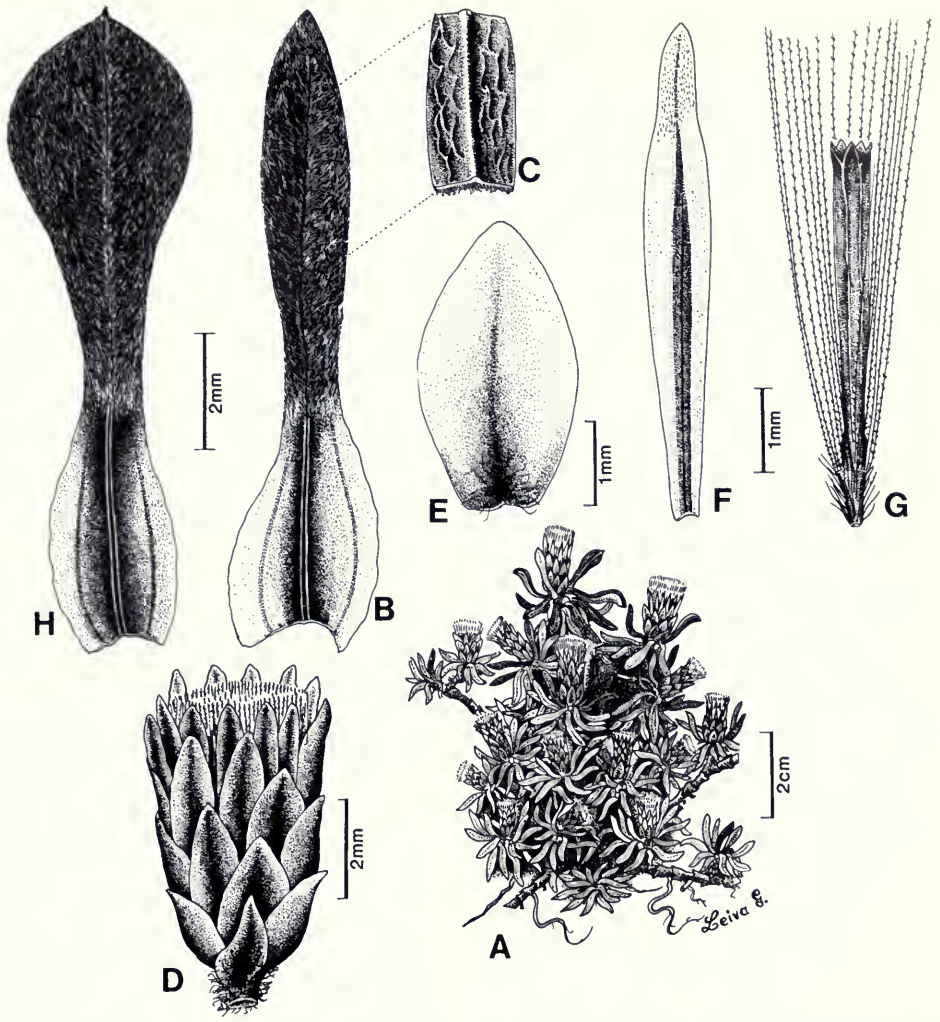


FIG. 14. *Lucilia conoidea*. A, habit; B, leaf, upper surface; C, leaf enlargement, lower surface; D, capitulum; E, outer phyllary; F, inner phyllary; G, hermaphroditic floret. (Drawn from Dillon et al. 1082, HUT). *Lucilia kunthiana*. H, leaf, lower surface. (Drawn from Dillon & Turner 1392, HUT.)

Capitula 7–8 mm high, ca. 4 mm wide; phyllaries 35–40, 5-seriate, the outer ovate, 3–4 mm long, 1.5–2 mm wide, concave, dorsally lanuginous, apex obtuse, the inner linear, ca. 6 mm long, 0.8–1 mm wide; pistillate florets 40–50, the corolla 4–5 mm long; hermaphroditic florets 5–6, the corollas 4–5 mm long. **Achenes** obovoid, ca. 1 mm long, pilose, brown; pappus bristles ca. 6 mm long.

Lucilia conoidea is known from three collections in southern Peru and northern Bolivia. It approaches *L. kunthiana* in general appearance but is distinctive in having leaves that are pubescent on the upper surface and glabrescent below, the reverse of the usual condition in *Lucilia*. Although

Lucilia conoidea was reduced to synonymy of *L. kunthiana* (as *L. pusilla*) by Freire (1986b), it is here accepted as distinct and readily recognizable.

PUNO. Carabaya: ca. 20 km SE of Macusani, ca. 4500 m, Dillon et al. 1082 (F, HUT, LP, MO, NY, USM); Lago Titicaca, 4000 m, Monheim M157 (NY).

2. *Lucilia kunthiana* (DC.) Zardini, Ann. Missouri Bot. Gard. 74: 431. 1987. **Figure 14, H.**

Conyza kunthiana DC., Prodr. 5: 379. 1836. (nomen novum for *Conyza pusilla* Kunth).

Gnaphalium kunthianum (DC.) Kuntze, Revis. Gen. Pl., 3: 152. 1898.

Lucilia pusilla (Kunth) Hieron., Bot. Jahrb. Syst., 29: 29. 1900.

Conyza pusilla Kunth, Nov. Gen. Sp. (fol.) 4: 54. 1820. TYPE: Ecuador, Prov. Pichincha, "crescit regione alpina Regni Quitensis," *A. Humboldt & A. Bonpland s.n.* (holotype, P, not seen, IDC Microfiche 6209. 95: II. 3, F neg. 37649). Non Houttuyn (1779).

Lucilia lehmannii Hieron., Bot. Jahrb. Syst. 19: 51. 1895. TYPE: Ecuador, Prov. Azuay, Páramo del Cajas, 3600–4200 m, *F. C. Lehmann 4649* (holotype, B, probably destroyed, F neg. 15126).

Cespitose perennial herbs; stems much-branched, decumbent, densely foliaceous. Leaves imbricate, sessile; blade linear-spatulate to spatulate, 10–20 mm long, 1–2 mm wide, plane to falcate, marcescent, the base attenuate and clasping stem, apex rounded, both surfaces tomentose. Capitulescences of solitary heads, terminal. Capitula 7–8 mm high, ca. 5 mm wide; phyllaries ca. 35, 5–6-seriate, brownish black to stramineous, the outer ovate, ca. 3 mm long, ca. 2 mm wide, concave, dorsally glabrescent, apex obtuse, the inner linear, 7–8 mm wide, ca. 1 mm wide, glabrous, apex acute; pistillate florets ca. 50, the corolla filiform, 5–6 mm long; hermaphroditic florets ca. 8, the corolla narrowly tubular, 4–5 mm long. Achenes obovoid, ca. 1 mm long, pilose, brown; pappus bristles 6–7 mm long.

Lucilia kunthiana is distributed throughout high-elevation Andean habitats from Ecuador to Bolivia, 3000–4800 m. In Peru, it has a wide range and is a relatively common element in *jalca* and *puna* formations, 3000–4600 m.

ANCASH. Bolognesi: Quebrada Cancha-cancha, cerca a Colca, 14,300 ft, *Roberts 69* (USM). Carhuáz: Huascarán National Park, Quebrada Honda, between Vinoyapampa and Portachuelo Honda, 4200–4400 m, *Smith et al. 11669* (F, MO). Huari: Huascarán National Park, Quebrada Pucaraju, 3900–4200 m, *Smith et al. 12681*. Huaylas: Huascarán National Park, Parón Valley, E of lake, 4200 m, *Smith 11483* (F, MO). Recuay: Huascarán National Park, Río Pachacoto drainage, moraine below Nevado Pasto Ruri, 4700 m, *Smith 11426* (F, MO). APURÍMAC. No Exact Locality: *Rauh & Hirsch P1426* (NY p.p.). AYACUCHO. Parinacochas: 57 km W of Cotaruse, ca. 111 km E of Puquio, 4100 m, *Gentry et al. 23300* (F, MO, USM). CAJAMARCA. Cajabamba: Cajabamba-Luchubamba, 3800 m, *Sagástegui et al. 11163* (F, HUT, MO). CUZCO. Cuzco: Cordillera Verónica (Vilcanota), 4100 m, *Rauh & Hirsch P999* (NY). Quispicanchis: Laramarca, 3800 m, *Rauh & Hirsch P1222* (NY); Auzan-gate, 4600 m, *Rauh & Hirsch P1259* (NY p.p.). Urubamba:

Machupicchu, 4430 m, *Peyton & Peyton 102* (MO); Ollantaytambo, 4285 m, *Peyton & Peyton 1136* (F, MO). HUANCAVELICA. Huancavelica: San José de Acobambilla, 4000 m, *Cerrate & Marshall 3811* (USM). HUÁNUCO. Huánuco: 6 mi S of Mito, 10,500 ft, *Macbride & Featherstone 1861* (F). JUNÍN. Jauja: Mt. La Juntay, near Huancayo, ca. 4700 m, *Killip & Smith 22109* (F, NY). Junín: ca. 6 km N of La Cima, ca. 56 km N of La Oroya, 10 km S of Junín, 4100 m, *Dillon & Turner 1392* (F, HUT, MO, TEX, USM); Atocsayco, 4166 m, *Johns 81–85* (F, MICH, USM). Yauli: Km 125 E of Casapalca, 14,250 ft, *Davidson & Jones 9005* (US); ca. 17 km E of La Oroya on road to Tarma, 3900–4000 m, *Dillon & Turner 1466* (F, MO, USM); 15 km SSW of La Oroya, 3850 m, *Iltis & Ugent 9* (UC, US); Laguna Pomacocha, 4200 m, *Ochoa 606* (GH); near Atocsayco, ca. 4200 m, *Pearsall 888* (F). PASCO. Pasco: Cerro de Pasco, ca. 14,000 ft, *Macbride & Featherstone 2400* (F). PUNO. Melgar: between Santa Rosa and Ayaviri, ca. 3500 m, *Dillon et al. 1069* (F, LP, USM); Chuquibambilla, 3900–4000 m, *Pennell 13371* (F). Puno: Cerros de Puno, 3000–3900 m, *Tovar s.n.* (USM). NO EXACT LOCALITY. *Ellenberg 626* (USM), *Soukup 3779* (F).

XIV. Mniodes

Mniodes A. Gray ex Benth. & Hook., Gen. Pl. 2: 301. 1876. TYPE: *Mniodes andina* (A. Gray) A. Gray ex J. D. Hook. & A. B. Jackson.

Antennaria Gaertn. sect. *Mniodes* A. Gray, Proc. Amer. Acad. Arts 5: 138. 1861.

Subshrubs or perennial herbs, suffrutescent, cespitose, cushion-shaped, dioecious; stems much-branched, often tightly compacted. Leaves densely imbricate, appressed to stems, sessile; blade 2–5 mm long, both surfaces tomentose to villose, often glabrescent, the margins entire. Capitulescences of solitary heads, terminal or subterminal. Capitula discoid, homogamous, sessile; involucre cylindrical; phyllaries multiseriate, imbricate, subequal, scarious, stramineous, rarely with white petaloid apex; receptacles naked; masculine florets with the corollas tubular, apically dilated, 5-fid, the anthers sagittate, caudate, the style branches obtuse, the ovary sterile, the pappus bristles uniseriate, clavellate, rarely slender and acute; feminine florets with the corollas filiform, 5-fid or truncate, the style branches linear-oblong, dorsally pubescent, apex subobtuse, the ovary fertile, the pappus bristles uniseriate, apex slender and acute. Achenes fusiform to ovoid, 4-angled, brown, usually pubescent with biseriate, multicellular, capitate-glandular trichomes or glabrous.

Mniodes is a distinctive genus of 4 species known only from the Peruvian and adjacent Chilean Andes (2730–4900 m).

Reference

CUATRECASAS, J. 1954. El género *Mniodes*. *Folia Biol. Andina*, 1: 1–7.

Key to Species of *Mniodes*

1. Leaves obtrullate or fan-shaped, 4–5 mm long, 3–5 mm wide, 3-nerved; capitulescences subterminal, axillary *M. pulvinulata*
1. Leaves oblong to obovate or obovoid, 3–4 mm long, (1–)1.5–3 mm wide, 1-nerved; capitulescences terminal 2
2. Leaves oblong to subobovate, 1–1.2(–1.7) mm wide, apex truncate to rounded; achenes glabrous *M. andina*
2. Leaves obovate to obovoid, 1.2–2 mm wide, apex subacute to rounded; achenes glabrous or glandular 3
3. Leaves obovate-oblong, apex subacute, often briefly mucronate; achenes glandular *M. aretioides*
3. Leaves ovoid to elliptic, apex obtuse to rounded; achenes glabrous *M. coarctata*

1. ***Mniodes andina*** (A. Gray) A. Gray ex J. D. Hook. & A. B. Jackson, *Ind. Kew.* 2: 250. 1893. **Figure 15.**

Antennaria andina A. Gray, *Proc. Amer. Acad. Arts* 5: 138. 1861. TYPE: Peru, Dept. Junín, Prov. Yauli, Alpamarca, *Wilkes s.n.* (holotype, GH; isotypes, MO, NY, US).

Suffrutescent **subshrub**, pulvinate-cespitose; stems foliaceous, cylindrical, 3–5 mm in diameter (including leaves). **Leaves** with blades oblong to subobovate, 3–4 mm long, 1.0–1.2(–1.7) mm wide, 1-nerved, apex rounded or rarely truncate, both surfaces incano-villous. **Capitulescences** of solitary heads, terminal. Masculine **capitula** 3–3.5 mm high, ca. 1.5 mm wide; phyllaries 7–8, oblong-linear, 3.2–3.5 mm long, 0.6–0.8 mm wide, subequal, apex obtuse, lacerate; florets ca. 7, the corollas ca. 2.5 mm long; pappus bristles ca. 3 mm long, clavellate. Feminine **capitula** ca. 4 mm high, ca. 1.5 mm wide; phyllaries 8–10, oblong-linear, 3–3.5 mm long, 0.8–1 mm wide, subequal, apex obtuse, lacerate; florets 10–14, the corollas 1.8–2.3 mm long; pappus bristles 2.5–3 mm long, acute. **Achenes** ca. 1.6 mm long, glabrous.

Mniodes andina is distributed from central to southern Peru. It most closely resembles *M. coarctata*, but differs from that species in having leaves widest at the apex. This species forms large rounded cushions of stems that are easily separated.

ANCASH. Bolognesi: Dist. Ticllos, paso de Chonta, 4400 m, *Cerrate 2658* (USM); Cushish, punta entre Chi-

quán y la Pampa de Lampas, 4300 m, *Cerrate 2713* (USM). **Carhuáz:** Huascarán National Park, Quebrada Ishinca, 4700–4930 m, *Smith & Buddensiek 11207* (F, MO). **Recuay:** Huascarán National Park, Quebrada Quenua Ragra, 4600–4700, *Smith et al. 10659* (F, MO). **Yungay:** Cordillera Blanca, Llanganuco Valley, 16,000–16,500 ft, *Bathgate 11* (F, USM); Huascarán National Park, Llanganuco sector, Quebrada Demanda, 4750–4900 m, *Smith & Cautivo 10296* (F, MO, USM); Pisco Creek, Llanganuco Valley, *Tothil 162* (UC). **AREQUIPA. Cailloma:** San Ignacio above Cailloma, 4500 m, *Schmidt s.n.* (F). **JUNÍN. Huancayo:** Cordillera Huaytapallana, 4800 m, *Rauh & Hirsch P1781* (NY). **Yauli:** Anticona Pass, 4800–4900 m, *Dillon & Turner 1479* (F, USM); Morococho, *Isern 2201* (F). **NO EXACT LOCALITY.** *Ellenberg 2181* (USM).

2. ***Mniodes aretioides*** (Schultz-Bip.) Cuatr., *Folia Biol. Andina*, 1: 3. 1954. **Figure 15.**

Baccharis aretioides Schultz-Bip., *Bonplandia* 4: 51. 1856. TYPE: Peru, Dept. Puno, Prov. Carabaya, Agapata [Ayapata], *W. Lechler 1823* (holotype, v, probably destroyed; isotypes, F, GH, G-DEL, not seen, F neg. 28502, fragment, F).

Merope aretioides (Schultz-Bip.) Wedd., *Chlor. And.* 1: 164. 1856.

Antennaria aretioides (Schultz-Bip.) A. Gray, *Proc. Amer. Acad. Arts* 5: 139. 1861.

Suffrutescent **subshrubs**, pulvinate-cespitose; stems foliaceous, cylindrical, 2–3 cm long, 3–4 mm in diameter (including leaves). **Leaves** with blades obovate to oblong, ca. 3 mm long, 1.2–2 mm wide, 1-nerved, base cuneate, apex truncate to subacute, both surfaces incano-villous, the abaxial surface

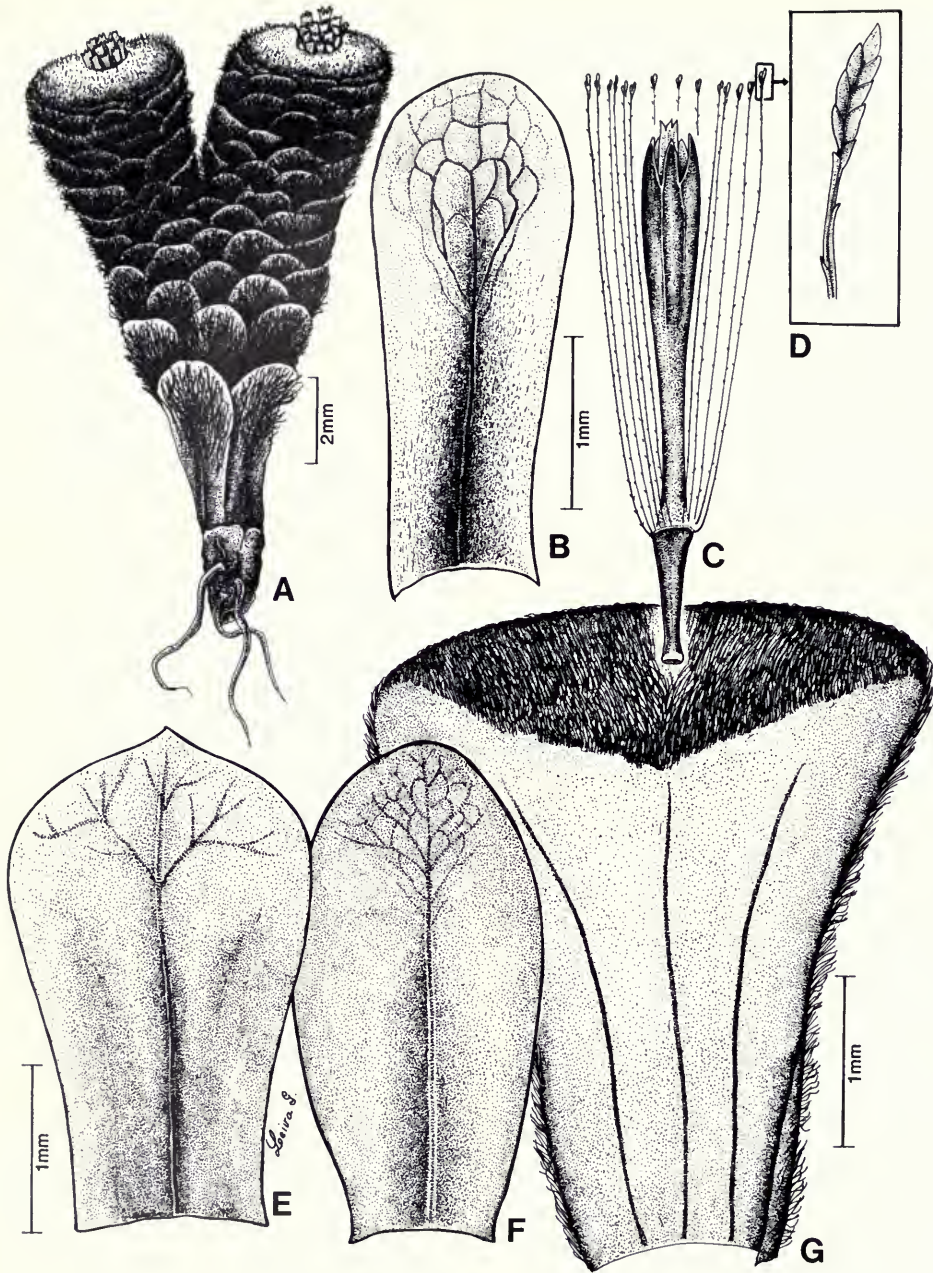


FIG. 15. *Mniodes andina*. A, habit; B, leaf with pubescence removed; C, masculine floret; D, enlargement of pappus apex, (drawn from Ellenberg 2181, USM); E, leaf of *M. aretioides* with pubescence removed; F, leaf of *M. coarctata* with pubescence removed; G, leaf of *M. pulvinulata*.

rapidly glabrescent. Capitulescences of solitary heads, terminal. Masculine capitula 3–3.5 mm high, 1–1.2 mm wide; phyllaries 8–12, oblong-linear, 3–3.5 mm long, 0.5–0.8 mm wide, subequal, apex obtuse, lacerate; florets ca. 3, the corollas ca. 2.5 mm long; pappus bristles ca. 2.5 mm

long, apex slightly dilated, acute. Feminine capitula ca. 3.5 mm high, ca. 1.5 mm wide; phyllaries 8–12, oblong-linear, 2.5–3 mm long, 0.5–1 mm wide, subequal, apex obtuse, lacerate; florets 3–5, the corollas 1.5 mm long; pappus bristles ca. 2 mm long, acute. Achenes ca. 1 mm long, glandular.

Mniodes aretioides appears to have a narrow distribution at very high elevations (ca. 4500 m) in southern Peru. It is characterized by its narrow, readily separable, cylindrical stems that are leafy for their entire length. *Mniodes aretioides* most closely resembles *M. andina* but it is readily distinguished by its glandular achenes. It is also distinguished from both *M. andina* and *M. coarctata* by its acute, slightly dilated pappus tips of the male florets.

CUZCO. Quispicanchis: Auzangate, 4500 m, *Rauh & Hirsch P1142* (NY). **PUNO. Carabaya:** ca. 20 km SE of Macusani, ca. 4500 m, *Dillon et al. 1083* (F, HUT, K, MO, NY, USM).

3. *Mniodes coarctata* Cuatr., Folia Biol. Andina 1: 4. 1954. TYPE: Peru, Dept. Arequipa, Prov. Arequipa, 52 mi ENE of Arequipa, 15,000 ft, 18 Apr 1952, *C. B. Koford P. 25* (holotype, UC; isotype, F). **Figure 15.**

Suffruticose perennial **herbs**, pulvinate-cespitate; stems foliaceous, cylindrically compressed, 2–3 cm long, 3–5 mm in diameter (including leaves). **Leaves** with blades ovate to elliptic, 3–3.5 mm long, ca. 2 mm wide, 1-nerved, apex obtuse to rounded, both surfaces densely villous. **Capitulescences** of solitary heads, terminal. Masculine **capitula** 3–3.5 mm high, 1–1.5 mm wide; phyllaries 7–8, oblong, 3–3.2 mm long, 0.3–1 mm wide, apex obtuse, lacerate; florets ca. 8, the corollas ca. 2.8 mm long; pappus bristles ca. 3 mm long, clavellate. Feminine **capitula** ca. 3 mm high, ca. 1.5 mm wide, sessile; phyllaries 7–8, oblong, ca. 2.5 mm long, ca. 0.5–0.9 mm wide, apex obtuse to rounded; florets ca. 9, the corollas ca. 1.8 mm long; pappus bristles ca. 2 mm long, acute. **Achenes** ca. 1 mm long, glabrous.

Mniodes coarctata is only known from a few collections from central and southern Peru. While it has been reported from northern Chile, no material from that region has been seen. It most closely resembles *M. aretioides* in general habit but is distinguished from that species by its ovate to elliptic leaves with rounded to obtuse apices.

AREQUIPA. Arequipa: Paso del Condor, 4693 m, *Illis & Ugent 1486* (GH, MO, NY, UC, USM); Volcán Pichupichu, 4500 m, *Rauh & Hirsch P622* (NY). **La Unión:** Cordillerana Río Armas, 4300–4500 m, *Vargas 19547* (UC). **AYACHUCO. Parinachocas:** Negro Mayo, Km 75–80, *Illis & Ugent 504* (GH, MO). **LIMA. Huarochiri:** Caprichosa, above Casapalca, 4750 m, *Amstutz 114* (MO).

4. *Mniodes pulvinulata* Cuatr., Folia Biol. Andina 1: 5. 1954. TYPE: Peru, Dept. Huánuco, Rumichaca, estación 8 millas SW de Chasqui, 11,500 ft, 28 Sep 1922, *J. F. Macbride & W. Featherstone 2460* (holotype, F, F neg. 49244; isotype, US). **Figure 15.**

Mniodes ferreyrae Cuatr., Folia Biol. Andina 1: 6. 1954. TYPE: Peru, Dept. Ancash, Prov. Bolognesi, Conococha, 4000 m, 8 Aug 1949, *R. Ferreyra 6231* (holotype, US; isotype, USM).

Suffruticose **herbs**, pulvinate-cespitate; stems 4–8 cm long, 4–6 mm in diameter (including leaves). **Leaves** with blades widely obtrullate or fan-shaped, 3.5–4 mm long, (3–)3.5–4 mm wide, 3-nerved, base encircling the stems ca. half the circumference, apex rounded to truncate, both surfaces densely villous distally. **Capitulescences** of solitary heads, subterminal. Masculine **capitula** 5–6 mm high, 2–2.5 mm wide; phyllaries ca. 14, oblong, 3–3.5 mm long, 1–2 mm wide, subequal, scarious, apex obtuse, revolute, petaloid, white; florets 10–12, the corollas 3–3.5 mm long; pappus bristles ca. 4 mm long, clavellate. Feminine **capitula** 6–7 mm high, 1.5–2.5 mm wide; phyllaries 14–20, oblong, 4–6 mm long, 1–2 mm wide, subequal, apex obtuse, revolute, petaloid, white; florets 12–14, the corollas 4 mm long; pappus bristles ca. 5 mm long, acute. **Achenes** ca. 1.5 mm long, densely glandular.

Mniodes pulvinulata is widely distributed throughout puna habitats from northern to southern Peru. It is characterized by its 3-nerved, wide obtrullate or fan-shaped leaves encircling the stems for nearly half the circumference.

Cuatrecasas (1954) described *M. ferreyrae* as distinct from *M. pulvinulata* and stated that it had slightly narrower leaves that were less densely imbricate. After intensive study of considerable additional material, the present authors can find no basis to maintain this species. It appears that slight variations in leaf size and degree of compactness are under environmental control and a full range of leaf sizes and orientations is present in an individual gathering (*Sagástegui & Dillon 12342*) collected from the type locality.

ANCASH. Bolognesi: Cordillera Raura, 4900 m, *Rauh & Hirsch P1899* (NY). **Carhuáz:** Cordillera Blanca, above Vicos on trail to Llacshacocho, at Carhua Catac, 4000 m, *Hutchison & Wright 4401* (F, NY, UC); Huascarán National Park, Quebrada Ishinca, 4730–4930 m, *Smith et al. 9456* (F, MO, USM), *Smith & Buddensiek 11210* (F, MO). **Huaylas:** Huascarán National Park, Quebrada Santa Cruz,

4300–4800 m, *Smith et al. 9313* (F, MO, USM). **Recuay:** Conocochoa, 4100 m, *Sagástegui & Dillon 12342* (F, HUT); Huascarán National Park, Quebrada Queshque, 4550–4600 m, *Smith et al. 11884* (F, MO, USM), *11858* (F, MO, USM). **CAJAMARCA.** **Cajabamba:** Cajabamba-Luchubamba, 3800 m, *Sagástegui et al. 11154* (F, HUT, K, MO, US). **Cajamarca:** desvío al Arboretum Negritos, Km 35 de la carretera Cajamarca-Hualgayoc, 4050 m, *Sánchez et al. 2558* (CPUN, F). **Celendín:** Pumarrume, 2730 m, *Mostacero et al. 1098* (HUT). **Otusco:** Julcán, 3000 m, *sin coll.* (HUT #16935). **PUNO.** **Huancané:** Miajachi, 3900 m, *Aguilar s.n.* (F, USM). **LA LIBERTAD.** **Huamachuco:** ca. 25 km E of Quirivilca, 13,600 ft, *Duncan et al. 2643* (F, MO, UC); Jalca de Huaguil, 3950 m, *López 2731* (HUT), *1424* (USM); Pallar-Huaguil, carretera a Tayabamba, 3300 m, *López & Sagástegui 8139* (GH, HUT, MO). **Santiago de Chuco:** Huillilas N of Cachicadán, 4000 m, *Stork & Horton 10002* (F). **LIMA.** **Canta:** La Viuda, arriba de Culhuay, 4250 m, *Meza 200* (F, MO, USM).

XV. *Novenia*

***Novenia* Freire, Bol. Soc. Argent. Bot. 24: 296. 1986. TYPE: *Gnaphalium tunariense* Kuntze = *Novenia acaulis* (Benth.) Freire & Hellwig.**

Acaulescent, cespitose, perennial **herbs**. **Leaves** densely rosulate, sessile; blade narrowly linear, coriaceous, canaliculate, the base slightly expanded and densely villous, apex attenuate, mucronate, both surfaces glabrous distally. **Capitulescences** of 1–4 heads, glomerulate and sessile in the central rosette, rarely of a solitary head. **Capitula** disciform, heterogamous; phyllaries subequal, ca. 4-seriate, stramineous, scarious, glabrous, indurate; pistillate florets 3–9, the corolla filiform, briefly ligulate; hermaphroditic florets 3–6, the corollas narrowly tubular, 5-lobed. **Achenes** obovoid to oblong, sericeo-pubescent, brownish; pappus bristles uniseriate, the bases fused.

A monotypic genus distributed in high-elevation habitats of Peru, Bolivia, and extreme northwestern Argentina. Freire (1986a) established *Novenia* as distinct from *Lucilia* on the basis of differences in habit, foliar trichomes, and chromosome number. In fact, the characteristic $n = 9$ chromosome number was considered to be of such significance that she named the genus for the number nine and placed the genus within Merxmuller's broad "*Lucilia* group." The relationships of this genus are not clear but it is noteworthy that Anderberg (1989) has questioned its position even within his Gnaphalieae. We accept this genus within the Gnaphaliinae and would look to the

Brazilian genus *Chionolaena* for possible generic relationships.

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1. ***Novenia acaulis* (Wedd. ex Benth.) Freire & Hellwig, *Taxon*, 39: 125. 1990. **Figure 16.****

- Dolichogyne acaulis* Wedd. ex Benth., *Gen. Pl.* 2: 258. 1873. TYPE: Bolivia, "Prov. a Larecaja, vicinias Sorata," *Mandon 221* (BM, lectotype, not seen).
- Lepidophyllum acaule* (Wedd. ex Benth.) Benth. & Hook. ex J. D. Hook. & A. B. Jackson, *Ind. Kew* 3: 58. 1894.
- Gnaphalium tunariense* Kuntze, *Revis. Gen. Pl.* 3: 155. 1898. TYPE: Bolivia, Dept. Cochabamba, Tunarigebirge, 4000–5000 m, Apr–May 1892 "besonders auf Torfmooren häufig," *O. Kuntze s.n.* (NY, holotype, not seen).
- Lucilia tunariensis* (Kuntze) K. Schumann, *Just. Bot. Jahresber.* 28: 378. 1898.
- Mniodes tunariensis* (Kuntze) Hieron. ex Weberbauer, *El Mundo Vegetal de los Andes Peruanos* 731: 1945.
- Novenia tunariensis* (Kuntze) Freire, *Bol. Soc. Argent. Bot.* 24: 295. 1986.

Acaulescent **herbs**, 1.5–4 cm in diameter, forming cushions. **Leaves** with blades 1.5–2.5 cm long, 0.8–1 mm wide. **Capitula** 9–10 mm high, 4–5 mm wide; phyllaries ca. 18, the outer ovate to lanceolate, 5–6 mm long, 1.5–2 mm wide, apex attenuate, the inner linear, 6–7(–10) mm long, 0.8–1.1 mm wide, apex acute; marginal florets (3)–7–8(–9), the corolla ca. 3.5 mm long; hermaphroditic florets 3–4(–6), the corollas ca. 4 mm long. **Achenes** ca. 3 mm long; pappus bristles 4–5 mm long. Chromosome number: $n = 9$ (Freire, 1986b).

Novenia acaulis is distributed from northern Peru to Bolivia and into extreme northwestern Argentina, 3100–4600 m. Its acaulescent habit and densely rosulate, apiculate, coriaceous leaves are distinctive within the Peruvian Inuleae.



FIG. 16. *Novenia acaulis*. A, habit; B, leaf; C, capitulum; D, outer phyllary; E, center phyllary; F, inner phyllary; G, pistillate floret; H, hermaphroditic floret; I, enlargement of corolla lobes and style branches of hermaphroditic floret; J, achene. (Drawn from López & Sagástegui 8243, HUT.)

ANCASH. Carhuáz: Cordillera Blanca, above Viscos [Viscas] on trail to Llaschacocho, at Carhua Catac, 4000 m, Hutchison & Wright 4398 (UC). Huari: Huascarán National Park, 1 km below Manto Mina, 4300 m, Smith

& Buddensiek 11012 (F, MO). Recuay: Quebrada Huanca, 3950 m, Smith & Buddensiek 10971 (F, MO); Quebrada Queshque, 4550–4600 m, Smith et al. 11887 (F). CA-JAMARCA. Contumazá: Jalca de las Quinuas (Contu-

mazá-Asunción), 3900 m, *Sagástegui et al. 10089* (F, HUT, MO). **San Miguel:** Taulis Alto, 3100 m, *Sagástegui et al. 9545* (F, HUT). **CUZCO. Canchis:** La Raya, 4400–4500 m, *Pennell 13508* (F). **HUÁNUCO. Dos de Mayo:** Lauricocha, *Cardich s.n.* (F, MO, USM). **JUNÍN. Junín:** Junín, *Aguilar s.n.* (F, MO, USM); **Yauli:** near Atocsayco, ca. 4200 m, *Pearsall 825* (F). **LA LIBERTAD. Patáz:** carretera Huancapata-Tayabamba, 3700 m, *López & Sagástegui 8243* (HUT, MO). **LIMA. Huarochiri:** laguna de Chumpicocha, 4600 m, *Cerrate 2001* (USM). **PASCO. Pasco:** Huarón, ca. 14,000 ft, *Macbride & Featherstone 1144* (F). **PUNO. Carabaya:** Macusani, 4300 m, *Marín 2092* (F). **NO EXACT LOCALITY.** *Ellenberg 654* (USM), 679 (USM); *Haenke 1928* (F); *Weberbauer 5452* (F).

XVI. *Pluchea*

***Pluchea* Cass., Bull. Sci. Soc. Philom. Paris 1817: 31. 1817. TYPE:** *Conyza marilandica* A. Michaux \equiv *Pluchea marylandica* (A. Michaux) Cass.³

Perennial herbs or shrubs, often aromatic; stems glabrous, pubescent, or glandular, sometimes winged. Leaves alternate, simple, sessile, auriculate-clasping, or occasionally petiolate, often decurrent on stem; blade ovate to linear-lanceolate, glabrous, pubescent, or glandular, the margins entire or toothed. Capitulescences corymbose-paniculate or elongate to flat-topped, cymes. Capitula disciform, heterogamous; involucre ovoid or campanulate to hemispheric; phyllaries 2–5-seriate, imbricate, herbaceous to chartaceous, indurate, or scarious; receptacles flat, glabrous; pistillate florets multiseriate, the corollas filiform, slightly dilated distally, 3(–4)-lobed, purplish to

cream-white, the styles greatly divided, the branches slender, exerted; disc florets hermaphroditic, the corollas tubular, slender, distally dilated, cylindrical or slightly campanulate, 5-lobed, rose to rose-purple, the anther bases sagittate, caudate, the terminal appendages deltoid, rounded, the styles bifid, the branches slender, separate or united, apex rounded. Achenes cylindrical, prominently 3–6-ribbed, strigose, glandular, or glabrous; pappus bristles barbellate, uniseriate, the bases fused. Chromosome numbers: $n = 10, 15$.

Pluchea includes about 40 species occurring in the warmer regions of both hemispheres, with four species known from Peru. The generic limits have been emended by Robinson and Cuatrecasas (1973) to include several species previously placed in *Tessaria* (e.g., *P. absinthioides* and *P. zamalloae*).

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Key to Species of *Pluchea*

1. Perennial herbs usually 1 m or less tall; stems winged; leaves linear-lanceolate to obovate, generally greater than 6 cm long *P. microcephala*
1. Shrubs usually over 1 m tall; stems unwinged; leaves oblanceolate, elliptic, or ovate, 1–5(–8) cm long 2
2. Leaves 5–8 cm long, usually oblanceolate, densely cano-tomentulose *P. absinthioides*
2. Leaves 1–3.7 cm long, ovate to oval or elliptic (rarely oblanceolate), tomentose to strigillose . 3
3. Spreading shrubs to 3.5 m tall; leaves oval to ovate, 8–25 mm wide; distributed in arid coast habitats from northern Peru to northern Chile (usually below 1000 m) *P. chingoyo*
3. Erect shrubs, usually less than 2 m tall; leaves elliptic or rarely oblanceolate, 7–15 mm wide; distributed in interior southern Peru, above 1000 m *P. zamalloae*

1. *Pluchea absinthioides* (Hook. & Arn.) H. Robinson & Cuatr., Phytologia 27: 284. 1973.

³ For additional generic synonymy, see Godfrey (1962). Only the above name has been used for Peruvian material.

Baccharis absinthioides Hook. & Arn., Bot. Beechey Voy. p. 57. 1830. TYPE: Chile, Valparaíso, T. Bridges 55 (holotype, GL, not seen).
Tessaria absinthioides (Hook. & Arn.) DC., Prodr. 5: 457. 1836.

Shrubs or **subshrubs** to 2 m tall; stems erect, densely tomentulose. **Leaves** oblanceolate, 5–8 cm long, 5–12 mm wide, base attenuate to a pseudo-petiole, apex acute to subobtusate, both surfaces densely cano-tomentose, the margins dentate or rarely entire. **Capitulescences** cymose-corymbose, terminal. **Capitula** 6–8 mm high, 4–5 mm wide; involucre campanulate; phyllaries 3–4-seriate, scarious, ciliate, the outer ovate, 2.5–3 mm long, 1.2–1.5 mm wide, apex obtuse, the inner lanceolate to linear, 5–6 mm long, 0.6–1 mm wide, apex obtuse to attenuate; pistillate florets ca. 100, the corollas 5–6 mm long, lilac; hermaphroditic florets 6–14, the corollas ca. 6 mm long, the lobes 1–1.5 mm long. **Achenes** ca. 0.6 mm long, glabrous; pappus bristles 4.5–5 mm long.

Pluchea absinthioides occurs frequently in sandy soils from southern Peru, Bolivia, Chile, Uruguay, and Argentina. In Peru, it is known from two collections in the Department of Arequipa (2100–2300 m) where it is known by the following common names: *brea*, *pájaro bobo*, *suncho negro*.

AREQUIPA. Arequipa: southern slopes of Chachani, 2287 m, *Hinkley 33* (F, GH, US); Tiabaya, 2100–2200 m, *Pennell 13084* (GH).

2. ***Pluchea chingoyo*** (Kunth) DC., Prodr. 5: 452. 1836. **Figure 17.**

Conyza chingoyo Kunth, Nov. Gen. Sp. (fol.) 4: 59. 1820. TYPE: Peru, Dept. Ancash, Prov. Santa, A. *Bonpland 3758* (holotype, P, not seen, IDC Microfiche 6209. 96: I. 5, F neg. 37652, fragment, F).

Shrubs to 3.5 m tall; stems densely branched, spreading, glandular-pubescent. **Leaves** sessile or with petiolates to 1 cm long; blade ovate to oval, 1–3(–3.5) cm long, 8–25 mm wide, upper surfaces glabrous to sparsely tomentose, lower surfaces glabrous to densely tomentose, both surfaces glandular-punctate, base cuneate to truncate or cordate, apex rounded to obtuse, the margins entire to serrate. **Capitulescences** densely corymbose-paniculate, terminal and axillary; peduncles 1–5 mm long, puberulent. **Capitula** 4–5 mm high, 2.5–3 mm wide; involucre campanulate; phyllaries 4–5-seriate, the outer ovate to lanceolate, 1–1.5 mm long, 0.5–0.7 mm wide, glandular, resinous, apex acute, ciliolate, the inner linear to lanceolate, 3.5–4.5 mm long, 0.3–0.5 mm wide, apex attenuate, glandular, resinous; pistillate florets ca. 100, the



FIG. 17. Flowering branch of *Pluchea chingoyo*. (Drawn from *Ferrerya 6298*, F.)

corollas 2.5–3 mm long, 3-fid, the style branches linear, ca. 0.5 mm long; hermaphroditic florets ca. 15, the corollas 4.2–4.7 mm long, the limb slightly expanded, 5-lobed, the lobes ca. 0.5 mm long, deltate, the style branches ca. 0.5 mm long, strigillose below the point of bifurcation. **Achenes** ca. 0.6 mm long, hirtellous; pappus bristles 1.5–3 mm long. Chromosome number: $n = 10$ (Sundberg & Dillon, 1986).

Pluchea chingoyo occurs in xeric, coastal habitats (10–800 m) from northern Peru to northern Chile; occasional individuals are found at higher elevations further inland. This species is quite distinctive in having densely branched, shrubby habit and small ovate leaves. In Peru, populations in the north (Department of Piura) have considerably more pubescence than those in the south (Departments of Ica and Arequipa), possibly due to environmental effects.

It is known by the following common names: *parrano*, *toñuz*.

ANCASH. Bolognesi: abajo de Raquis, ruta Pativilca-Huaráz, 1900 m, *Sagástegui et al. 12298* (F, HUT). **Casma:** ca. 48 km N of Pativilca on Pan American Hwy., ca. 10 m, *Dillon & Whalen 4006* (F, USM); Yautan, 2000 ft, *Macbride & Featherstone 2562* (GH, US). **Bolognesi:**

abajo de Raquía, ruta a Pativilca-Huaráz, 1900 m, *Sagástegui et al.* 12298 (F, HUT). **Santa:** Samanco, cerca a Chimbote, 10–15 m, *Ferreyra* 18529 (F, MO, USM). **AR-EQUIPA. Camaná:** 25 km NW of Camaná, *Ilitis et al.* 1557 (MO, US). **Caraveli:** Lomas de Jahuary, entre Chala y Nazca, 300–400 m, *Ferreyra* 14010 (MO, USM). **Islay:** 14 km S of Mollendo, *Hutchison & Wright* 7138 (F, US, USM); 7 km de Matarani, 500 m, *López* 64 (MO); Mollendo, 600 ft, *Stafford* 902 (F). **ICA:** Ica: laguna de La Victoria, 500 m, *Ferreyra* 565 (F, MO, USM); Hda. Ocucaje, 300–400 m, *Ferreyra* 1381 (UC, US, USM); Laguna de Orovilca, a 6–7 km de Ica, 400 m, *Cerrate* 897 (MO, USM), *Ferreyra* 2496 (MO, NY, US), 6277 (MO, US, USM); Huaga, 300 m, *Ferreyra* 8205 (MO, USM); Ica, *Ridoutt s.n.* (MO, USM 11308); Ica-Ocucaje, 300 m, *Weberbauer* 7194 (GH, US). **Nazca:** ca. 85 km S of Nazca, 90 m, *Ellenberg* 4143 (US). **Pisco:** Chinchá, valley of Río San Pisco, 900–1000 m, *Weberbauer* 5369 (F, GH, US). **JUN-ÍN. Tarma:** cerca Fundo Puguio, 800–900 m, *Ferreyra* 17702 (MO, USM). **LA LIBERTAD. Pascasmayo:** 7 km E of San Pedro de Lloc, ca. 120 m, *Dillon & Whalen* 4020 (F, MO, NY, TEX, USM). **Trujillo:** between Virú and Chimbote, 485 km N of Lima on Pan-Amer Hwy, *Rahn* 323 (MO). **LAMBAYEQUE. Chiclayo:** ca. 2 km E of Zaña, 100–150 m, *Dillon et al.* 4095 (F, MO, TEX, USM); 28 km S of Lambayeque, 30 m, *Ellenberg* 3749 (US); desvío a Oyotun, cerca a Bebedero, 200 m, *Sagástegui et al.* 12352 (F, HUT, K, MO); Chiclayo-Patapo, 50 m, *West* 3580 (GH, UC). **Ferreñafe:** Pitipo (tres Tomas), 80 m, *Llatas & Laos* 822 (F). **LIMA. Cañete:** Chilca, *Asplund* 13849 (US). **Huachirí:** Cocachaca, Km 60 entre Lima y La Oroya, *Ridoutt s.n.* (MO, USM 126399). **Lima:** Chosica, 40 km de Lima, 800 m, *Ferreyra* 546 (MO, USM); La Cantuta, cerca Chosica, Lima-Huancayo, 700–800 m, *Ferreyra* 6298 (F, US, USM); ruinas de Cajamarquilla, 300–400 m, *Ferreyra* 2847 (MO, USM), 16886 (MO, USM); Ricardo Palma, 850 m, *Riccio* 4677 (US). Hda. Zárate, *Soukup* 3133 (US). **PIURA. Huancabamba:** arriba de Palambla, 1500–1600 m, *Cerrate & Tovar* 10809 (MO, USM). **Morropón:** road to Huancabamba, 3 km W of Serran, 12 km E of Malacasi, 200 m, *Hutchison & Wright* 6548 (F, GH, MO, NY, UC, US). **Talara:** 25 mi E of Cabo Blanco, Caña Dulce, *Haught* 200 (F, GH, NY). **TACNA. Tacna:** Boca del Río, 50 m, *Zegarra* 3344 (US).

3. *Pluchea microcephala* Godfrey, Jour. Elisha Mitchell Soc. 68: 270. 1952. TYPE: Argentina, Prov. Formosa, Dept. Pirane, al N.O. a 6 km Pirane, 5 Dec 1945, *T. Morel* 518 (holotype, F; isotype, LIL, not seen). **Figure 18.**

Perennial herbs to 1.2 m tall; stems erect, branched, glabrous to glandular-pubescent, leafy, alate, the wings 1.5–5 mm wide. **Leaves** sessile; blade narrowly obovate, elliptic, or linear-lanceolate, 6–9(–11) cm long, 1–3(–4) cm wide, upper and lower surfaces glandular pubescent to glabrous, base attenuate, decurrent on stems, apex acute to obtuse, the margins serrate. **Capitulescences** densely cymose-paniculate, 50–75-headed; peduncles glandular pubescent. **Capitula** (3–)4–5(–

6) mm high, 2–3.5(–4) mm wide; involucre narrowly campanulate; phyllaries 4–5-seriate, glabrous, the outer ovate, 1.5–2 mm long, 0.9–1.2 mm wide, submembranous, apex obtuse, the inner oblong to linear-lanceolate, 3.5–4.5 mm long, 0.4–0.7 mm wide, membranous, apex acute to attenuate; pistillate florets 25–50, the corollas ca. 4–4.3 mm long, 3-dentate, rose-purple; hermaphroditic florets 3–5, the corollas 4.5–5.5 mm long, apex dilated, 5-lobed, the lobes lanceolate, ca. 0.5 mm long. **Achenes** 0.8–1 mm long, papillose to glabrous, 4–6-ribbed; pappus bristles, 4–4.5 mm long. Chromosome number: $n = 10$ (Sundberg & Dillon, 1986).

Pluchea microcephala is known from eastern Bolivia, northern Argentina, and northeastern Peru (0–200 m). It is perhaps most closely related to *P. suaveolens* of Argentina, which shares its winged stems and leaves, but *P. microcephala* is distinguished by its smaller capitula with narrowly campanulate involucre.

LA LIBERTAD. Pacasmayo: Río Jequetepeque, *Sagástegui et al.* 8530 (F, HUT, MO); Chépén-Pacanguilla, 180 m, *Sagástegui & Diestra* 11486 (F, HUT, K). **LAMBAYEQUE. Chiclayo:** ca. 2 km E of Zaña, 100–150 m, *Dillon et al.* 4094 (CPUN, F, GH, HUT, K, MO, NY, TEX, US, USM); ca. 2.5 km E of Chiclayo, *Hudson* 965 (F, MO); Chiclayo-Lambayeque, Km 764, *López* 8108 (F), *Sagástegui* 8353 (F, HUT, MO); common in plains around Chiclayo, *Stork* 11429 (F, UC).

4. *Pluchea zamalloae* (Cabr.) H. Robinson & Cuatr., Phytologia 27: 284. 1973.

Tessaria zamalloae Cabr., Notas Mus. La Plata, Bot. 19: 201. 1959. TYPE: Peru, Dept. Cuzco, Prov. Urubamba, 3870 m, *H. Zamalloa* 1007 (holotype, LP, not seen).

Shrubs to 3 m; stems densely villous to glabrescent, striate. **Leaves** sessile or with petioles 1–2 mm long; blade elliptic to oblanceolate, 1.5–3.7 cm long, 7–15 mm wide, upper surfaces sparsely strigillose, glandular-punctate, resinous, lower surfaces strigillose, glandular-punctate, resinous, base attenuate, apex obtuse, the margins entire or dentate with 6–8 pairs of teeth. **Capitulescences** dense corymbose cymes, terminal; peduncles 3–5 mm long, puberulent. **Capitula** 4–5 mm high, 2.5–3 mm wide; involucre campanulate; phyllaries 4–5-seriate, the outer ovate to oblong, 1–2 mm long, ca. 0.6 mm wide, apex obtuse, the inner lanceolate to oblong-lanceolate, 3.5–4 mm long, apex acute

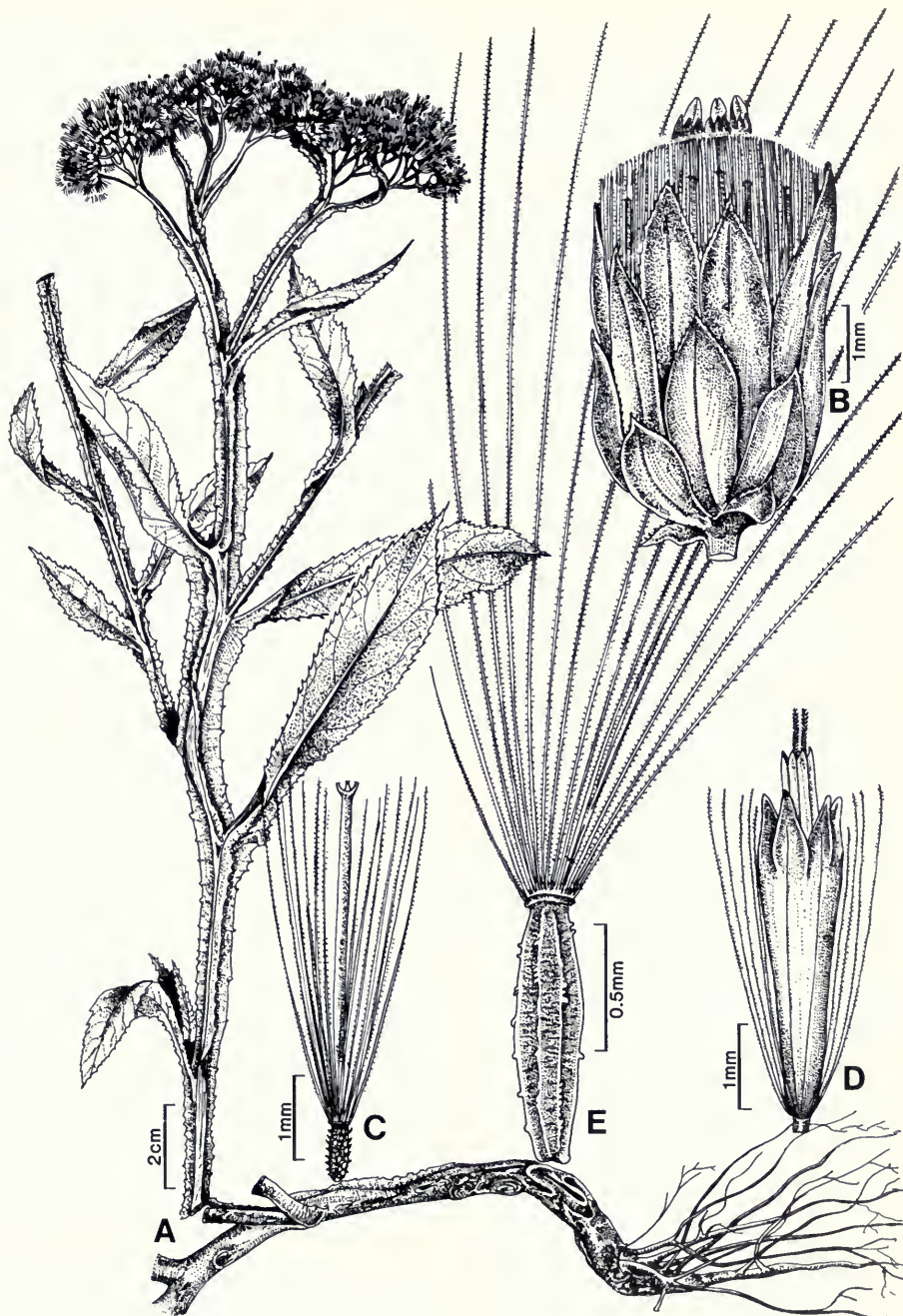


FIG. 18. *Pluchea microcephala*. A, habit; B, capitulum; C, pistillate floret; D, hermaphroditic floret; E, achene with pappus. (Drawn from Sagástegui et al. 8530, HUT.)

to attenuate; pistillate florets ca. 20, the corollas ca. 3 mm long, 3-4-fid, the style branches ca. 0.5 mm long; hermaphrodite florets ca. 4, the corollas 4-5 mm long, the limb slightly expanded, 5-lobed,

the teeth triangular, ca. 0.5 mm long, the style branches ca. 0.5 mm long, strigillose below the point of bifurcation. Achenes 0.6-0.8 mm long, sericeous; pappus bristles 2.5-3.5 mm long.

Pluchea zamalloae is apparently a rare species that occurs in dry sites along river valleys in southern Peru (1850–3300 m). This species is most closely related to *P. chingoyo* but is readily distinguished from the latter by its leaf-shape and ecological preference.

APURÍMAC. Abancay: cerca de Cunyac, 2300 m, *Ferreya 9829* (F, MO, US, USM); 33 km SW of Abancay, Hac. Casinchiua, 2300–2500 m, *Iltis & Ugent 814* (wis, us), *814a* (wis); Quebrada Honda, *Vargas 465* (us); E side of Río Pacachacas, 1850 m, *West 3795* (MO, UC). **AYACUCHO.** Huanta: Hda. Bado Grande, 2300 m, *Vargas 15670* (us). **CUZCO.** Anta: cerca de Yucay, 3300 m, *Ferreya 9875* (MO, USM).

XVII. Pterocaulon

Pterocaulon Elliott, Sketch Bot. S. Carol. 2: 323. 1823. TYPE: *Conyza pycnostachya* A. Michaux \equiv *Pterocaulon pycnostachyum* (A. Michaux) Elliott.

Perennial herbs, often suffruticose, glabrous or tomentose. Leaves alternate, sessile, decurrent on alate stems, the margins entire or dentate. Capitulescences glomerate or spicate. Capitula disciform, heterogamous, sessile; involucre campanulate; phyllaries imbricate, linear-lanceolate, scarious, caducous; receptacles hirsute or glabrous; pistillate florets multiseriate, the corollas filiform, truncate or 2–3-dentate, the styles of pistillate florets bifid, filiform, glabrous; disc florets hermaphroditic or functionally staminate, the corollas narrowly tubular, the limb 5-lobed, the anther bases sagittate, the terminal appendages ovate-lanceolate, rounded, the styles of hermaphroditic florets bifid, pubescent distally. Achenes cylindrical to fusiform, angled or compressed, costate; pappus bristles 1–2-seriate. Chromosome number: $n = 10$.

Pterocaulon contains 25–30 species in North and South America, Madagascar, Mauritius, Asia, and Australia. Some 12 species occur in South America, with only the following species represented in Peru.

References

CABRERA, A. L., AND A. M. RAGONESE. 1978. Revisión del género *Pterocaulon* (Compositae). Darwiniana, 21: 185–257.

COLEMAN, R. 1968. Chromosome numbers in some Brazilian Compositae. Rhodora, 70: 95–102.

1. *Pterocaulon alopecuroides* (Lam.) DC.⁴, Prodr. 5: 454. 1836. Figure 19.

Conyza alopecuroides Lam., Encycl. 2: 93. 1786. TYPE: Martinique, “on trouve cette plante a la Martinique, dans les prés qu’on nomme Savannes. M. Commerson l’a observée au Brasil,” collector unknown (holotype, P, not seen).

Perennial herbs to 1.5 m tall, suffruticose; stems erect, branched above, tomentose, alate, the wings entire, discolorous, 2–3 mm wide. Leaves sessile, decurrent; blade obovate-lanceolate to elliptic, 5–7 cm long, 2–3 cm wide, discolorous, upper surfaces glabrescent, lower surfaces lanuginous, the margins denticulate. Capitulescences spicate, terminal, 3–17 cm long, compact, frequently interrupted at the base. Capitula 5–8 mm high, ca. 3 mm wide; involucre campanulate; outer phyllaries oblong-lanceolate, 2–3 mm long, ca. 0.5 mm wide, lanulose, apiculate, the inner phyllaries narrowly lanceolate, 4–6 mm long, 0.3–0.5 mm wide, ciliolate, acuminate; pistillate florets 25–50, the corollas 4–5 mm long; hermaphroditic florets 1–2, the corollas ca. 4 mm long. Achenes ca. 3 mm long, pilose, glandular; pappus bristles ca. 5 mm long, white. Chromosome number: $n = 10$ (Coleman, 1968).

Pterocaulon alopecuroides is a widely distributed species ranging from the Caribbean Antilles to southern South America, including Brazil, Peru, Bolivia, Paraguay, Uruguay, and northern Argentina. In Peru, it is found on the eastern slope of the Andes at elevations below 1200 m.

JUNÍN. Tarma: Chanchamayo Valley, 1200 m, *Schunke 1533* (F). **SAN MARTÍN.** San Martín: Tarapoto, 1855, *Spruce 4488* (F, GH, NY); Tarapoto, 840 m, *Woytkowski 35101* (F, MO).

XVIII. Stuckertiella

Stuckertiella Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 205. 1913. TYPE: *Gamochoeta capitata* Wedd. \equiv *Stuckertiella capitata* (Wedd.) Beauverd.

⁴ For complete synonymy, see Cabrera and Ragonese (1978).

Annual to perennial **herbs**, branched, prostrate to ascending. **Leaves** alternate, the margins entire. **Capitulescences** glomerate, terminal, subtended by upper leaves. **Capitula** disciform, sessile; involucre hemispherical to campanulate; phyllaries 3–4-seriate, imbricate, scarious; receptacles plane, alveolate; pistillate florets multiseriate, the corollas filiform, irregularly lobed; disc florets hermaphroditic, 4–5, functionally staminate, the corollas tubular, 4-lobed, the anthers 4, base sagittate, caudate, 3 with short, obtuse apical appendages, 1 longer, lanceolate, the style branches truncate. **Achenes** fusiform to obovoid, surface with sinuate-reticulate sculpturing, glandular with bicelled, sessile papillae or trichomes, mucilaginous when wet; pappus bristles scabrid, barbellate, apex blunt, base fused, deciduous together as a unit, white.

A genus of two species confined to South America: *Stuckertiella capitata* (Wedd.) Beauverd from Peru, Bolivia, and northern Argentina and *S. pergrina* Beauverd from central Argentina.

Reference

BEAUVERD, G. 1913. Le genre *Stuckertiella* Beauverd, gen. nov. Bull. Soc. Bot. Genève, ser. 2, 5: 205–209.

1. *Stuckertiella capitata* (Wedd.) Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 206. 1913. **Figure 20.**

Gamochoeta capitata Wedd., Chlor. And. 1: 153. 1855. TYPE: Peru, Dept. Cuzco, C. Gay s.n. (holotype, P, not seen, F neg. 37584, fragment, F).

Gnaphalium capitatum (Wedd.) Griseb., Abh. Königl. Ges. Wiss. Göttingen, 24: 186. 1879. Non Lamark (1786), nec Thunberg (1799).

Gnaphalium weddellianum Rusby, Mem. Torrey Bot. Club 3: 57. 1893 (*nomen novum* for *Gnaphalium capitatum* (Wedd.) Griseb.).

Annual to perennial **herbs**, to 25 cm tall; stems usually prostrate, arachnoid-lanate, branched. **Leaves** linear-lanceolate, 5–30 mm long, 1–2 mm wide, sessile, apex acute, both surfaces arachnoid-lanate, or glabrescent below. **Capitulescences** glomerate at tips of branchlets, overtopped by terminal leaves. **Capitula** 4–5 mm high, 4–5 mm wide; involucre campanulate; outer phyllaries ovate, ca. 2.5 mm long, ca. 1.5 mm wide, base woolly, apex obtuse to rounded, the margins scarious, the inner lanceolate to oblong-lanceolate, ca. 3 mm long, ca.



FIG. 19. Flowering stem of *Pterocaulon alopecuroides*. (Drawn from Woytkowski 35101, MO.)

1 mm wide, apex rounded, scarious; marginal florets pistillate, 50–75, the corollas ca. 2 mm long; hermaphroditic florets 4–5, the corollas 2–2.5 mm long, 4-merous. **Achenes** obovoid, 0.4–0.5 mm long; pappus bristles ca. 2.5 mm long.

Stuckertiella capitata is distributed from northern Peru to northwestern Argentina, 2000–4000 m. In Peru, it occupies moist habitats between 3000–4000 m. This species is readily distinguished by its capitula, which are subtended by upper leaves, and by its 4-merous hermaphroditic florets.

ANCASH. Carhuáz: Cordillera Blanca, valley of Río Marcará, Viscos [Viscas], 2960 m, *Hutchison & Wright 4291* (us). **Huaylas:** Huascarán National Park, Quebrada

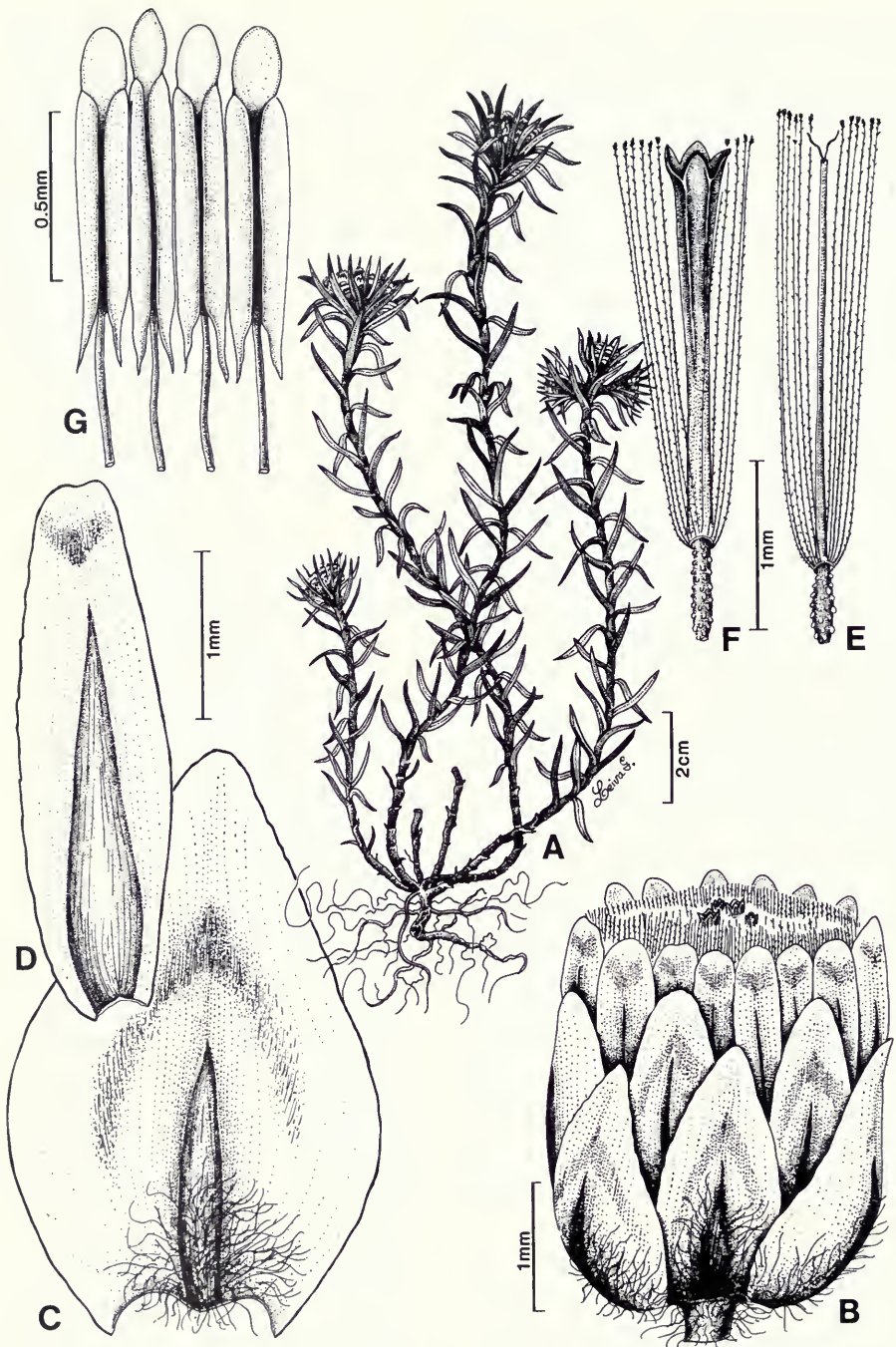


FIG. 20. *Stuckertiella capitata*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, anthers. (Drawn from Sagástegui et al. 8993, HUT.)

Alpamayo, 4020–4250 m, Smith et al. 9828. Yungay: ca. 25 km NE of Yungay, slopes below Laguna de Llanganuco, 3380 m, Dillon et al. 3115 (F, MO, USM); Yungay-Llanganuco, 3950 m, López et al. 7442 (HUT). APURÍMAC. Abancay: Sayhuite, Km 45 E of Abancay, 3600

m; Hutchison 1737 (F, US); Ampay, 3500 m, Vargas & Santander 510 (F, MO), 513 (F). AYACUCHO. Prov. Unknown: near Mataral, 3600 m, West 3670 (GH, MO). CAJAMARCA. Contumazá: Portachuelo de Nanrá (Ventarrón-Totorillas), 3350 m, Sagástegui et al. 8993 (F,

HUT, MO). **CUZCO.** Canas: Langui, 4000 m, *Chávez 2324* (MO). **Paucartambo:** Hacienda Churu, 3500 m, *Herrera 1049* (F, GH), *1399* (US). **HUÁNUCO.** **Huánuco:** Pampayacu, *Sawada 95* (F). **JUNÍN.** **Huancayo:** Quebrada Occopilla, *Soukup 3631* (F); **Yauli:** Laguna de Pomacocha, 4100 m, *Ochoa 1991* (US). **LIMA.** **Huarocharí:** Chicla, 3700 m, *Asplund 11318* (US); Ticllo-Pap, 4800 m, *Rauh & Hirsch P84* (NY). **PASCO.** **Pasco:** Km 5 Cerro de Pasco-Huánuco, 4125 m, *Ellenberg 4130* (US). **PUNO.** **Huancané:** Miajachi, Isla Chirone, 3900 m, *Ortiz s.n.* (USM); **Lampa:** 9 km SW of Santa Lucia, 4000 m, *Iltis & Ugent 1426* (US); **Melgar:** Orurillo, *Soukup 504* (F), *10317* (MO).

XIX. *Tessaria*

Tessaria Ruiz & Pavón, Fl. Peruv. Prodr. 112, t. 24. 1794. TYPE: *T. integrifolia* Ruiz & Pavón.

Trees or large shrubs; roots giving rise to adventitious stems. Leaves alternate, the margins entire or rarely dentate. Capitulescences cymose-paniculate. Capitula disciform, short pedunculate; involucre turbinate; phyllaries 3–5-seriate, imbricate, scarious, glabrous; receptacles conical, alveolate, pubescent; marginal florets pistillate, the corollas filiform, 2–3-fid; disc floret hermaphroditic, functionally staminate, solitary, the corolla tubular, the limb 5-lobed, the anther bases sagittate, caudate, the terminal appendages narrowly ovate, the style unbranched, scabrous. Achenes cylindrical, glabrous; pappus bristles scabrid, barbellate, uniseriate, base fused, deciduous together as a unit, white.

A monotypic genus as circumscribed by Robinson and Cuatrecasas (1973). They transferred several species traditionally placed in *Tessaria* to *Pluchea* (see discussion under that genus).

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- WAISMAN, C. E., E. ROZENBLUM, AND J. H. HUNZIKER. 1984. Estudios cariologicos en Compositae. I. *Darwiniana*, 25: 217–226.

1. *Tessaria integrifolia* Ruiz & Pavón, Syst. Veg. Fl. Peruv. Chil. 213. 1798. TYPE: Peru [exact locality unknown], *H. Ruiz & J. Pavón 30/26* (holotype, MA, not seen; isotype, F, F neg. 49304). **Figure 21.**

Tessaria dentata Ruiz & Pavón, Syst. Veg. Fl. Peruv. Chil. 214. 1798. TYPE: Peru, Dept. Lima, Prov. Chancay, Chancay, *H. Ruiz & J. Pavón 30/25* (holotype, MA, not seen, F neg. 29309; isotype, F).

Trees or large shrubs, 3–10(–15) m tall; stems green to brownish green. Leaves oblanceolate to lanceolate or elliptic, 3–9 cm long, 0.8–3.5 cm wide, base attenuate, apex acute, mucronulate, both surfaces minutely puberulent, glandular, grayish. Capitula 4–5 mm high, 3–3.5 mm wide; outer phyllaries ovate, 1.5–2.5 mm long, 1–1.2 mm wide, apex acute, the inner linear to lanceolate, 4–5 mm long, 0.5–1 mm wide, apex reflexed; marginal florets 40–80, corollas 3–3.5 mm long, styles exserted; hermaphroditic floret 1, the corolla ca. 4 mm long. Achenes 0.5–0.8 mm long; pappus bristles ca. 20, ca. 5 mm long. Chromosome number: $n =$ ca. 10 (Waisman et al. 1984).

Tessaria integrifolia is widely distributed throughout southern Central and South America. It generally prefers sandy soils along the margins of rivers, and at times forms pure stands from adventitious root sprouts.

Leaves of this species are used medicinally for hepatitis and as a diuretic, its wood is often used in the construction of corrals, and its bark is said to be used in the tanning of leather. In Argentina, its wood is utilized in the production of paper (A. L. Cabrera, pers. comm.), and around Iquitos, Peru, it is an important forage source for cattle (F. Ayala, pers. comm.).

In Peru, it known by the common names *bobo*, *chamchi*, and *mayu-chamchi*, in Argentina as *pá-jaro bobo* or *aliso*, and in Colombia as *aliso*, *cenizo*, *sauce de playa*, *olivo*, and *sauce playero*.

AMAZONAS. **Bagua:** between Bagua and Nazareth, 430 m, *Croat 58344* (F, MO); trail from La Peca into Serranía de Bagua, 1000–1400 m, *Gentry et al. 23081* (F, HUT, MO, USM); 1 km de bajo La Poza, 180 m, *Huashikat 44* (F, MO); rain forest along Río Santiago 3–5 km above mouth, 250–300 m, *Wurdack 2227* (F, GH, NY, US). **ANCASH.** **Carhuáz:** Yungay-Marcará, 2400 m, *Sagástegui et al. 12327* (F, HUT, TEX). **Santa:** Río Santa floodplain, 2 km N of Santa, 5 m, *Stork & Horton 9153* (GH). **Yungay:** Mancos-Yungay, *Smith & Bas 4939* (F, US, USM). **APURÍMAC.** **Abancay:** Abancay, 2400 m,



FIG. 21. *Tessaria integrifolia*. A, flowering branch; B, capitulum; C, pistillate floret; D, hermaphroditic floret. (Drawn from *Ridoutt 44a*, HUT.)

Vargas 468 (F); Hacienda Matara, edge of Río Matara, 2200 m, *Vargas 9806* (F). **AREQUIPA.** Arequipa: Río Yarabamba, 2800–2900 m, *Arenas 53* (USM); Tingo, ca. 7500 ft, *Munz 15491* (F). **Camaná:** Río Ocoña at Ocoña, 4 m, *Ilitis et al. 1553* (MO, US). **CAJAMARCA.** **Chota:** Carhuaquero, entre Chongayape y Llama, 500 m, *Fer-*

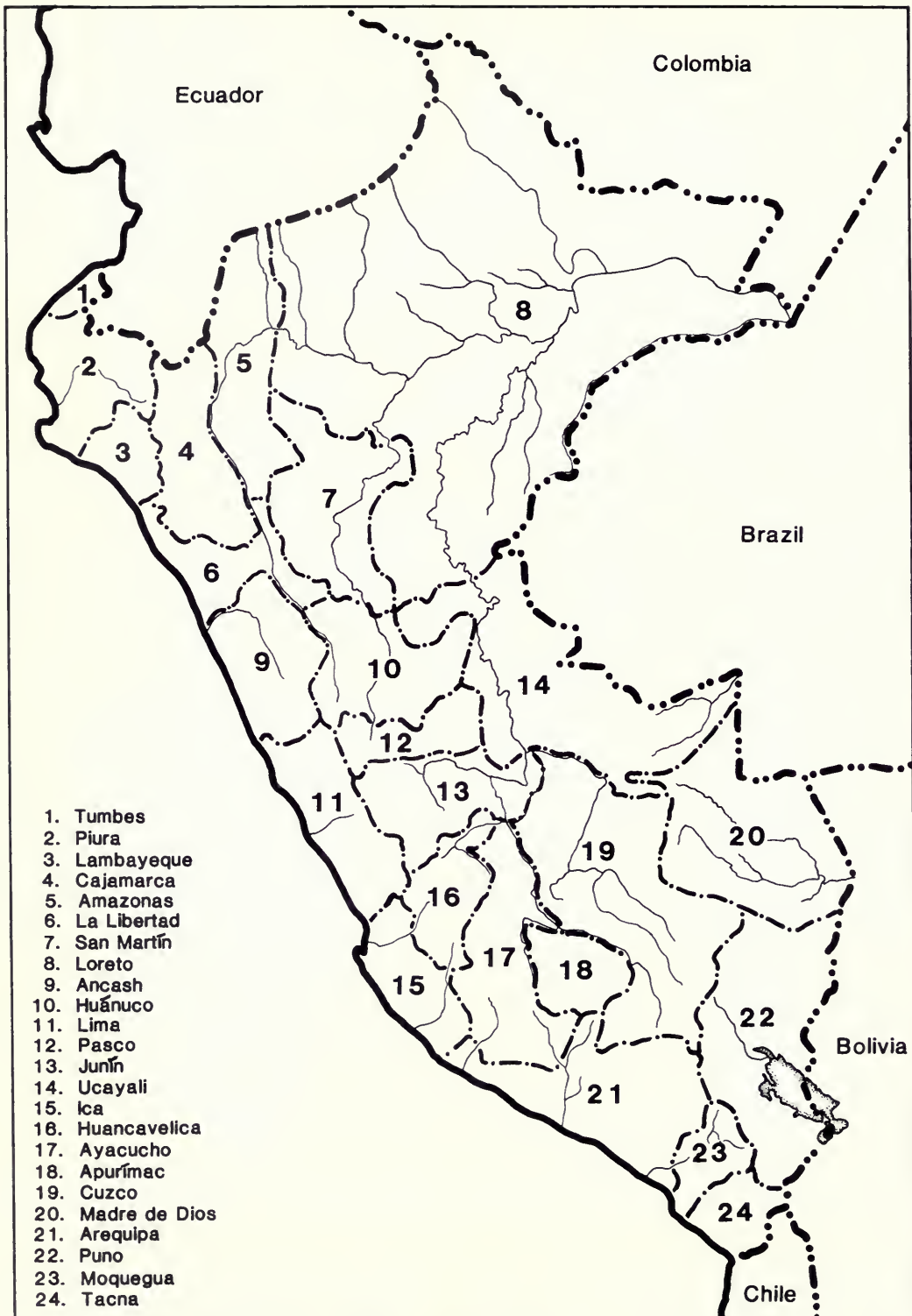
reyra 3165 (MO, USM). **Jaen:** Jaen, 500 m, *Woytkowski 5585* (GH, MO, US). **CUZCO.** **La Convención:** ca. 5 km N of Aguas Calientes, 2000 m, *Solomon 3178* (MO); Machu Picchu, 2000 m, *Stork et al. 10490* (F), *Vargas 823* (F, MO). **Urubamba:** San Miguel, ca. 1800 m, *Cook & Gilbert 970* (GH, US). **HUANCAVELICA.** **Angaraes:** 4 km W of

Huanta, 2000 m, *Stork & Horton 10806* (F, GH). **HUANUCO.** **Huánuco:** downriver from Tingo María, 7000 ft, *Belshaw 3094* (F, GH, MO, NY, US); Huánuco, ca. 7000 ft, *Macbride 3231* (F, GH, US). **Leoncio Prado:** La Divisoria, ca. 18 km NNE of Tingo María on road to Pucallpa, 1500–1600 m, *Dillon 2647* (F, MO, USM), *Gentry et al. 18845* (MO, USM), *Plowman & Schunke 11705* (F, USM). **JUNÍN.** **Tarma:** La Merced, *Acosta 19* (MO, USM), La Merced, 700 m, *Killip & Smith 23466* (GH, NY, US), 23690 (NY, US); Río Perené, 2300 ft, *Townsend 765* (F). **LA LIBERTAD:** **Pascasmayo:** Pascasmayo, *Fosberg 27995* (F, NY, US), *Rose & Rose 18524* (NY), *Williams 2910* (NY). **Trujillo:** Trujillo, near sea level, *Killip & Smith 21503* (GH, NY, US). **LAMBAYEQUE:** **Lambayeque:** E side of Chiclayo, *Hudson 938* (MO); road to Jaen, Km 17 E of Olmos, at the Bridge of Silence, 570 m, *Hutchison & Wright 4423* (F, GH, MO, NY, US). **LIMA.** **Callao:** San Lorenzo, *Andersson s.n.* (F, GH, US). **Chancay:** Chancay, *Ridoutt s.n.* (MO, USM 12196); Pativilca, *Ridoutt s.n.* (MO, USM 13946); Estanque Lampay, Hda. Paramonga, *Ridoutt s.n.* (MO, USM 13999). **Lima:** Lima, *Ball 176* (GH); between Lima and Callao, *Cook & Gilbert 2095* (US); Hacienda Villa, ca. 20 km S of Lima, 100–120 m, *Ferreya 6133* (MO, USM); Chosica, ca. 3000 ft, *Macbride & Featherstone 518* (F, GH), *Holway & Holway 778* (GH); ca. 12 km SW of Matucana, ca. 5800 ft, *King & Collins 9002* (F, US); Lima, Bajada de Miraflores, along Malecón, 100 m, *Plowman 11015* (F, USM); Santarrositas, *Ridoutt s.n.* (MO, USM 10276); Lima, *Soukup 1921* (US), 2054 (F); Barranco, 50 m, *Weberbauer 7224* (F, GH, US). **LORETO:** **Alto Amazonas:** Quebrada Shanuce above Yurimaguas, *Croat 19775* (F, MO); entre Andoas y Capahuari Sur, 210 m, *Díaz & Jaramillo 1371* (F, MO, USM); Andoas, Río Pastaza near Ecuador border, 210 m, *Gentry et al. 29725* (F, MO, USM); Balsapuerto, 220 m, *Klug 2999* (F, GH, MO, NY, US); Maucallacta, Río Paranapura, 200 m, *Klug 3940* (F, GH, MO, NY, US). **Maynas:** Lupuna, 100 m, *Ayala 528* (MO); Ditto. Iquitos, Isla de Escabino near Santa María de Nanay, *McDaniel & Rimachi 17324* (F, NY); Padre Isla, *McDaniel & Rimachi 22297* (F); Río Amazonas, Isla Rondiña, opposite Leticia, *Plowman et al. 6384* (ECON, F); Quebrada del caserío de Bombonaje Yanayacu, *Rimachi 2567* (F), 2652 (F); lower Río Nanay, *Williams 494* (F, GH, US); Pebas, *Williams 1863* (F, GH, US); Iquitos, 120 m, *Williams 8024* (F). **MADRE DE DIOS.** **Tam-**

bopata: ca. 3 air km or 70–80 river km SSW Puerto Maldonado, ca. 260 m, *Barbour 5174* (F, MO, USM). **PASCO.** **Oxapampa:** Huancabamba, 1830 m, *Smith et al. 1665* (F, MO). **PIURA.** **Piura:** Piura, *Townsend 1399* (US). **Talara:** Parins Valley, *Haught 146* (NY, US). **SAN MARTÍN.** **Mariscal Cáceres:** Quebrada de Cachiyacu, 500–600 m, *Schunke 8494* (F, MO). **San Martín:** Vaca Pozo, Río Chumbazo al SE de Tarapoto, 830 m, *Woytkowski 35178* (F, MO); Alto Río Huallaga, 360–900 m, *Williams 6891* (F, GH, US). **UCAYALI.** **Coronel Portillo:** cerca Divisoria, 1400 m, *Ferreya & Jones 19020* (USM). **TACNA.** **Tacna:** near Tacna on road to Calientes, 500 m, *Meicalf 30356* (GH, MO). **TUMBES.** **Prov. Unknown:** *Ferreya 10744* (MO, USM). **NO EXACT LOCALITY.** *Matthews s.n.* (US); *Wilkes s.n.* (GH, MO, NY).

Acknowledgments

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1. Tumbes
2. Piura
3. Lambayeque
4. Cajamarca
5. Amazonas
6. La Libertad
7. San Martín
8. Loreto
9. Ancash
10. Huánuco
11. Lima
12. Pasco
13. Junín
14. Ucayali
15. Ica
16. Huancavelica
17. Ayacucho
18. Apurímac
19. Cuzco
20. Madre de Dios
21. Arequipa
22. Puno
23. Moquegua
24. Tacna

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