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Three New Species of *Mniodes* A. Gray (Gnaphaliinae, Gnaphalieae, Asteraceae) from Bolivia and Peru and Nomenclatural Changes in the *Lucilia*-Group

Tres nuevas especies de *Mniodes* A. Gray (Gnaphaliinae, Gnaphalieae, Asteraceae) de Bolivia y Perú y cambios nomenclaturales en el grupo *Lucilia*

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Abstract

Recent studies within the Neotropical members of the Gnaphaliinae (Gnaphalieae, Asteraceae), especially those utilizing DNA sequences, have served to refine putative generic boundaries and clarify internal classification within the subtribe. In preparation of a monographic treatment built upon DNA investigations, we describe here one new species from Bolivia, *M. beckii* Quip. & M.O. Dillon, sp. nov., and two from Peru, *M. montesinosii* Quip. & M.O. Dillon, sp. nov., and *M. zapatae* Quip. & M.O. Dillon, sp. nov. Further, we resurrect a valid name proposed by Weddell (1954), *Merope caespititia* Wedd., and provide a new combination, *Mniodes caespititia* (Wedd.) Quip. & M.O.Dillon, comb. nov**.** A diagnostic key to *Mniodes* species from Bolivia and Peru is presented.

Key Words: Asteraceae, Gnaphalieae, *Mniodes*, Bolivia, Peru, Andean flora, sp. nov., comb. nov.

Resumen

Estudios recientes dentro de los miembros neotropicales de Gnaphaliinae (Gnaphalieae, Asteraceae), especialmente aquellos que utilizan secuencias de ADN, han servido para refinar los límites genéricos putativos y aclarar la clasificación dentro de la subtribu. En preparación de un tratamiento monográfico basado en investigaciones de ADN, describimos una nueva especie de Bolivia, *Mniodes beckii* Quip. & M.O. Dillon, sp. nov. y dos especies de Perú, *M. montesinosii* Quip. & M.O. Dillon, sp. nov. y *M. zapatae* Quip. & M.O. Dillon, sp. nov. Además, restablecemos un nombre válido propuesto por Weddell (1954), *Merope caespititia* Wedd., y proporcionamos una nueva combinación, *Mniodes caespititia* (Wedd.) Quip. & M.O. Dillon, sp. nov. Se presenta también, una clave de diagnóstico para las especies de *Mniodes* de Bolivia y Perú.

Palabras claves: Asteraceae, Gnaphalieae, *Mniodes*, Bolivia, Peru, Andean flora, sp. nov., comb. nov.

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Introduction

The Gnaphalieae (Cass.) Lecoq & Juill. (Asteraceae) comprise approximately 187 genera and 1240 species (Bayer et al., 2006, Ward et al., 2009) and with worldwide distribution. In South America, the tribe contains ~23 genera and over 100 species with highest diversity in the tropical and subtropical Andean Cordillera (Dillon & Sagástegui, 1991). The majority are endemics with 16 genera restricted to the New World, and several genera have proliferated in upper elevation habitats (Dillon, 2005). The adaptation that most exhibit is the severe reduction of habit into small cushions of densely packed pubescent leaves (Aubert et al., 2014). These genera tend to look remarkably alike, both in the field and as collections on herbarium sheets. Experience within these groups has shown that only upon inspection of capitular and floral microcharacters can the generic identity be confirmed with certitude.

Generic boundaries have been controversial and none more so than the recognition and relationships of a suite of genera in the *Lucilia*-group (Dillon, 2018). The recognition and constitution of genera such as *Belloa* J. Rémy and *Lucilia* Cass. has been an ongoing classification saga. Friere et al. (2015) transferred of all *Luciliocline* and some *Belloa* to the entirely dioecious genus, *Mniodes* (Gray, 1862). Ongoing DNA studies are contributing to our knowledge of species relationships in this expanded genus.

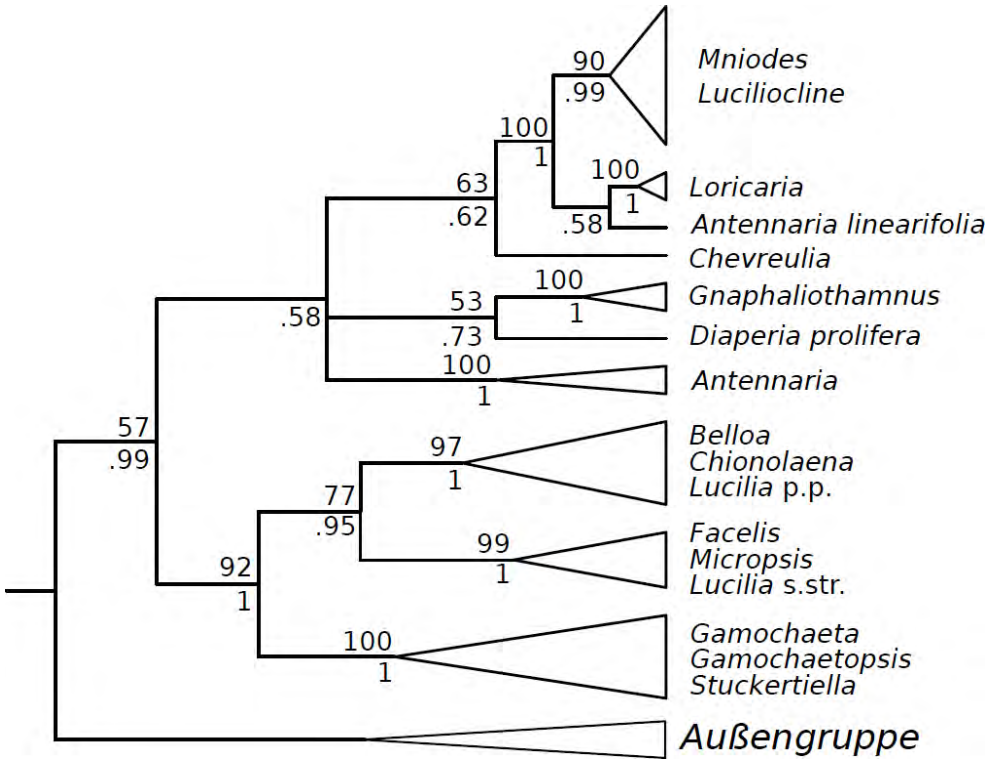

Fig. 1. Consensus tree based on Maximum Likelihood and Bayesian Analysis of the ITS + ETS nrDNA. Adapted from K. Wilke (2014).

With these additions, *Mniodes* consists of 19 species confined to high-elevation habitats of the Andean Cordillera from Venezuela, Colombia, Ecuador, Peru to Bolivia, Argentina, and extreme northern Chile (2800–4900 m). Most species at higher elevations tend to have more widespread distributions, but there are six Peruvian endemics and one Bolivian endemic. Peru appears to be a center of diversity for the genus with no fewer than 14 species recorded, followed by Bolivia with seven species, Argentina with five species, Chile and Ecuador with four species each, and Colombia with three species, and Venezuela with two species (Table1).

Table 1. *Mniodes* species recorded from each country. New species described here are in **bold**.

Country	# Spp	*Mniodes* species
Venezuela	2	*M. longifolia*, *M. piptolepis*
Colombia	3	*M. longifolia, M. piptolepis, M. radians*
Ecuador	4	*M. argentea, M. longifolia, M. piptolepis, M. turneri*
Chile	5	*M. argentea, M. coarctata, M. piptolepis, M. santanica, M. subspicata*
Argentina	5	*M. argentea, M. catamarcensis, M. piptolepis, M. santanica, M. subspicata*
Bolivia	7	*M. aretioides, M. argentea,* ***M. beckii****, M. caespititia, M. longifolia, M. piptolepis, M. subspicata*
Peru	14	*M. andina, M. argentea, M. aretioides, M. caespititia, M. coarctata, M. longifolia, M. lopezmirandae,* ***M. montesinosii****, M. plicatifolia, M. piptolepis, M. spathulata, M. subspicata, M. turneri,* ***M. zapata*****e**

Mniodes sensu Cuatrecasas (1954) contained strictly dioecious species. The generic concept applied here relies upon various criteria and *Mniodes* combined with *Luciliocline* taxa into a strongly supported as monophyletic group circumscribed by both morphological and molecular markers (Friere *et al*., 2015; Luebert *et al*., 2017).

In the preparation a formal monograph for *Mniodes* intended to address the implications of this newly recircumscribed genus, we describe three new, monecious species, one from Bolivia and two from Peru.

Materials & Methods

Herbarium material was investigated from the following herbaria: B, BM, F, GH, HSP, HUT, K, M, MO, NY, P, US, and W. Dried herbarium material was used after rehydration for measurements and descriptions of achene surface structures. Herbarium acronyms follow Thiers (2017).

Results

1. *Mniodes beckii* Quip. & M.O. Dillon, sp. nov. (Figs.2, 3, 4).

TYPE. BOLIVIA. **Dept. La Paz**: Prov. Franz Tamayo, Ulla Ulla, Cordillera de Apolobamba, 4 Jan 1982, 4700 m, *X. Menhofer 1037* (Holotype: F1934783; Isotype: LPB, *n.v*.)

Diagnosis

Habit similar to *Mniodes pulvinulata*, pulvinulate-cespitose habit, stems to 20 mm long, non-connate, densely leafy imbricate, leaf blades oblong, ca. 2.5 mm long, ca. 2.5 mm wide, apically densely villous, capitula heterogamous, 7-11 pistillate florets, 6-8 hermaphroditic florets, achenial trichomes capitate-glandular, ca. 30 µm long.

Description

Dwarf, cespitose-pulvinulate, perennial *herbs* forming cushions, the stems foliaceous, 10-20 mm long, cylindrical,

5-6 mm in diameter (including leaves); roots fibrous. *Leaves* densely imbricate; petioles ca. 2.5 mm long, 1.5–2 mm wide, strongly 3-nerved; blades obovate, apically reniform or rounded, both surfaces densely villous, ca. 2.5 mm long, ca. 2.5 mm wide, the bases encircling the stems to 1/2 the circumference, marcescent. *Capitulescences* of solitary heads, terminal. *Capitula* heterogamous, sessile; involucres cylindrical, 2.5–3 mm wide, 3–4 mm tall; phyllaries ca. 16, subequal, the outer lance-ovate, ca. 4 mm long, 2.5–3 mm wide, scarious, the margins hyaline, apex obtuse, revolute, petaloid, white, the inner ca. 5 mm long, ca. 0.5 mm wide, linear-lanceolate, pink band near midpoint, apex acute, revolute, petaloid, white; pistillate florets 7–11, the corollas ca. 3 mm long, ca. 0.4 mm wide at base, tapering to apex, ca. 0.15 mm, the style branches long-attenuate; pappus bristles 3–3.5 mm long, apically acute; hermaphroditic florets 6–8, the corollas ca. 3 mm long, ca. 0.4 mm wide; pappus bristles 3.2–3.5 mm long, apically acute. *Achenes* ca. 1.2 mm long, pubescent with capitate-glandular trichomes, ca. 30 μm long.

Distribution & ecology (Fig. 5)

Mniodes beckii is a Bolivian endemic, currently known from two localities in northern Bolivia ca. 100 kms apart. In the north, the holotype collection was recorded from the Ulla Ulla area at 4700 m (15º3'0"S, 69º16'0"W). To the south, the collection from near Combaya at 4200 m (15º47'40.45"S, 68º45'34.30"W) were made in 1850's (Figs. 6, 7). The Ulla Ulla Reserve is on a high plain northwest of La Paz, with an average elevation of over 4000 meters above sea level. The reserve is about 2,000 km² in size and protects part of the Central Andean wet puna ecoregion.

Etymology

The species epithet honors Dr. Stephan G. Beck, Curator and Director of the Bolivian National Herbarium (LPB), which he founded in 1979. He has personally added over 30,000 collections to the herbarium These are the origin of dozens of new species described in a wide variety of families, including the Asteraceae.

Discussion

In 1886, Schultz Bipontinus published an enumeration of species collected by *G. Mandon* in Bolivia in 1857. *Mandon 174* was a *nomen nudum* listed as *Lucilia nivalis* Schultz-Bip. (1865, p. 532). Although *Lucilia nivalis* was not validly published, an inspection of *Mandon 174* confirmed it to be a distinct species. Two duplicate collections of *Mandon 174* were examined in this study, a collection from the New York Botanical Garden (Fig. 6) and another at Kew Gardens (Fig. 7). Subsequently, the collection gathered by X. Menhofer was encountered in material sent to F for identification. It is characterized by compact habit with its 3-nerved, reniform or fan-shaped leave blades with bases encircling the stems for nearly half the circumference. Lower or older leaves are marcescent and quite persistent.

Superficially, its overall habit approaches that of *Mniodes pulvinulata* Cuatrec., a dioecious Peruvian species from northern Peru (Cuatrecasas, 1954). In fact, the duplicate collection of *Mandon 174* housed at Kew Herbarium was annotated as *Mniodes pulvinulata*. *Mniodes beckii* is easily distinguished from *M. pulvinulata* by possessing heterogamous capitula with nearly equal numbers of hermaphroditic and pistillate florets. Further, the leaves of *M. beckii* are smaller, 2.5 mm wide and 2.5 mm long, versus 3.5-4 mm in *M. pulvinulata*.

It should be noted that in the exsiccate of Mandon's collections, he also collected an unrelated plant under his number "*Mandon 174*" on the Portuguese island of Madeira in 1865.

Conservation status

This species deserves a preliminary status of Data Deficient (DD) due to its representation from only two collections and nothing is known about the populations size (IUCN, 2017).

Specimens examined

BOLIVIA, **Dept. La Paz**, Prov. Larecaja, Combaya, 4200 m, Jan 1859, *H. Mandon 174* (K, NY (NY00214770); P (P02533947, P02533953, P02533960).

2.*Mniodes montesinosii* Quip. & M.O. Dillon, sp. nov. (Figs. 8, 9, 10, 11).

TYPE. PERU. **Dept. Moquegua**: Prov. General Sánchez Cerro, Dist. Lloque; Qellan, Lucco, Matorral arbustivo, xerófilo, 16°16'36"S, 70°44'58"O, 3600 m, 25 Mar 2013, *D. Montesinos T. 4036* (HSP-003730).

Diagnosis

Habit similar to *Mniodes lopezmirandae*; leaves longer, narrower, not strongly discolorous; 3-5 hermaphroditic florets (vs 1-2 in *M. lopezmirandae*); 7-14 pistillate flores (vs 17-20 in *M. lopezmirandae*); pistillate stigmatic lobes ca. 40 mm (vs. 90 mm in *M. lopezmirandae*).

Description

Perennial *herbs*, the stems 10–13 cm tall, branched, ascending, leafy to the apices. *Basal leaves* linear-lanceolate, 20-35 mm long, 3-4 mm wide; *cauline leaves* linear, 17-18 mm long, ca. 2 mm wide, abaxial surfaces densely arachnoid-lanate, adaxial surfaces arachnoid, glandular, shining. *Capitulescences* terminal, pseudospicate, of 4-5 capitula subtended by reduced leaves. *Capitula* heterogamous, sessile, 6-7 mm long, ca. 5 mm wide; involucres cylindrical; phyllaries 12-15, 3-seriate, the outer ovate, ca. 3 mm long, ca. 2 mm wide, densely lanuginous, the inner series lanceolate, ca. 4 mm long, 1.5-2 mm wide, to linear, ca. 7 mm long, ca. 1.5 mm wide, glabrous, acute to obtuse, with purple coloration; pistillate florets 7-14, the corollas filiform, ca. 6 mm long, apically 3-cleft, uniseriate, multicellular trichomes, the style branches ca. 40 mm; hermaphrodite florets 3-5, corollas cylindrical, 5 mm long, 5-lobed. *Achenes* oval to oblong, 1-1.4 mm long, ca. 0.5 mm wide, densely pubescent with glandular-capitate, biseriate trichomes; pappus bristles 5 mm long, white.

Etymology

The species epithet honors Dr. Daniel B. Montesinos-Tubée, a plant systematists from Arequipa, Peru. His contributions and interests include taxonomy and ecology of the Caryophyllaceae and Senecioneae (Asteraceae) of the Andes, phytosociology, ecology, and conservation.

Distribution & ecology (Fig. 5)

Mniodes montesinosii is endemic to Department of Moquegua in the southern Peruvian Andes. It typically inhabits open xerophilous scrublands at elevations between 3800-4040 m. Observations suggest that it grows on calcareous soils.

Conservation status

This species deserves a preliminary status of Critically Endangered (CR); only recorded from only a few individuals in two population (IUCN, 2017).

Additional specimens examined: PERU. **Dept. Moquegua**: Prov. General Sánchez Cerro, Dist. Ichuña, Tolapampa,

16º 09'50"S, 70º27'10"W, 4040 m, 15 Apr 2012, *D.B. Montesinos 3824* (HSP-001275).

3. *Mniodes zapatae* Quip. & M.O. Dillon, sp. nov. (Figs. 12, 13, 14, 15).

TYPE. PERU. **Dept. La Libertad**: Prov. Pataz, Laguna Huascacocha – Las Montañita, 3550 m, 8º5.3'S, 77º16.2' W, 11 May 2003, *A. Sagástegui A., M. Zapata C., E. Rodriguez R., V. Medina 17399* (holotype: F (F-2313838), isotype: F (F-2309590), HAO duplicates destroyed by fire, 6 Jun 2010).

Diagnosis

Minute trailing herbs with delicate stems to 6 cm long; leaves similar to *Mniodes plicatifolia*, but leaves only 4-5 mm long, arranged spirally; achenes with capitate-glandular trichomes; pappus bristles of subulate lamina, reflexed when dry, apically penicillate.

Description

Minute, cespitose-pulvinulate *herbs*, the stems foliaceous, 3-6 cm long, delicate or weak, the internodes 1–2 mm long. *Leaves* oblong, falcate, 4–5 mm long, spirally arranged, broadly petiolate, the petioles 2–2.5 mm long, ca. 0.8 mm wide, 3-nerved; blades elliptic to orbicular or rotund, subplicate, discolorous, ca. 2 mm long, ca. 1.5 mm wide, apically rounded, mucronate, the abaxial surfaces densely lanate-tomentose, white, oblique-aseptate-flagellate trichomes, body cells 1 mm long, the adaxial surfaces green, sparsely tomentose. *Capitulescences* of solitary, terminal head subtended by distal leaves. *Capitula* heterogamous, sessile, ca. 5 mm tall; involucres 2–3-seriate, the outer phyllaries ovate, ca. 3.5 mm long, ca. 1.5 mm long, apically acute, the inner phyllaries oblanceolate, ca. 5 mm long, ca. 0.7 mm wide, apically attenuate; pistillate florets 10, the corollas tubular, ca. 1.6 mm long, ca. 0.2 mm wide, apically with 3–4-fid; hermaphroditic florets 2, the corollas tubular, ca. 2.2 mm long, ca. 0.2 mm wide, apically 3–4-fid. *Achenes* obovoid, 0.9–1 mm long, ca. 0.5 mm wide, the basal portion of the style persistent, pubescent with biseriate, capitate-glandular trichomes, opening and dehiscing mucilage in water; pappus ca. 9 setae, uniseriate, basally coherent, caducus, the bristles laminar, subulate, ca. 2 mm long, ca. 0.1 mm wide, echinate, apically penicillate.

Distribution & ecology (Fig. 5)

Mniodes zapatae is assumed to be an endemic since it is only known from the type locality within a *jalca* formation (Dillon, 2005). It was found growing amongst mosses in moist situations at 3550 m and the tiny plantlet (Fig. 14 a, b, c) was actually discovered within plant material surrounding the roots of a *Tillandsia* species (Bromeliaceae) that was being prepared for the plant press.

Discussion

This species has a combination of unique characters that distinguish it from all other members of the genus. Its overall habit suggests a bryophyte, with weak, thin stems and very small leaves. The shape and morphology of the leaves of *Mniodes zapatae* suggests that of a miniature *M. plicatifolia*; a species possessing leaves with blades 5–15 mm long and 3–7 mm wide, well over twice the size of the former species. It is easily assigned with capitular and floral characters, such as the presence of capitate-glandular achenial trichomes diagnostic for the genus (Fig. 15b). The pappus bristles are unusual in being laminar and reflexing in maturity and the penicillate apices are not recorded elsewhere in this genus or any other to our knowledge.

This species is only known from the holotype and isotype collections at F; regrettably all duplicate collections were lost when the herbarium at HAO in Trujillo was destroyed by fire on 6 June 2010. Efforts to recollect is miniature plant have not been successful.

Etymology

The species epithet honors Biologist, Technical Assistant - Vice Chancellor of Research Mario Enrique Zapata Cruz at Universidad Privada Antenor Orrego, Trujillo, Peru. He has held a wide variety of important positions at UPAO, including curator of collections at the Natural History Museum up to 2010 when the Museum burned down. Over many years, he has participated incollecting expeditions, typically tasked with pressing plants. He discovered this tiny species as he cleaned away the refuse of bryophytes inadvertently gathered associated with roots of a *Tillandsia* species; a testament to his taxonomic eye!

Conservation status

This species deserves a preliminary status of Critically Endangered (CR); only recorded from only a few individuals in one population (IUCN, 2017).

New Combination

***Mniodes caespititia* (Wedd.) Quip. & M.O. Dillon, comb. nov.** (Figs. 16, 17, 18).

Basionym: *Merope caespititia* Wedd., Chlor. Andina 1: 164. 1855. TYPE**:** BOLIVIA. **Dept. La Paz**: Lagunas de Potosí, *A.C.V. d'Orbigny 1399* (Holotype: P [P00704581]; Isotypes: F [F-972444 ex P], GH, [GH00010097], LP [LP002195]).

Belloa caespititia (Wedd.) Cabrera, Bol. Soc. Arg. Bot. 7: 81. 1958.

Description

Compact, cespitose perennial *herbs* forming dense cushions, the stems to 3-4 cm long, branched. *Leaves* sessile, densely imbricate; blades 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 or subterminal, sessile. *Capitula* heterogamous, sessile; involucres cylindrical, 4–4.5 mm high, 1.5–2 mm wide; 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 5–16, the corollas 3–3.5 mm long; hermaphroditic florets (1-) 2-3 , the corollas 2.5–3 mm long. *Achenes* oblong, 0.6–0.8 mm long, brown, glabrous or rarely with a few capitate-glandular trichomes; pappus bristles ca. 4 mm long, white, apically acute.

Distribution

Mniodes caespititia ranges from central Peru (Departments of Arequipa, Ayacucho, Huancavelica, Lima, Moquegua, Puno) to Bolivia (Provinces of La Paz, Murillo), 4200–4900 m.

Discussion

Mniodes caespititia is one of a series of small, gray, cushion-forming plants that occur in habitats above 4000 m. Many collections had previously been classified under the name of *M. schultzii* (Wedd.) S.E. Freire et al. and the latter name remains dubious. Collection originally determined as *Mniodes piptolepis*, Dept. Lima, Casa Cancha, *Capt. Charles Wilkes s.n.* (US-83334, US00756268) and Casa Cancha to Culnai, *Capt. Charles Wilkes s.n.* (GH p.p., NY, US-84643).

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Contributions of the Authors

V.Q.S.: Collected data in situ, photographed the species and vouchers, and reviewed herbarium material. M.O.D. prepared the descriptions and microphotographic plates. We have read the final manuscript, approved and authorized its publication.

Conflicts of Interest

The authors declare no conflicts of interest in association with this publication.

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Fig. 2. *Mniodes beckii* Quip. & M.O. Dillon. Photograph of the holotype collection at Field Museum of Natural History by *X. Menhofer 1037* (F1934783 ex LPB).

Fig. 3. *Mniodes beckii* Quip. & M.O. Dillon. Enlargement of the holotype collection at Field Museum of Natural History by *X. Menhofer 1037* (F1934783 ex LPB).

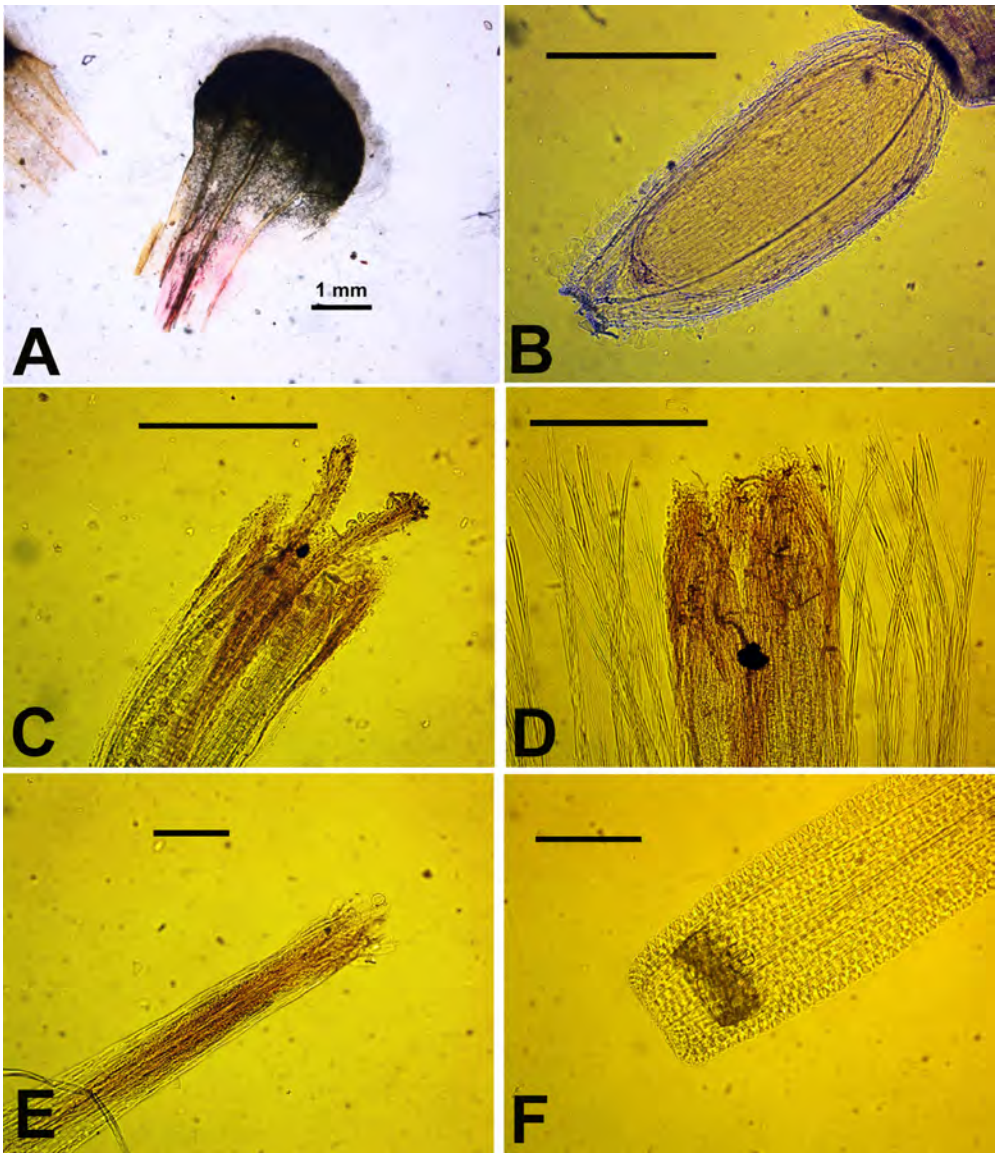

Fig. 4. *Mniodes beckii* Quip. & M.O. Dillon. A. Leaf; B. Hermaphroditic floret achene (bar = 40 mm); C. Hermaphroditic floret apex (bar = 40 mm); D. hermaphroditic floret with pappus apices (bar = 40 mm); E. Pistillate floret apex (bar = 15 mm); F. Pistillate floret base with dark nectary (bar = 30 mm). Voucher: *X. Menhofer 1037* (holotype, F1934783 ex LPB).

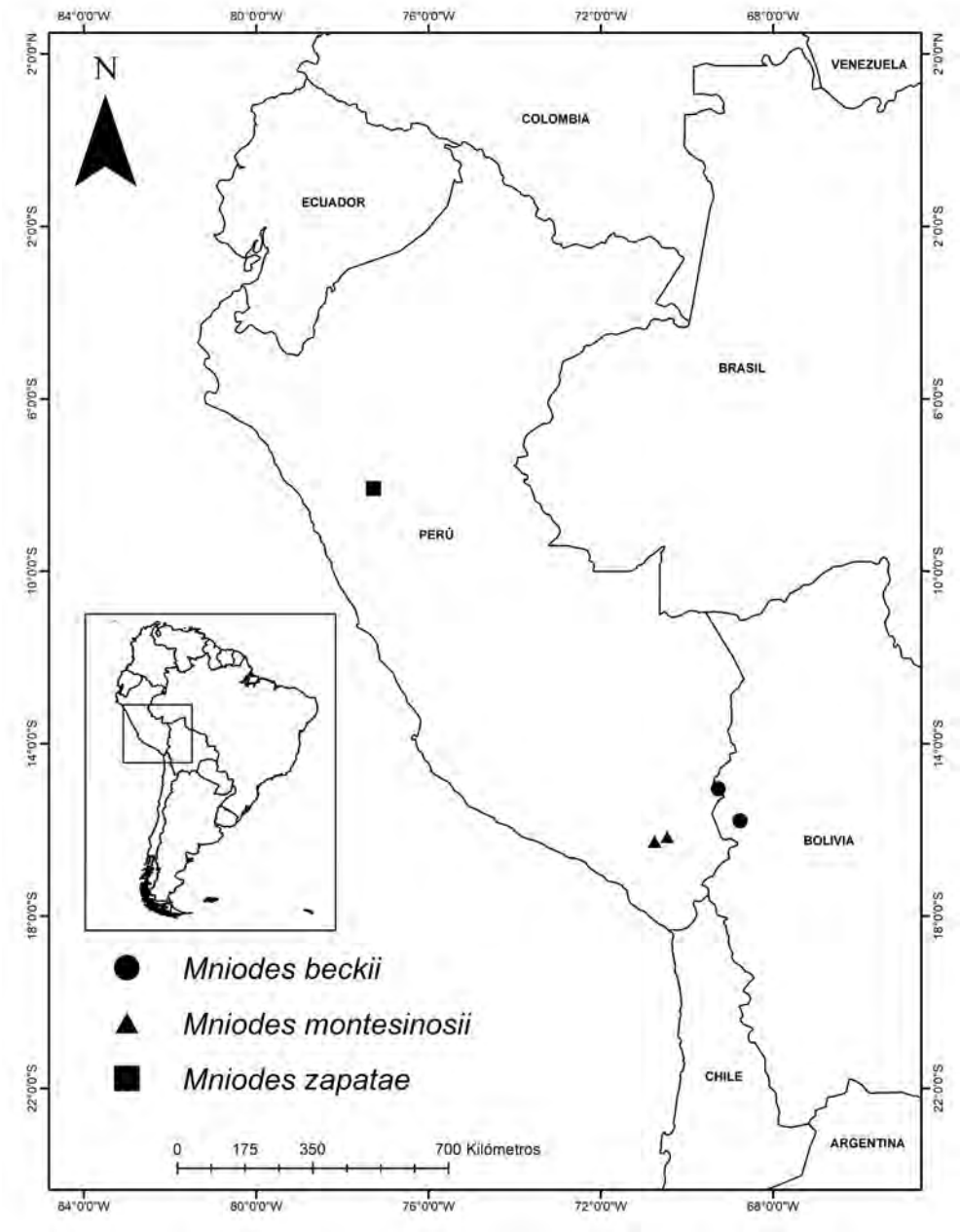

Fig. 5. Distribution of new *Mniodes* species.

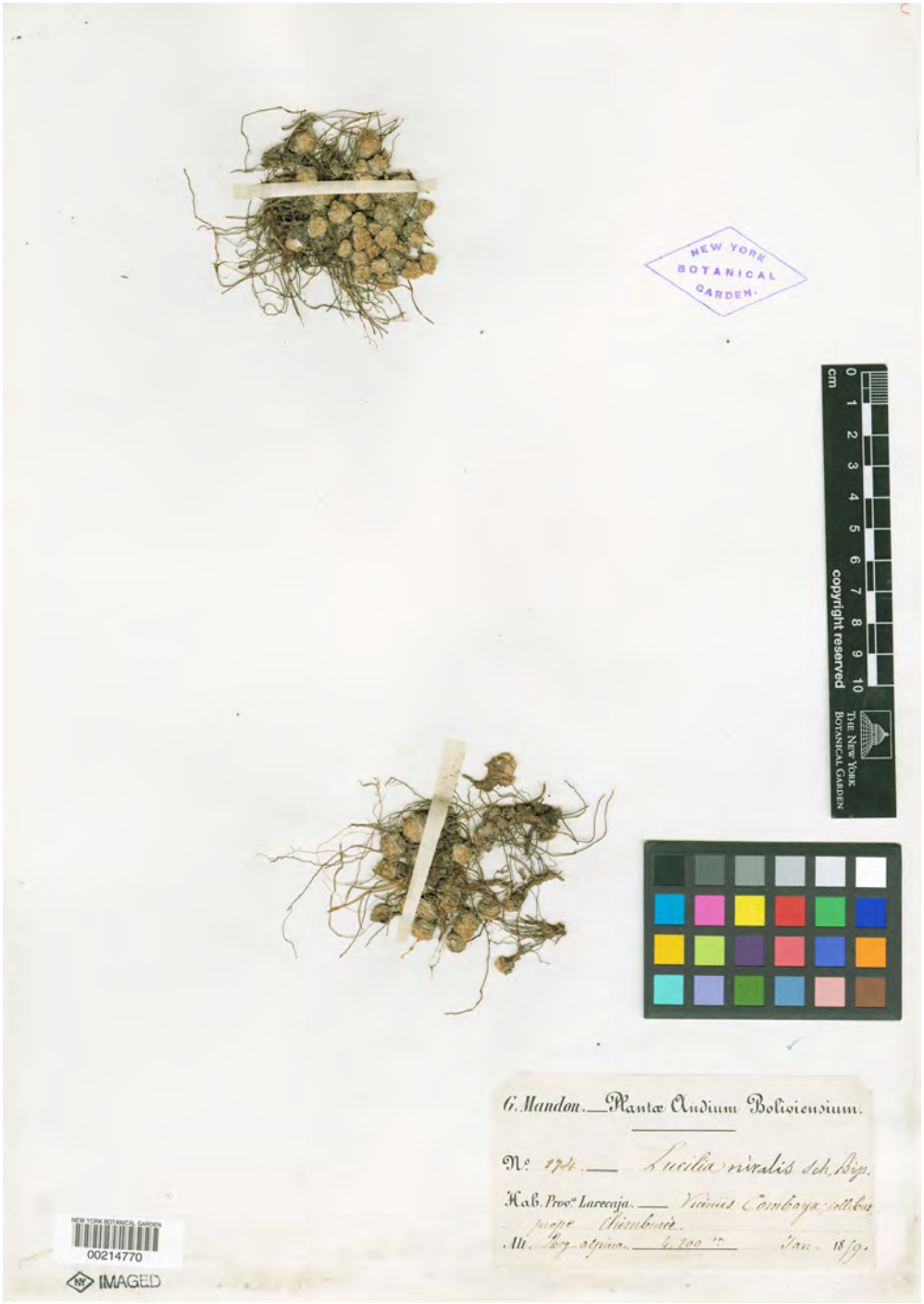

Fig.6. *Mniodes beckii* Quip. & M.O. Dillon. Photograph of paratype material collected by *G. Mandon 174* (NY00214770) with the herbarium annotation of *Lucilia nivalis* Schultz-Bip., *nomen nudum*.

Fig.7. *Mniodes beckii* Quip. & M.O. Dillon. Photograph of paratype material collected by *G. Mandon 174* (K) with the herbarium annotation of *Lucilia nivalis* Schultz-Bip., *nomen nudum*.

Fig. 8. *Mniodes montesinosii* Quip. & M.O. Dillon. Photograph of holotype collection at HSP. Voucher: *D. Montesinos T. 4035* (HSP-003730).

Fig. 9. *Mniodes montesinosii* Quip. & M.O. Dillon. A. Achene (bar = 40 mm); B. Achenial carpopodium (bar = 10 mm); C. Achenial trichomes (bar = 10 mm). (Voucher: *D. Montesinos T. 4036*, HSP-003730).

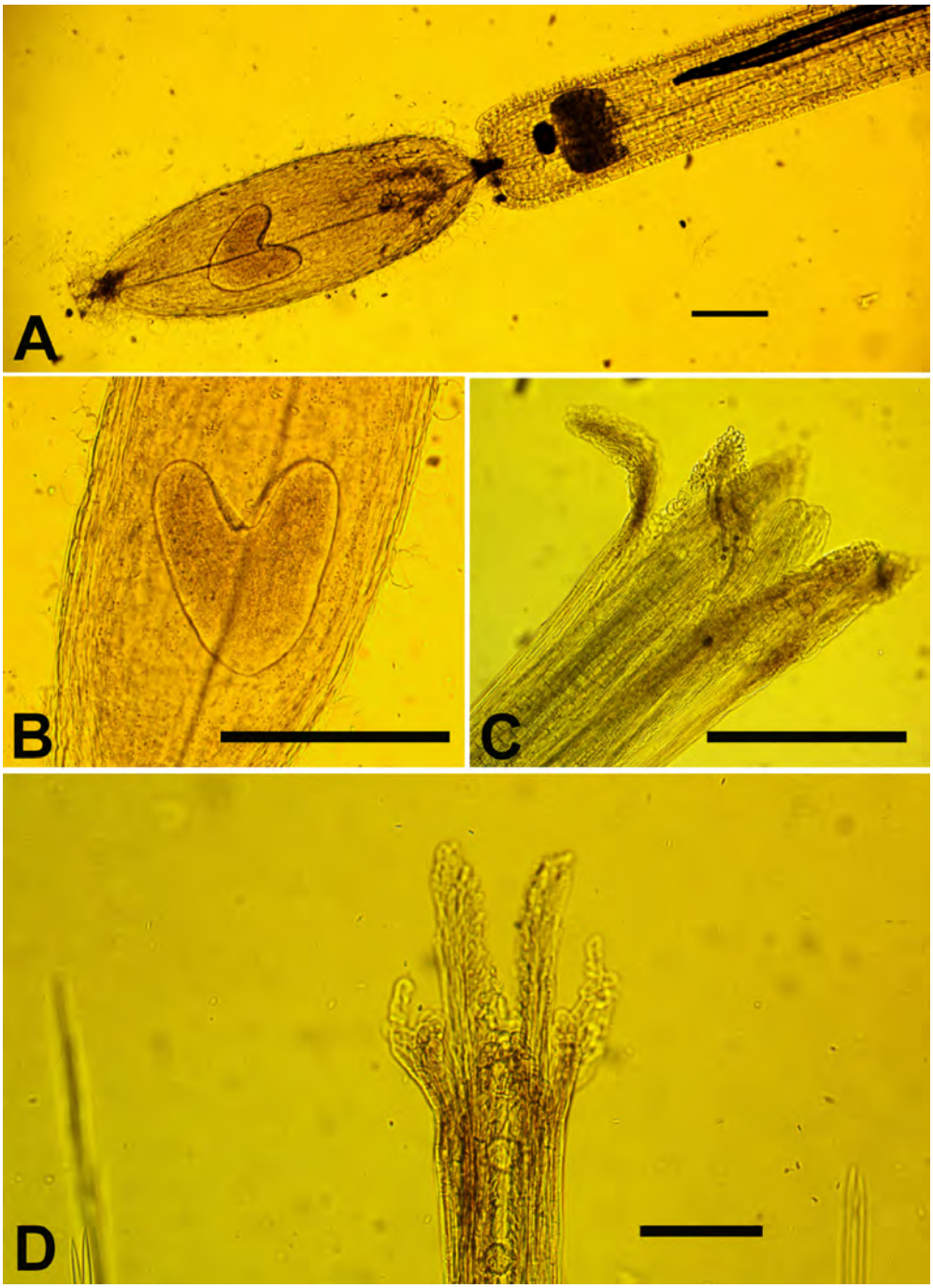

Fig. 10. *Mniodes montesinosii* Quip. & M.O. Dillon. A. Hermaphroditic floret with heart-shaped embryo (bar = 40 mm); B. Close-up of heart-shaped embryo (bar = 25 mm); C. Hermaphroditic floret (bar = 45 mm); D. Pistillate floret apex (bar = 40 mm). (Voucher: *D. Montesinos T. 4036*, HSP-003730).

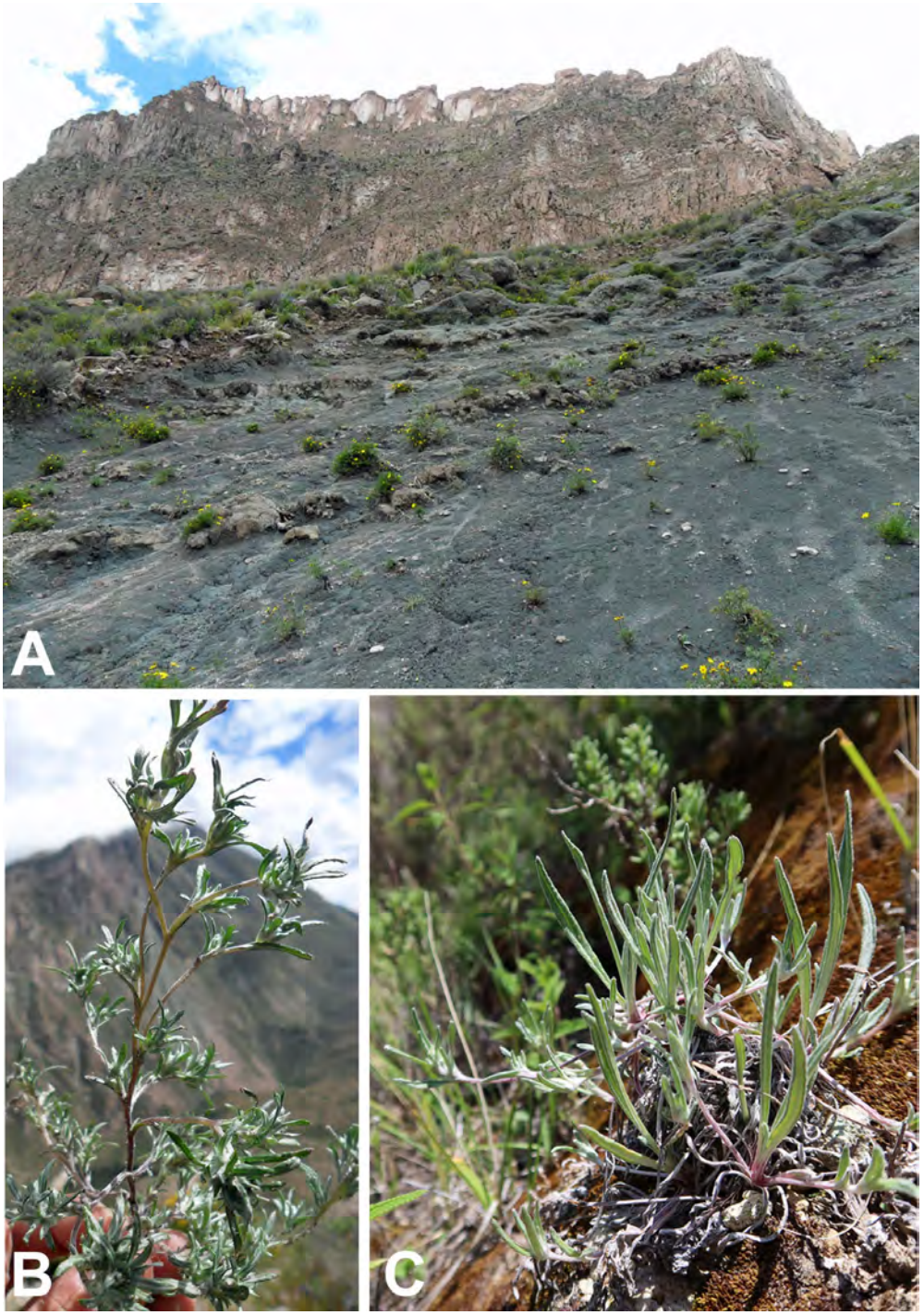

Fig. 11. *Mniodes montesinosii* Quip. & M.O. Dillon. Photographs of the holotype locality(A); and the habit (B); and basal leaves (C). Voucher: *D. Montesinos T. 4036* (HSP-003730).

Fig.12. *Mniodes zapatae* Quip. & M.O. Dillon. Photograph of the holotype collection the Field Museum by *Sagástegui et al. 17399* (F-2313838).

Fig. 13. *Mniodes zapatae* Quip. & M.O. Dillon. Photograph of the isotype collection at the Field Museum by *Sagástegui et al. 17399* (F-2309590).

Fig. 14. *Mniodes zapatae* Quip. & M.O. Dillon. A. & B. Photograph of plants with capitula *in situ* within vegetation of the habitat; C. Photograph of an individual with mm rule; D. Leaves. Holotype collection by *Sagástegui et al. 17399* (F-2313838).

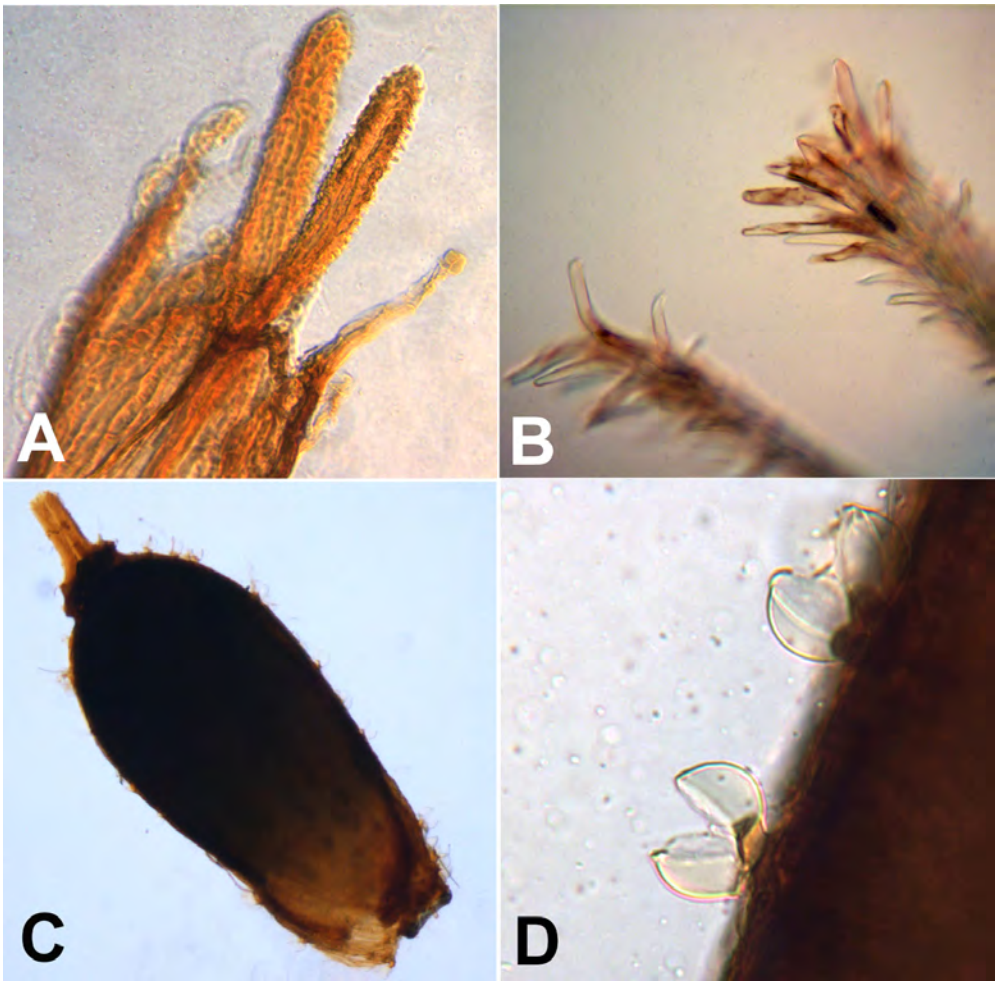

Fig.15. *Mniodes zapatae* Quip. & M.O. Dillon. A. Stigma apex; B. Microphotograph of the distal end of the penicillate pappus bristles; C. Achene; D. Capitate-glandular trichomes, apical cells myxogenic and rupture open in wetting agent. Photograph of the holotype collection at the Field Museum by *Sagástegui et al. 17399* (F-2313838).

Fig. 16. *Mniodes caespititia*. Holotype collection of *Merope caespititia* Wedd., *A.C.V. d'Orbigny 1399* (P [P00704581]).

Fig. 17. *Mniodes caespititia.* Close-up of holotype collection (top) and enlargement of the label (bottom). *Merope caespititia* Wedd., *A.C.V. d'Orbigny 1399* (P [P00704581]).

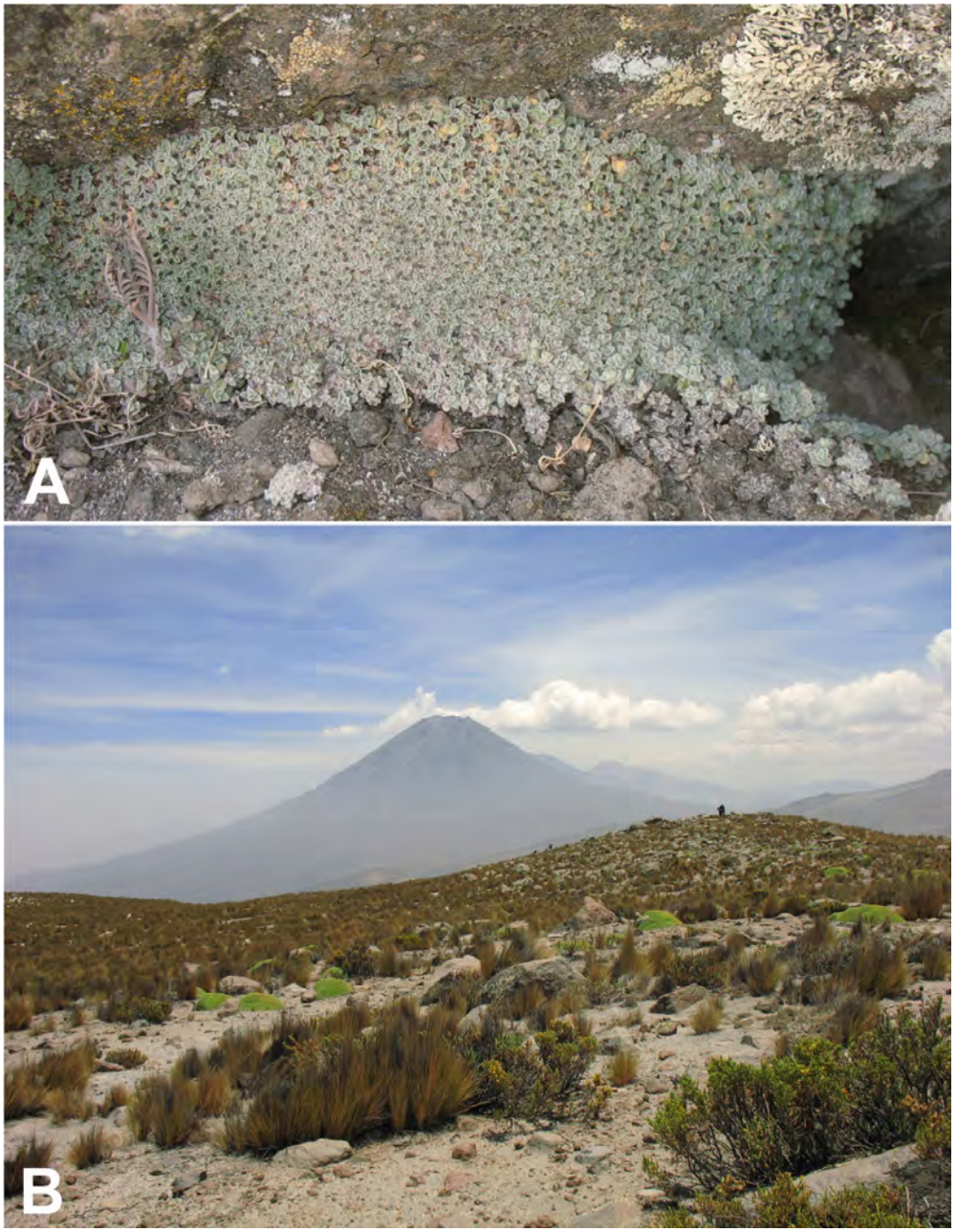

Fig. 18. *Mniodes caespititia*. A. habit, B. habitat.

Appendix I. Key to *Mniodes* Species registered from Bolivia & Peru

1	Plants dioecious; capitula homogamous, male & female individuals; stems with leaves densely set, no internodes evident; habit spreading or cushionform (*Mniodes* sensu Cuatrec.)	***2***
-	Plants monecious; capitula heterogamous, both male and female florets present; stems erect, leafy with obvious internodes; or stems cushionform, with leaves densely crowded with no evident internodes habit or with a basal rosette & erect capitulescences branches (Luciliocline sensu auct. nonn., p.p.).	***5***
2	Stems not tightly grouped, evident, not connate; leaves obtrullate or fan-shaped, 4-5 mm long, 3-5 mm wide; capitulescences subterminal; phyllary showy, apices petaloid, white; achenes densely pubescent with capitate-glandular trichomes.	***M. pulvinulata***
-	Stems tightly grouped in dense cushions, connate; leaves oblong to obovoid, 3-4 mm long, 1-2 mm wide; Capitulescences terminal; phyllaries not showy; achenes glabrous or pubescent with capitate-glandular trichomes.	***3***
3	Leaves oblong to subobovate, ca. 3 mm long, 1-1.2(-1.7) mm wide, apex truncate to rounded; achenes glabrous.	***M. andina***
-	Leaves obovate to obovoid 1.2-2 mm wide, apex subacute to rounded; achenes with capitate-glandular trichomes or glabrous.	***4***
4	Leaves obovate-oblong, apex subacute, often mucronate; achenes with capitate-glandular trichomes.	***M. aretioides***
-	Leaves ovoid to elliptic, apex obtuse to rounded; achenes glabous.	***M. coarctata***
5	Caulescent with stems erect to spreading with leaves spaced; habit erect to spreading; plants with larger leaf blades 10-50 mm long; capitulescences pseudospicate or glomerulate.	***6***
-	Acaulescent, the leaf blades 20-50 mm long, & capitula solitary, showy; or with stems obscured by densely spaced leaves, no evident internodes, appearing connate; rosulate, cushionform, or caespitose; leaf blades 2-6 mm long	***7***
6	Foliaceous stems compressed; leaves distichous, the blades orbicular to suborbicular, 5-14 mm long, conduplicate, folded upward	***M. plicatifolia***

-	Foliaceous stems non-distichous; leaves alternate, the blades oblanceolate to lanceolate, non-conduplicate, 5-50 mm long	***8***
8	Leaves rosulate, persistent basal rosette; capitulescences pseudospicate or solitary	***9***
-	Leaves not rosulate; capitulescences in upper leaf axils or terminal, 2-3-headed glomerules	***10***
9	Leaves lanceolate, 20-40 mm long; pistillate corollas ca. 3.5 mm long	***M. turneri***
-	Leaves oblong-linear to spatulate, (10-)20-50 mm long; pistillate corollas 4-5 mm	***M. subspicata***
10	Leaves oblanceolate, 10-30 mm long, 3-5 mm wide; capitula ca. 7.5 mm tall; pistillate florets 6.5-7 mm long.	***M. lopezmirandae***
-	Leaves linear, 1-2.5 mm wide; capitula ca. 6 mm tall; pistillate florets 4.5-5 mm long	***M. montesinosii***
7	Leaves 20-50 mm long; capitula solitary, 7.5-10 mm tall, showy	***M. longifolia***
-	Leaves 2.5-6 mm long; capitula terminal & axillary	***11***
11	Plants minute branching herbs; leaves ca. 2 mm long, ca. 1.5 mm wide; pappus elements ca. 8, laminar, apically penicillata	***M. zapatae***
_	Plant caespitose; pappus elements more than 20, slender bristles, apically aciformis	***12***
12	Leaves 4-6 mm long, 15-16 pistillate florets, 2-3 hermaphroditic florets	***M. caespititia***
-	Leaves 2-4.5 mm long, pistillate (5-)10-16	***13***
13	Hermaphroditic florets (1-)2-4	***M. argentea***
-	Hermaphroditic florets 6-8	***M. beckii***