

## *Quasiantennaria* (Asteraceae, Gnaphalieae), a new genus from the central Andes

## ***Quasiantennaria* (Asteraceae, Gnaphalieae), un nuevo género de los Andes centrales**



## Abstract

*Quasiantennaria* R. J. Bayer & M. O. Dillon, a new genus from the central Andes distributed from Peru to Bolivia, is described and illustrated. It is characterized among Andean Gnaphalieae by its dioecious or polygamo-dioecious breeding system, caespitose, perennial herbs, basal rosulate leaves, capitulescences scapose, cymose-corymbose. It most closely resembles *Antennaria* Gaertn., a typically northern hemispheric genus; however, it differs in its achenial trichomes and relationships suggested by DNA sequence data.

**Keywords:** Asteraceae, Gnaphalieae, new genus, Bolivia, Peru, Andean flora.

## Resumen

*Quasiantennaria* R. J. Bayer & M. O. Dillon, un nuevo género de los Andes centrales con distribución en Perú y Bolivia, se describe e ilustra para Perú. Se caracteriza entre las Gnaphalieae andinas por su sistema de reproducción dioico o polígamo-dioico, caespitosa, hierbas perennes, hojas basales en roseta, capitulescencias escaposas, cimoso-corimbosas. Es muy cercano a *Antennaria* Gaertn., un género típicamente del hemisferio norte; sin embargo, difiere en los tricomas de los aquenios y las relaciones filogenéticas sugeridas por datos de secuencia de ADN.

**Palabras clave:** Asteraceae, Gnaphalieae, nuevo género, Bolivia, Perú, flora andina.

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## Introduction

The Gnaphalieae (Cass.) Lecoq & Juill. (Asteraceae) is a small tribe comprising ca. 185 genera and 1240 species (Ward *et al.*, 2009). In South America, some 20 genera and over 100 species are recorded with highest diversity in the tropical and subtropical Andean Cordillera (Dillon & Sagástegui-A., 1991a). Many have proliferated in upper elevation or alpine habitats in Peru (Dillon, 2005) and overwhelmingly they possess reduced, small cushions of tightly clustered basal densely canescent leaves. Genera can look remarkably similar, both in the field and as collections on herbarium sheets, but experience within these groups has shown that upon inspection, microcharacters can allow discrimination of genera, especially when combined with DNA sequence data (Luebert *et al.*, 2017).

Species that have been attributed to *Antennaria* Gaertn. in South America, e.g.,

*A. chilensis* J. Rémy, *A. magellanica* Sch. Bip. (= *Antennaria chilensis* var. *magellanica* Reiche), and *A. sleumeri* Cabrera, have been considered as putative disjunctions from Northern Hemispheric taxa (Bayer *et al.*, 1996). Recent next generation sequencing using hundreds of loci (Thapa *et al.*, ined.) shows that *Antennaria chilensis* is a traditional *Antennaria* and is closely related to the *Antennaria rosea* Greene polyploid agamic complex. It was recovered as sister to *Antennaria corymbosa* E. Nels., which is a putative sexual progenitor of *A. rosea* (Bayer, 1990; Thapa *et al.*, ined.). *Antennaria sleumeri* is an enigmatic species, known only from scant type material (LP) and until the species can be relocated, collected and studied further its relationships will likely remain cryptic. The remaining South American species, *A. linearifolia* Wedd., was recently included in analyses by Luebert *et al.* (2017) and Thapa *et al.* (ined.) and notably did not group with other authentic or traditional *Antennaria* species,

i.e., *A. chilensis*, *A. dioica* (L.) Gaertn., and *A. microphylla* Rydb. (see Fig. 1, p. 1188 in Luebert *et al.*, 2017).

Luebert *et al.* (2017) found that *A. linearifolia* was resolved in Clade L6 which included *Jalcophila* M. O. Dillon & Sagást., *Loricaria* Wedd., and *Mniodes* (A.Gray) Benth. (BPP: 1, MLB: 84). *Jalcophila* is sister to a clade with *A. linearifolia*, *Loricaria* and *Mniodes* (BPP: 1, MLB: 98). Relationships within the latter clade remain unresolved. *Loricaria* is well-supported (BPP: 1, MLB: 99) and *Mniodes* forms a well-supported monophyletic group (BPP: 1, MLB: 90). All other *Antennaria* were restricted to Clade L5 which contained *Diaperia* and sister to Clade L4 which contained *Chevreulia* Cass. and *Cuatrecasasiella* H. Rob.

Thapa *et al.* (ined.) conducted an analysis using hundreds of loci to reconstruct the phylogeny of 34 species of *Antennaria* including, *A. linearifolia*. *Antennaria linearifolia* fell clearly outside a strongly supported monophyletic traditional *Antennaria*, in an outgroup that contained four outgroup taxa, *Mniodes schultzii* (as *Belloa*), *M. subspicata* (as *Luciliocline*), *Gamochoetopsis alpina* (Poepp. & Endl.) Anderb. & S. E. Freire, and *Facelis lasiocarpa* (Griseb.) Cabrera. The relationships of *A. linearifolia* to any of the outgroup taxa was unresolved (Thapa *et al.*, ined.), however it is manifestly not an *Antennaria*.

Therefore, molecular data has suggested that *Antennaria linearifolia*, regardless of its overall morphology, was recovered in a clade together with *Loricaria* and *Mniodes*, while the remainder of *Antennaria* species form a separate clade (Luebert *et al.*, 2017). This result was not apparent in the ITS analysis of *Antennaria* (Bayer *et al.*, 1996), because material of *A. linearifolia* was not included in that study.

The distribution of the dioecious breeding syndrome has developed independently no fewer than seven times within the Gnaphalieae, viz. *Antennaria*, *Loricaria*, *Mniodes*, *Cuatrecasasiella* H. Rob., *Parantennaria* Beauverd, *Pterygopappus* Hook. f., *Sinoleontopodium* Y.-L. Chen (Anderberg, 1991) and is a good example of parallel evolution. *Antennaria* has a Holarctic (mostly North American) distribution, while *Loricaria*, *Mniodes*, and *Cuatrecasasiella* are South American, *Parantennaria* and *Pterygopappus* are Australian, and *Sinoleontopodium* is Asian (China). A recent ITS/ETS phylogeny (Nie *et al.*, 2015) of the Gnaphalieae using 80% of the genera (835 species) in the tribe confirmed the independent origins of the dioecious Gnaphalieae. *Sinoleontopodium* was described because its dioecious nature made it an “atypical” *Leontopodium* (Chen, 1985), however, it is clearly shown to be imbedded within traditional *Leontopodium* (Nie *et al.*, 2015) by the molecular data. , have been upheld as distinct from *Antennaria*. The evolution of the dioecious trait in the Gnaphalieae seems to be associated with the high elevation, usually cushion plant habit, and is therefore not always a trustworthy indicator of phylogenetic relatedness. Much taxonomic confusion in the Gnaphalieae has been caused because dioecy has been used as a strong taxonomic character, assumed to be homologous.

Therefore, as *A. linearifolia* cannot remain in traditional *Antennaria* and its relationships to other genera remain unclear, we propose that the taxon be moved to a new genus, *Quasiantennaria*.

## Results

*Quasiantennaria* R. J. Bayer & M. O. Dillon, gen. nov.

**TYPE:** *Quasiantennaria linearifolia* (Wedd.) R. J. Bayer & M. O. Dillon

Dioecious or more rarely 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, sessile, biseriate, capitate-glandular trichomes; pappus bristles uniseriate, scabrid, barbellate, fused at base or free, apices clavellate (staminate) or acute (pistillate).

A monotypic genus that contains the following species:

*Quasiantennaria linearifolia* (Wedd.) R. J. Bayer & M. O. Dillon, comb. nov.

*Antennaria linearifolia* Wedd., Chlor. And. 1: 150. 1856. TYPE: Peru, no exact locality, *J. Dombey* (Syntypes: P (P01816271!, P01816272!); lectotype (here designated): P01816271!); isolectotypes: MA (MA816408!, MA816409!) (Fig. 1, 2, 3, 4, 5).

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

*Leontopodium linearifolium* (Wedd.) Britton, Bull. Torrey Bot. Club 19(5): 148. 1892.

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

**Description:** Dioecious or rarely polygamo-dioecious, perennial herbs, rhizomatous; stems unbranched, 5-15(-30) 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, ca. 40  $\mu$ m long, ca. 55  $\mu$ m wide (Fig. 6D, 7); pappus bristles ca. 3.5 mm long, apices clavellate (staminate) (Fig. 8, right) or acute (pistillate) (Fig. 8, left).

**Etymology:** From the Latin *Quasi-*



(about, as if, just as if, as though) and *Antennaria*. Originally described as if it were an *Antennaria* to which it bears a superficial resemblance particularly in its dioecious breeding system.

#### Distribution:

*Quasiantennaria linearifolia* is distributed throughout the central cordillera in Peru from Departments of Amazonas to Cusco, and northern Bolivia; (2700-) 3100-4500 (-5000) m. Collections determined as *Q. linearifolia* (as *Antennaria*) have been recorded from Ecuador, both at MO and US; however, in this study, we have not examined any authentic material from Ecuador. Ecuadorian collections have thus far proven to be either *Pseudognaphalium* or *Mniodes*; therefore, the distribution in Ecuador is represented as putative records on the distribution map (Fig. 10).

#### Discussion

Collections of this species are commonly misidentified as *Antennaria* or *Gnaphalium* (inc. *Pseudognaphalium*). *Quasiantennaria* shares a dioecious or polygamo-dioecious reproductive system and dimorphic pappus bristles, as in *Antennaria*, and possessed white, showy phyllary apices and basal leaves (Fig. 9). Microcharacters of the achenial trichomes are quite different, with *Antennaria* having clavate trichomes ca. 40  $\mu\text{m}$  long, ca. 15  $\mu\text{m}$  wide (Fig. 6B, C) and those in *Quasiantennaria* are globose, wider than long, ca. 40  $\mu\text{m}$  long, ca. 55  $\mu\text{m}$  wide (Fig. 6D, 7).

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

**Nomenclatorial notes:** *Quasiantennaria linearifolia* has been confused with the heterogamous taxon currently treated as *Pseudognaphalium antennarioides*

(DC.) Anderb. or other potential *Pseudognaphalium* species. They have been confused in both identification of herbarium material and promulgated in the literature. They both have gray, basal leaves and spicate capitulescences with clustered heads; however, the similarities between these two taxa are purely superficial. *Pseudognaphalium antennarioides* was proposed for a taxon with heterogamic capitula containing numerous pistillate florets and ca. 15 central, hermaphroditic florets (*Humboldt & Bonpland s.n.*, P00322319). The latter taxon often has stolons or lateral stems and the erect flowering stems are often more leafy and without obvious internodes.

Dillon & Sagástegui (1991) placed *Gnaphalium sedoides* F. W. Klatt under the synonymy of *Antennaria linearifolia*; however, in retrospect, this taxon may be a member of *Pseudognaphalium*. The final placement of this collection will await additional study. *Gnaphalium sedoides* F. W. Klatt, *Linnaea* 42: 135. 1878-79. TYPE: Peru, *J. Dombey* 252 (holotype: P (P00704538), F neg. 37609; isotype: GH (GH00008364).

**Specimens examined:** "BOLIVIA. Prov." Larecaja. "Vicinius Sorata inter Pongo et Alinaya", 3700-3900 m, Apr-May 1859, *G. Mandon* 160 (BM, F-1012072, K, P (P02668530, P02668531, P02668532, P02668533, P03312094, P04279072), S (SR329)); Mapiri, 10,000 ft, May 1888, *H.H. Rusby* 1599 (BM, K, P02668528, US-1733467). PERU. Dept. Amazonas: Prov. Chachapoyas, Balsas-Leimebamba, 28 May 1977, *J.D. Boeke* 1824 (F-2252242, MO, US-2932828); Cerros Calla Calla, E side, 19 km above Leimebamba on road to Balsas, 3100 m, *P.C. Hutchison & J.K. Wright* 5560 (F-1651822, K, MO, NY, US-2533843); Puma-urcu, SE of Chachapoyas, 3100-3200 m, *J. Wurdack* 1135 (US-2373626); Cerro

- Campanario NNE of Diosan, 3200-3500 m, *J. Wurdack* 1603 (US-2373683). Dept. Ancash: Prov. Bolognesi, Chiquian, 3840-3860 m, *R. Ferreyra* 5766 (US-1998663, USM). Prov. Huaraz: Cerro San Cristóbal, NE of Huaraz, 8 Jul 1977, 3800 m, *M. Evangelista s.n.* (HUT, MO-3010688). Prov. Huaylas, Tocache Punta, 4 May 1987, 4000 m, *J. Mostacero L., S. Leiva G., F. Mejía C., F. Peláz P., D. Medina C., & W. Zelada E.* 1965 (F-2010105, MO, US-3262675). Prov. Huari, Huascarán National Park, 1 km below Manto Mina, 9°42'W, 77°15'W, 4300 m, 4 Jul 1985, *D. Smith & M. Buddensiek* 11010 (F-1961103, p.p., MO). Prov. Huaylas, Huascarán National Park, Quebrada Alpamayo, 8°50'S, 77°42'W, 4250-4020 m, *D.N. Smith, R. Valencia, & L. Minaya* 9846 (F-1961047, MO). Prov. Yungay, Huascarán National Park between guard post and head of María Josefa trail, 9°05'S, 77°40'W, 3500-3600 m, 28 Jan 1985, *D.N. Smith, B. Stein, & C. Todzia* 9409 (F-1963530, MO). Prov. Recuay, Conococha, 3 Nov 1984, 4100 m, *A. Sagástegui A. & M.O. Dillon* 12341 (F-1982346, MO). Sector Huari: 14.8 km NE of Tunel Cahuish along road between Catac and Chavin de Huantar, 3000-4000 m, *D. Stevens* 21965 (MO). Dept. Cajamarca: Prov. Cajabamba, Pumacama, ruta a Luchubamba, 3790 m, 4 Aug 2002, 7°33.7'S, 78°00'W, *A. Sagástegui A., M. Zapata M., & J. Leal* 17001 (F-2241955). Prov. Cajamarca, ca. 27 km NNW of Cajamarca on road to Hualgayoc, Pampa de Cerro Negro, 3600 m, *M.O. Dillon & U. Molau* 3023A (F-1925422); Quilish, al N. de Cajamarca, ruta a Hualgayoc, 3890 m., 16 Jan 1994, *I. Sánchez V. & M. Cabanillas* 6671 (F-2152116); Cumbe Mayo, 3450 m, 26 Jun 1987, *I. Sánchez V. & A. Sagástegui A.* 4430 (F-2140575). Tamiahoa, Cerro Negro, Gavilán, 3558 m, 26 May 2001, 7°15'W, 78°28'W, *I. Sánchez V.* 10614 (F-2230481); Tamiachocha, al Sur de Cerro Negro, a 5 km del Abra El Gavilán, 3560 m, 4 Jun 2001, 7°15'S, 78°27'W, *I. Sánchez V.* 10658 (F-2233227). Prov. Celendin, ca. 57 km NE of Cajamarca along road to Celendin, 3650 m., *M.O. Dillon & B.L. Turner* 1611 (F-1866911, MO). Prov. Contumaza: above Contumaza, 24 Apr 1966, 2700 m, *A. Sagástegui A. & M. Fukushima* 6098 (HUT, US-2582027); Pozo Kuan, 3600-3800 m, *A. Sagástegui et al.* 10086 (HUT), 12451 (HUT, MO). Prov. San Marcos, Ruta a Huagal, Cerro Quinua, a 10 km del desvío, 3120 m, 10 Apr 1991, *I. Sánchez V., W. Flores, & S. Leiva* 5514 (F-2138964). Prov. San Miguel: Taulis Alto (jalca), 3100 m, *A. Sagástegui, E. Alvitez, & J. Mostacero* 9543 (F-1893501, HUT). Dept. Cusco: Prov. Paucartambo, Acjanaco, 4 May 1990, 3600 m, *A. Cano E.* 3440 (F-2044360); Parque Nacional Manu, 19 Mar 1992, *A. Cano E.* 5125 (F-210409); Tres Cruces, 3330-3500 m, *A. Gentry, M. Dillon, P. Berry, & J. Aronson* 23439 (MO-2726315); Corihuayrachina, Callanga, 3800 m, *F. Woytkowski* 565 (MO). Urubamba: Machu Picchu, on the Palcay side of the Salcantay-Palcay pass, 3500 m, *B. Peyton & S.T. Peyton* 711 (MO); Kinca Concha, Espejo Puerto, 4500 m, 9 Apr 1993, *A. Tupayachi* 2138 (F ex CUZ 028537). Dept. Huancayo: Huancayo: Huancayo, 4000 m, *J. Soukup* 1870 (US-1831634); Laguna Huacracocha, 5000 m, Feb 1948, *J. Soukup* 3612 (F-1415624). Dept. Huanuco: Mito, 6 mi S of Mito, 1-5 Aug 1922, ca. 11,000 ft, *J.F. Macbride & W. Featherstone* 1894 (F-518389, US-1186021). Dos de Mayo: Probresco, 12 mi E of Huallanca, ca. 10,500 ft, *J.F. Macbride & W. Featherstone* 2463 (F-518892, K, US-1186095). Prov. Huanuco, Pillao, 2700 m, *F. Woytkowski* 34041 (F-1310502). Dept. Junin: Prov. Concepcion, 6 mi S of Mito, ca. 11,000 ft, *J.F. Macbride & W. Featherstone* 1819 (F, US). Dept. La

Libertad: Prov. Huamachuco, ca. 20 km W of Huamachuco, ca. 3400 m, 7 Jan 1983, M.O. Dillon, U. Molau, & P. Matekaitis 2809 (F-1938701, USM); Cacanán, 23 Feb 1967, 3300-3400 m, Ricchio & La Rosa 3564 (US-2582211). Prov. Otuzco: Cerro Sango, Motil-Shorey, 3300-3400 m, A. López M. 968 (US-2141164), 7950 (HUT); Cerro Sango, Motil-Shore, 28 Mar 1991, 3350 m, A. Sagástegui A., R. Campos C., C. Gorriti C., P. Lezama A., & C. Tellez A. 14427 (F-2119592). Cerro Ragache - Salpo, 3200 m, 23 May 1994, A. Sagástegui A., M. Diestra, & S. Leiva G. 11588 (F-1982345, F-1947675, HUT, MO). Prov. Pataz, Travesía a Laguna Huascacocha, 3650 m, 10 May 2003, A. Sagástegui A., M. Zapata, E. Rodríguez & V. Medina 17364 (F-2320491, MEM). Prov. Otuzco, Trujillo - Huamachuco, 10-15 km before Shorey and Rangel, 7°59'S, 78°22'W, 3300 m, 13 Feb 1983, D.N. Smith & R. Vasquez M. 3293 (F-2002062). Prov. Pataz: Quebrada Rangia, Tayabamba-Huancaspata, 3600 m, A. López M. & A. Sagástegui A. 8208 (HUT, MO, NY). Dist. Buldibuyo, Alto El Diablo, 3600 m, 17 Mar 2001, 8°7.2'S, 77°24'W, A. Sagástegui A. & M. Zapata C. 16380 (F-2226169). Prov. Sánchez Carrion: ca. 10 km N of Laguna Saucacocha, ca. 20 km NE of Huamachuco, ca. 3370 m, M. Dillon, U. Molau, & P. Matekaitis 2845 (F-1918815, MO, TEX, USM); Comumbamba, subiendo al Nevado Huaylillas, 20 May 2001, 3824 m, 7°51.9'S, 78°01'W, A. Sagástegui A. & M. Zapata C. 16460 (F-2226184). Prov. Santiago de Chuco, al Oeste del Cementerio de Quirivilca, 3980 m, 22 May 2001, S. Leiva G. & P. Leiva 2558 (F-2230006). Dept. Lima: Prov. Chancay, Auquimarca, Mar 1947, 4000 m, P. Abdón 3271 (F-1416105). Dept. Pasco: Prov. Pasco, Cerro de Pasco, 4135 m, H. Ellenberg 4123 (US-2889328). Quichas, Bosque de *Polylepis* de Q'asacancha, 10°33.09'S, 76°46.09'W, 4200 m, W. Mendoza

& G. Servat 150 (CUZ-31625). No exact locality: Peru, 1909-1914, A. Weberbauer 7004 (F-628017).

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### Contribution of the authors

R.J.B: Redaction of the text, evaluation, methodology, taxonomic determination of the species, review and approval of the final text. M.O.D.: Fieldwork, redaction of the text, taxonomic determination of the species.

### Conflicts of interests

The authors declare not to have conflicts of interests.

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**Fig. 1.** *Quasiantennaria 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) (tomado de Dillon & Sagástegui, 1991).

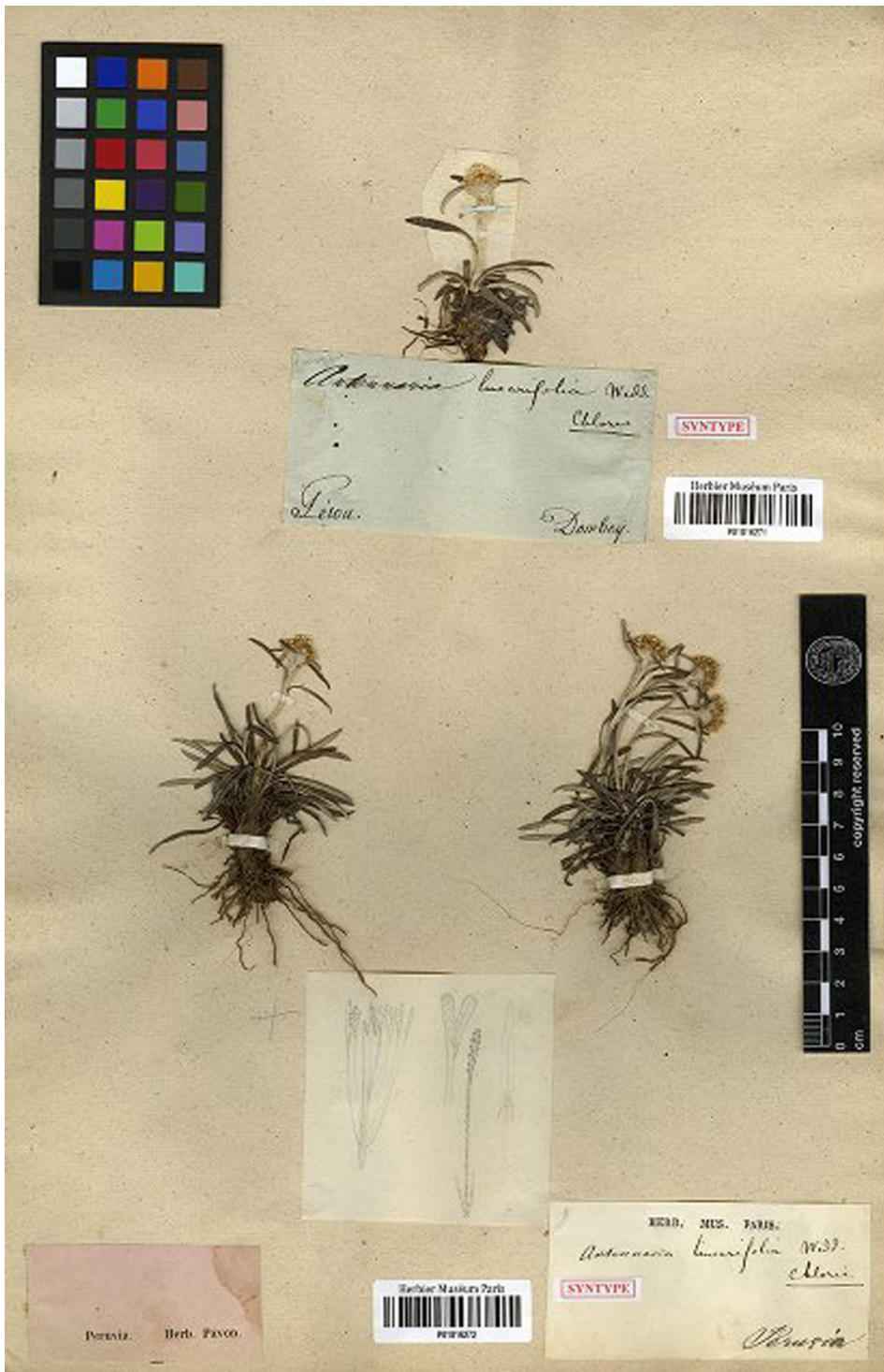


Fig. 2. *Quasiantennaria linearifolia*. Syntypes: *Dombey s.n.* (P01816271, P01816272)



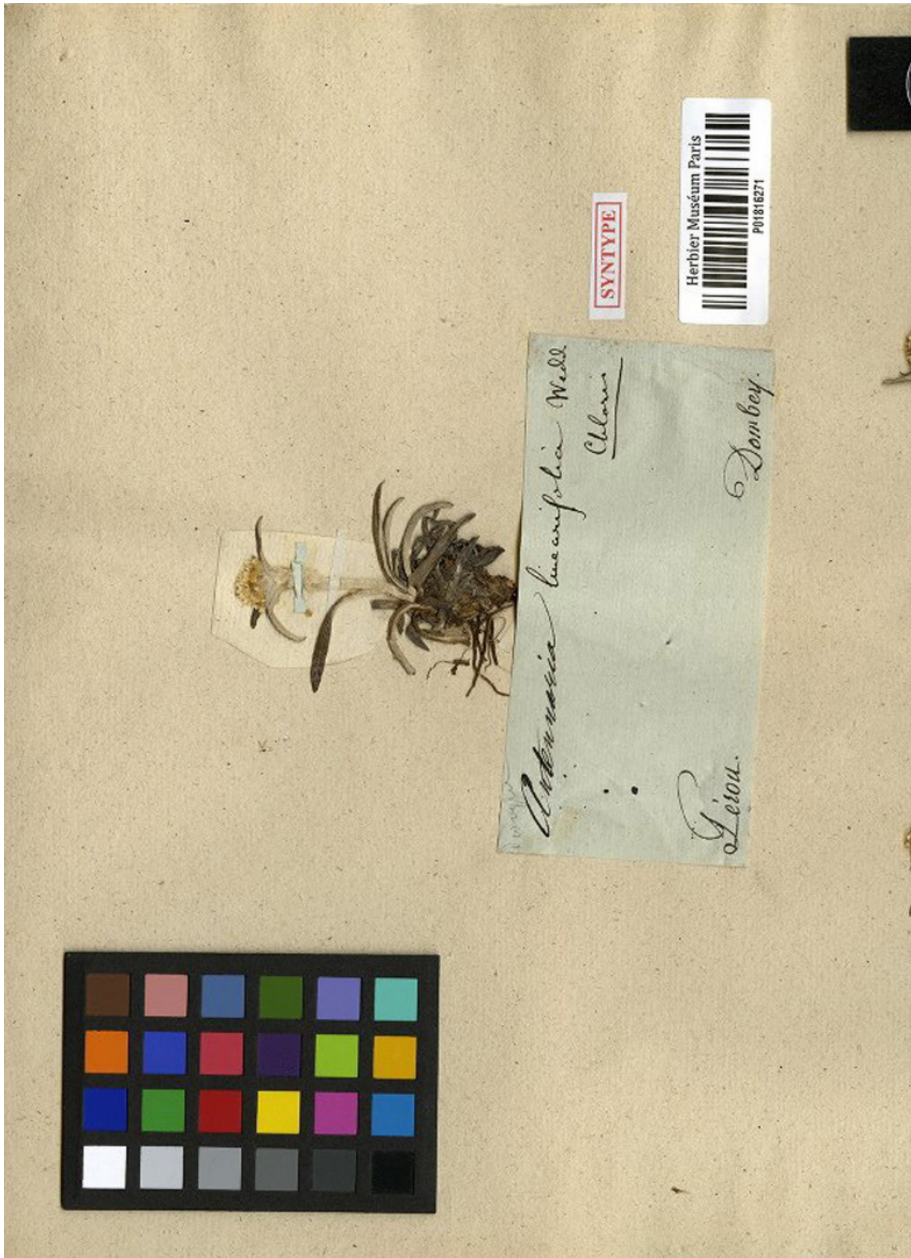


Fig. 3. *Quasiantennaria linearifolia*. Lectotype: chosen here from syntypes: Dombey s.n. (P01816271).



Fig. 4. *Quasiantennaria linearifolia*. Isotypic collection MA (MA816408). Note that Friedrich Walter Domke annotated the sheet as "*Gnaphalium antennarioides* DC." a taxon unrelated to *Q. linearifolia*.

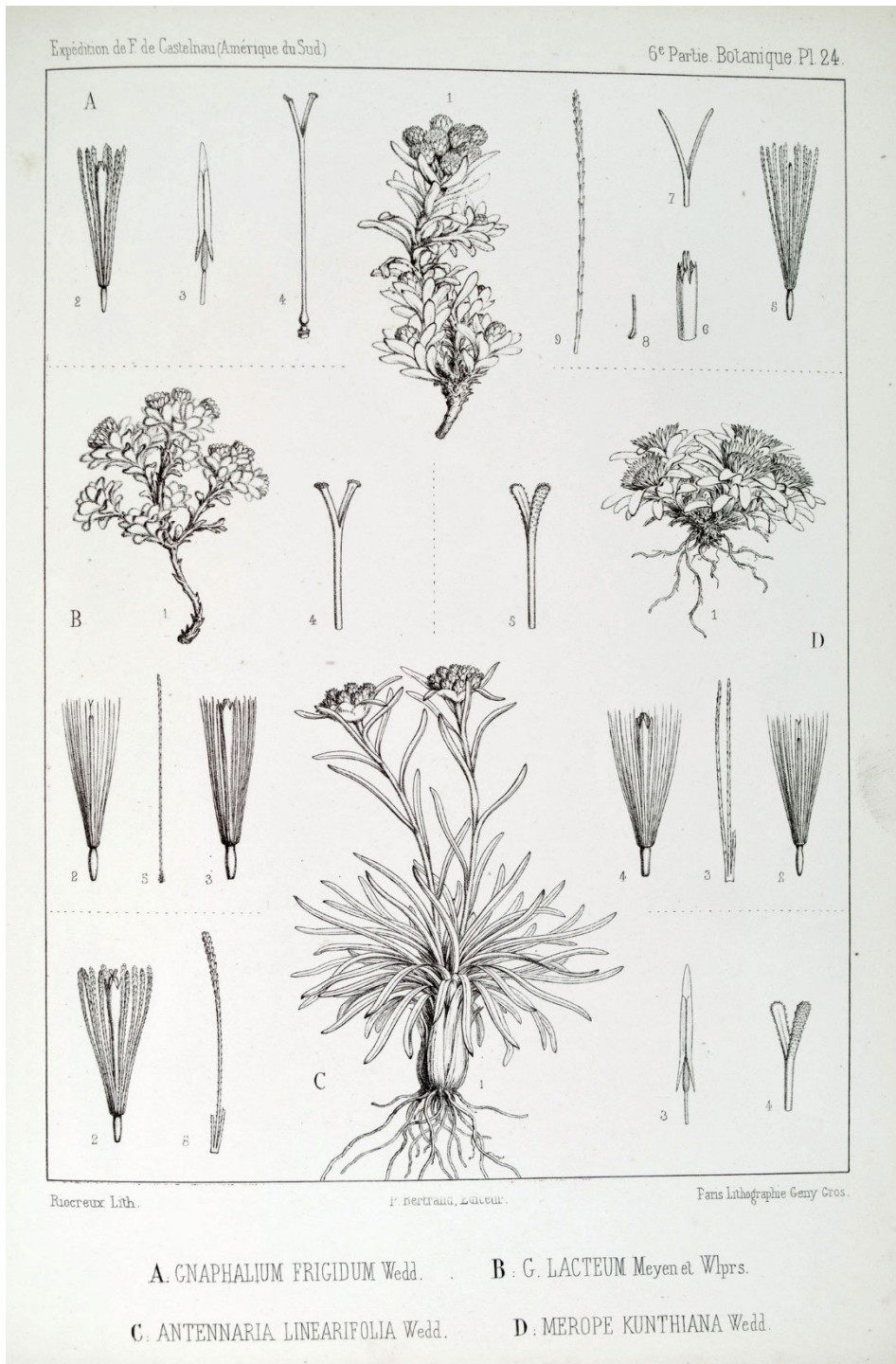
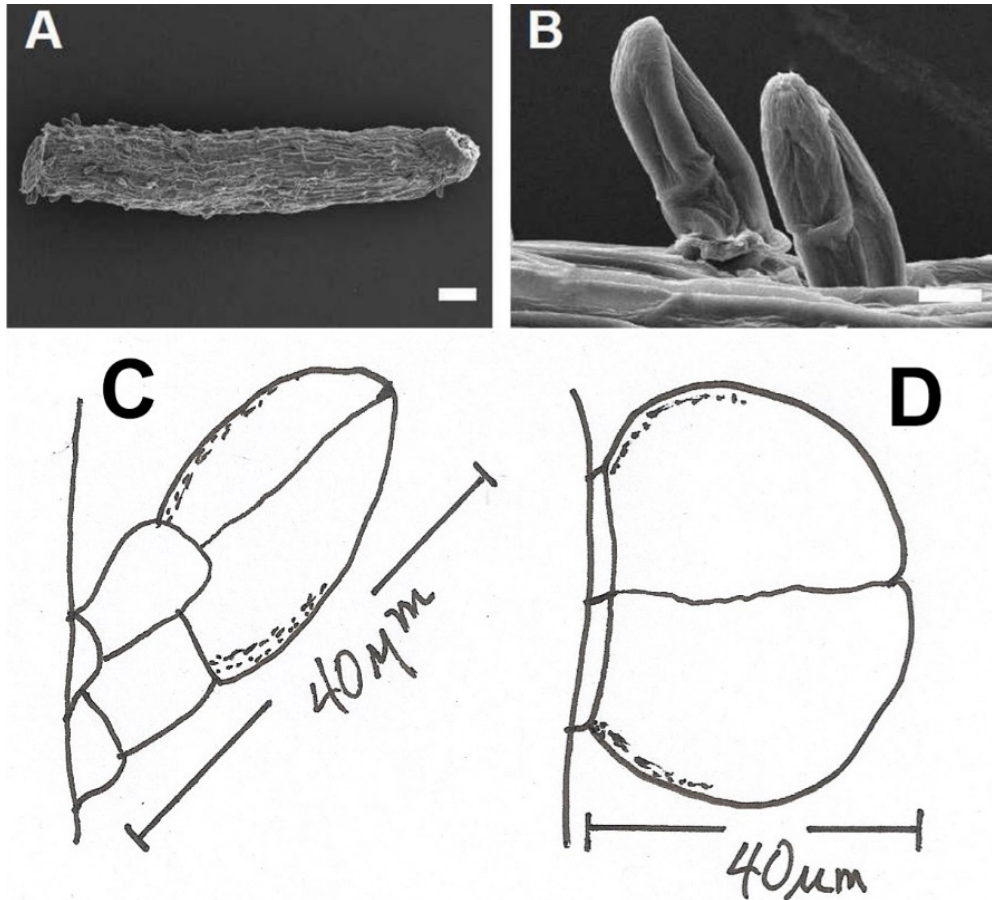
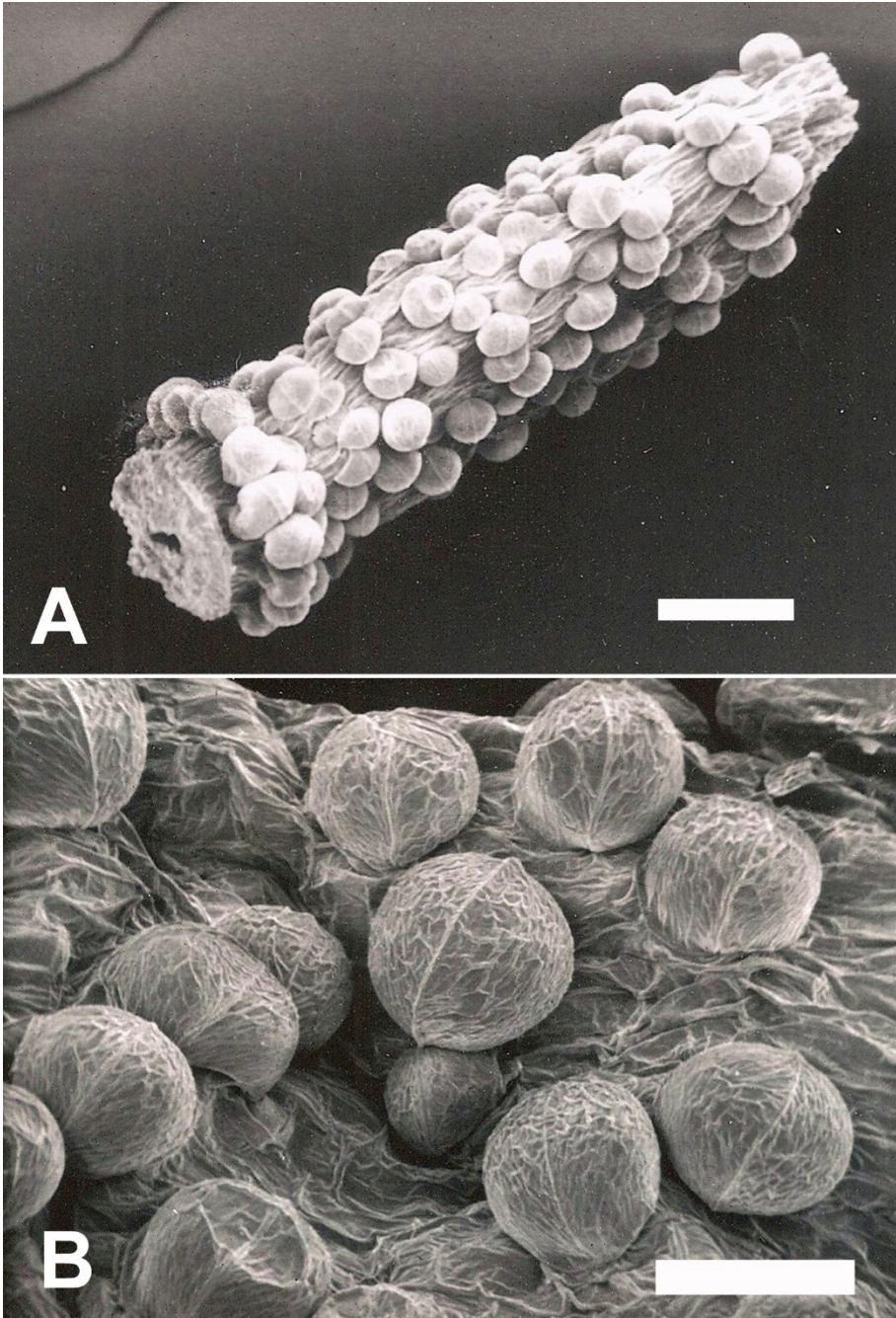


Fig. 5. Illustration of *Antennaria linearifolia* (Chloris Andina, Plate 24, C (1, habit; 2, male floret; 3, anther; 4, style branch apices; 5, male pappus bristle).





**Fig. 6.** Achenial trichomes. A. SEM of *Antennaria parvifolia* Nutt. achene, white scale bar = 100  $\mu\text{m}$ . B. Close-up of achenial trichomes, white scale bar = 10  $\mu\text{m}$  (adapted from Luebert et al., 2017, Fig. 2, A & B, p 1190). C. *Antennaria neodioica* (= *A. howellii* Greene) achenial trichomes, ca. 40  $\mu\text{m}$  long, ca. 16  $\mu\text{m}$  wide (redrawn from Porsild, 1931, Fig. 3). D. *Quasiantennaria linearifolia*, ca. 40  $\mu\text{m}$  long, ca. 55  $\mu\text{m}$  wide, illustration drawn from light microscope preparation (Voucher: Lopez & Sagástegui 8208, F).



**Fig. 7.** *Quasiantennaria linearifolia*. A. SEM of aborted achenes from male floret, white scale bar = 10 mm. B. Close-up of achenial trichomes, white scale bar = 50  $\mu$ m. (Voucher: *Ferrerya* 5766, F).



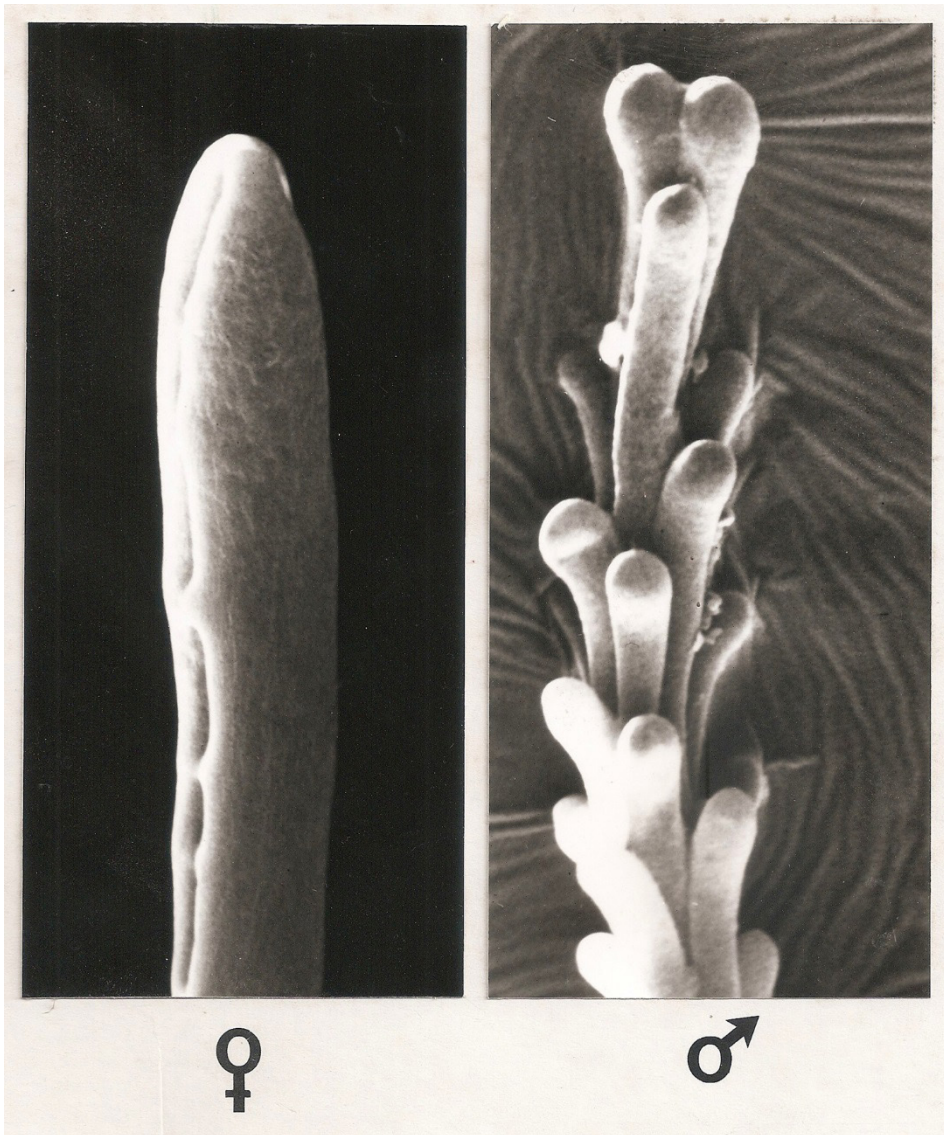


Fig. 8. *Quasiantennaria linearifolia* pappus bristle apices. Left pistillate (female) bristle apex. Right staminate (male) bristle apex.



**Fig. 9.** *Quasiantennaria linearifolia*. Photograph taken by A. Sagástegui (Voucher: Sagástegui et al. 17317 (F)).



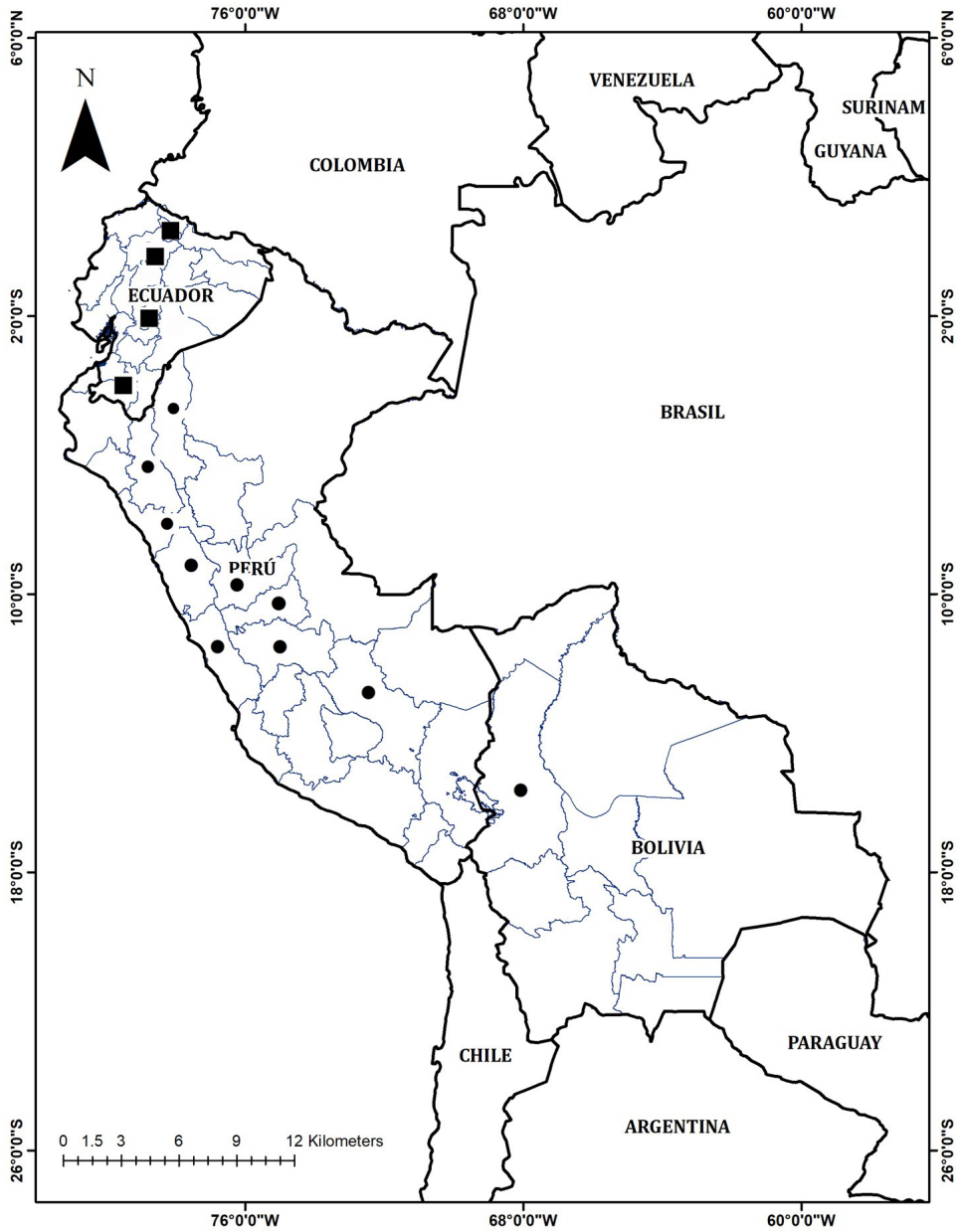


Fig. 10. Distribution of *Quasiantennaria linearifolia*. Verified distributional records from Bolivia and Peru = ●. Unverified distributional records from Ecuador = ■ (see text).