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ABSTRACT

Calvo, Joel, Andrés Moreira-Muñoz, and Vicki A. Funk. Taxonomic Revision of the Neotropical Genus *Werneria* (Compositae, Senecioneae). *Smithsonian Contributions to Botany*, number 111, vi + 123 pages, 58 figures, 3 appendixes, index, 2020. — *Werneria* is a neotropical genus belonging to the tribe Senecioneae (Compositae) that is mainly distributed through the highlands of the Andes. Only a single species, *W. nubigena*, has a trans-Andean distribution and reaches the Tacaná Volcano in southern Chiapas (Mexico). The traditional concept of *Werneria* was significantly narrowed at the end of the twentieth century after segregating several species and accommodating these mostly in the genus *Xenophyllum*. As currently circumscribed, it includes rosettiform or scapiform species characterized by usually displaying involucral bracts that are fused at the base, supplementary bracts commonly absent, usually radiate but sometimes discoid or disciform capitula, white or yellow ray corollas (when present), a balusterform filament collar, and style branches that are truncate and have a crown of sweeping hairs. The first modern, comprehensive revision of this genus recognizing 27 species is presented here. *Werneria heteroloba* and *W. obtusiloba* are synonymized with *W. pinnatifida*, and *W. acerosifolia* is synonymized with *W. staticifolia*. Moreover, five infraspecific names and three supraspecific names are synonymized. Detailed descriptions, distribution maps, photographs of living plants (except for *W. cochlearis*), and a list of all specimens examined are provided for each accepted species. An identification key to the species and a list of exsiccatae are also given. Eight species are illustrated, two of them for the first time. The following names are lectotypified: *Werneria brachypappa* Sch. Bip., *W. caespitosa* Wedd., *W. calyculata* Turcz., *W. canaliculata* Sch. Bip., *W. carnulosa* A. Gray, *W. densa* Benth., *W. disticha* Kunth, *W. glaberrima* Phil., *W. glandulosa* Wedd., *W. heteroloba* f. *microcephala* Rockh., *W. mandoniana* Wedd. ex Klatt, *W. nubigena* Kunth, *W. nubigena* var. *caulescens* Wedd., *W. nubigena* var. *dombeyana* Wedd., *W. orbignyana* Wedd., *W. orbignyana* var. *breviradiata* A. Gray, *W. orbignyana* var. *longifolia* Rockh., *W. pectinata* Lingelsh., *W. plantaginifolia* Wedd. ex Klatt, *W. pygmaea* var. *caespitosa* Wedd., *W. rhizoma* J. Rémy, *W. solivifolia* Sch. Bip., *W. staticifolia* Sch. Bip., *W. staticifolia* var. *celmisioides* Wedd., and *W. villosa* A. Gray. The names *Werneria knocheae* Perkins, *W. minima* Walp., *W. minima* var. *pygmaea* Walp., and *W. stuebelii* Hieron. are neotypified, and an epitype is designated for *W. glandulosa*. At the supraspecific level, the name *Werneria* sect. *Integrifoliae* Rockh. is typified.

RESUMEN

Werneria es un género neotropical perteneciente a la tribu Senecioneae (Compositae) que está principalmente distribuido en la parte alta de los Andes. Una única especie, *W. nubigena*, se extiende hasta el volcán Tacaná en el sur de Chiapas (México). A finales del siglo XX varias especies fueron transferidas al género *Xenophyllum*, reduciendo significativamente el concepto tradicional de *Werneria*. Según la delimitación actual, este género incluye especies rosetiformes o escapiformes que se caracterizan por presentar, generalmente, el involucro con las brácteas principales fusionadas en la base y sin brácteas suplementarias, los capítulos radiados (raramente disciformes o discoideos), las lígulas blancas o amarillas (en los capítulos radiados), el collar del filamento balaustriforme y las ramas estilares truncadas con una corona de cortos tricomas simples. Se presenta la primera revisión moderna y exhaustiva de este género, en la que se reconocen 27 especies. *Werneria heteroloba* y *W. obtusiloba* se sinonimizan a *W. pinnatifida*, así como *W. acerosifolia* a *W. staticifolia*. Además, cinco nombres infraespecíficos y tres supraespecíficos son sinonimizados. Para cada una de las especies se presenta una descripción detallada, un mapa de distribución, fotografías de plantas en vivo (a excepción de *W. cochlearis*) y la relación de los especímenes estudiados. También se proporciona una clave de identificación y una lista con todo el material examinado. Ocho especies son ilustradas, dos de ellas por primera vez. Los siguientes nombres se lectotipifican: *Werneria brachypappa* Sch. Bip., *W. caespitosa* Wedd., *W. calyculata* Turcz., *W. canaliculata* Sch. Bip., *W. carnulosa* A. Gray, *W. densa* Benth., *W. disticha* Kunth, *W. glaberrima* Phil., *W. glandulosa* Wedd., *W. heteroloba* f. *microcephala* Rockh., *W. mandoniana* Wedd. ex Klatt, *W. nubigena* Kunth, *W. nubigena* var. *caulescens* Wedd., *W. nubigena* var. *dombeyana* Wedd., *W. orbignyana* Wedd., *W. orbignyana* var. *breviradiata* A. Gray, *W. orbignyana* var. *longifolia* Rockh., *W. pectinata* Lingelsh., *W. plantaginifolia* Wedd. ex Klatt, *W. pygmaea* var. *caespitosa* Wedd., *W. rhizoma* J. Rémy, *W. solivifolia* Sch. Bip., *W. staticifolia* Sch. Bip., *W. staticifolia* var. *celmisioides* Wedd. y *W. villosa* A. Gray. Los nombres *Werneria knocheae* Perkins, *W. minima* Walp., *W. minima* var. *pygmaea* Walp. y *W. stuebelii* Hieron. son neotipificados y un epitipo es designado para *W. glandulosa*. A nivel supraespecífico, se tipifica el nombre *Werneria* sect. *Integrifoliae* Rockh.

Cover images (*from left*): *Werneria nubigena*, *W. glandulosa*, *W. villosa*, and *W. aretioides* (photographs by Joel Calvo, Alfredo Fuentes, Modesto Zárate, and Andrés Moreira-Muñoz).

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Taxonomic Revision of the Neotropical Genus *Werneria* (Compositae, Senecioneae)

Joel Calvo,[1]* *Andrés Moreira-Muñoz,*[1] *and Vicki A. Funk*[2]

INTRODUCTION

The neotropical genus *Werneria* Kunth belongs to Senecioneae, one of the largest tribes of the Compositae (Asteraceae) family, with approximately 150 genera and about 3,500 species (Nordenstam, 2007). Although the tribe has a worldwide distribution, it is especially well represented throughout the highlands of the Andes. Peru and Colombia appear among the countries harboring the highest generic diversity after South Africa and Mexico (Nordenstam et al., 2009).

Werneria is mostly distributed through the Andean highlands (Funk, 1997a). Only a single species (*W. nubigena* Kunth) has a trans-Andean distribution reaching the Tacaná Volcano in southern Chiapas, Mexico. In the Andes, the geographical area of the genus extends from the paramos of Mérida in western Venezuela to the Santa Cruz Province and the Aysén Region in southern Argentina and southern Chile, respectively. It encompasses 27 species, with Peru being the foremost center of species diversity (24 species), followed by Bolivia (18; Figure 1). They are rosettiform or scapiform perennial herbs, displaying involucral bracts that are usually fused at the base (strongly partite in a few species), radiate or discoid (rarely disciform) capitula, white or yellow ray corollas (when present), stamens with a balusterform filament collar, and style branches that are truncate and have a crown of sweeping hairs. Although two species bear supplementary bracts (calyculus) at the base of the involucre, these are absent in the other species.

The current circumscription of the genus is the result of the transfer of several species traditionally placed in *Werneria* to the segregated genera *Xenophyllum* V. A. Funk, *Misbrookea* V. A. Funk, and *Anticona* E. Linares, J. Campos, & A. Galán. Those suffruticose species developing or producing elongate stems were transferred to *Xenophyllum*, and the species displaying a strictly rosettiform or scapiform habit were retained in *Werneria* (Funk, 1997a). Likewise, the monotypic genera *Misbrookea* and *Anticona* differentiate two species traditionally placed in *Werneria* (Funk, 1997b; Linares et al., 2014). *Misbrookea* has a rosettiform habit similar to *Werneria,* but it is distinguished by a typical strigose indumentum composed of multiseriate trichomes that covers the leaves and involucre (Funk, 1997b). The genus *Anticona* differs from *Werneria* in producing elongate stems that are usually branched from the lower part and by having a cylindrical filament collar, which is barely wider than the filament. *Werneria* also shows morphological affinities concerning the habit and the involucre architecture with the widespread and highly diversified genus *Senecio* L., although they are only distantly related within the tribe in terms of evolutionary relationships (Pelser et al., 2007; Nordenstam et al., 2009). Indeed, some Andean species have been interchangeably treated as *Senecio* or *Werneria* depending on the authors' concepts, as is the case with *S. wernerioides* (Grisebach, 1874; Kuntze, 1898; Cabrera, 1985). As discussed in Calvo et al. (2019), we prefer differentiating *Werneria* from *Senecio* on the basis of the combination of the following

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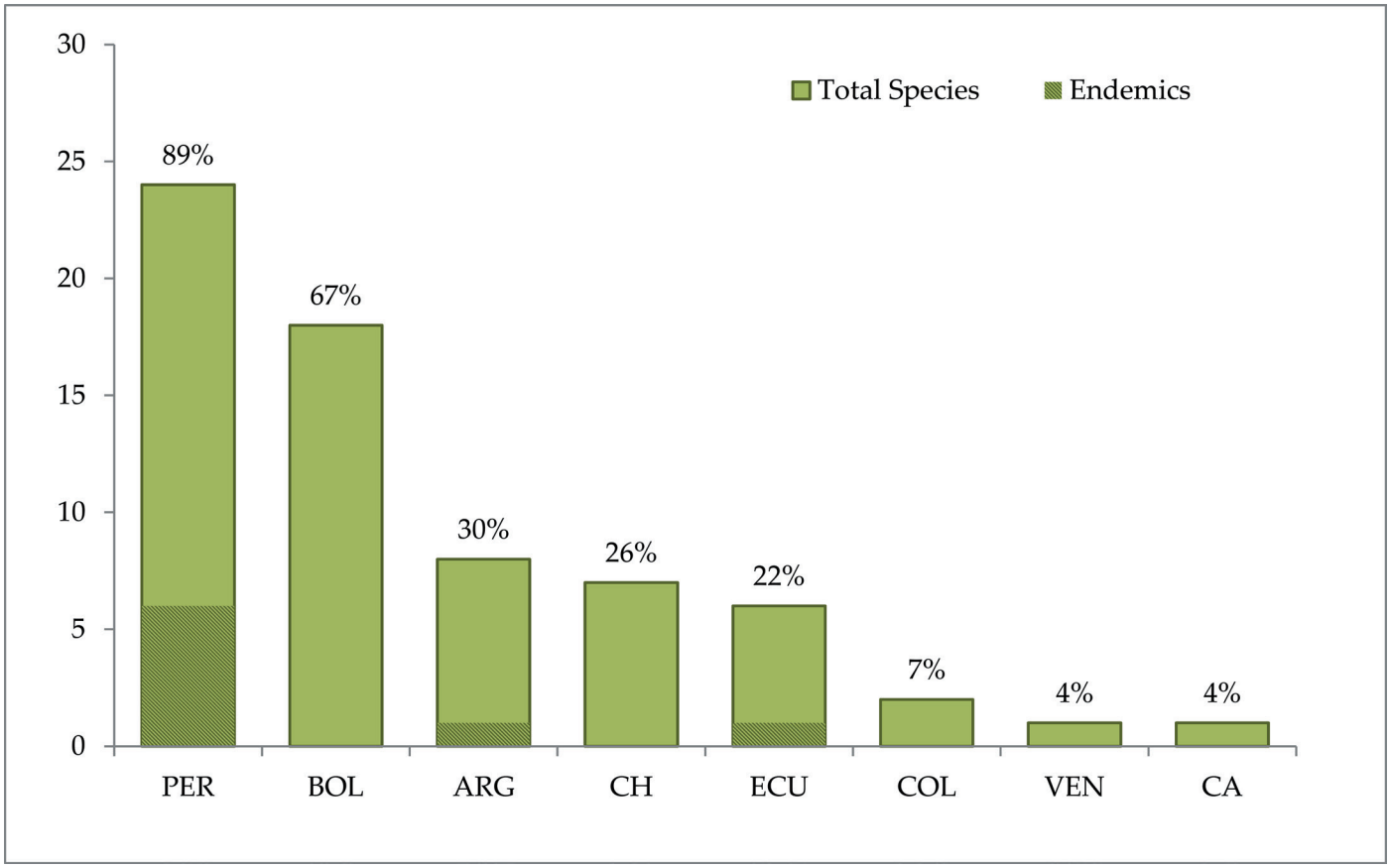

FIGURE 1. Number of *Werneria* species per country. The percentage of endemic species is shaded in darker green. Country abbreviations, from left: PER, Peru; BOL, Bolivia; ARG, Argentina; CH, Chile; ECU, Ecuador; COL, Columbia; VEN, Venezuela; CA, Central America (Costa Rica, Guatemala, southern Mexico, Panama).

characters: involucral bracts usually fused at the base (usually free in *Senecio*), supplementary bracts usually absent (usually present in *Senecio*), achene trichomes not myxogenic (myxogenic or not in *Senecio*), and habit rosettiform or scapiform (rather caespitose or creeping in *Senecio*). Accordingly, the species *W. melanandra* and *W. pygmophylla* were recently transferred to *Senecio* (Calvo et al., 2019).

The results of phylogenetic studies place the genus *Werneria* within the subtribe Senecioninae (Pelser et al., 2007, 2010; Nordenstam et al., 2009). The genus appears to be closely related to *Misbrookea* and *Xenophyllum*, an expected result considering their aforementioned morphological similarities. The molecular data also suggest that the subclade formed by these three genera is sister to a moderately supported subclade formed by the neotropical genera *Caxamarca* M. O. Dillon & Sagást., *Charadranaetes* Janovec & H. Rob., *Dorobaea* Cass., *Garcibarrigoa* Cuatrec., *Jessea* H. Rob. & Cuatrec., *Lomanthus* B. Nord. & Pelser, *Pseudogynoxys* (Greenm.) Cabrera, and *Talamancalia* H. Rob. & Cuatrec. (Pelser et al., 2010). However, some incongruences exist between trees produced with different data sets. Whereas plastid data moderately support a close relationship between the two subclades, nuclear data strongly support it but place *Lomanthus* within the subclade composed of *Misbrookea, Werneria,* and *Xenophyllum*. It should be noted that taxon sampling at the species level in these phylogenetic studies was very low (only two *Werneria* species were sequenced; Pelser et al., 2007). Therefore, an exhaustive species sampling is essential in order to understand the phylogenetic relationships among the *Werneria* species and appraise previous results suggesting that *Werneria* might not be monophyletic (Pelser et al., 2007).

Until now, Rockhausen's monographic treatment (1939) was the only available revision of the genus as a whole, including 21 accepted species (species later transferred to *Xenophyllum* and *Misbrookea* excluded). Because of subsequent taxonomic changes to the delimitation of *Werneria* and the discovery of several new species, there is a need for a modern comprehensive revision of this genus. The treatment presented here provides updated nomenclature, descriptions, distribution maps, drawings

and/or photographs for the 27 recognized species, and a dichotomous identification key. This study was carried out in parallel with the revision of the closely related genus *Xenophyllum* (Calvo and Moreira-Muñoz, in press).

TAXONOMIC HISTORY

The genus *Werneria* was established by Kunth (1818) for a group of Andean species characterized by displaying leaves that are distichous or stellate-imbricate, linear, entire, coriaceous, and sheathed at the base and having a capitulum that is radiate, solitary, terminal, and shortly pedunculate, with a campanulate involucre, epaleate receptacle, and ray corollas that are yellow, white, or slightly rose colored. Their small and caespitose habit was also mentioned as a singular feature. Six species were initially included in *Werneria*, all of them from Ecuador (*W. disticha* Kunth, *W. graminifolia* Kunth, *W. humilis* Kunth, *W. nubigena*, *W. pumila* Kunth, and *W. rigida* Kunth). Kunth's circumscription was adopted by Lessing (1832) in his synopsis of the Compositae genera. Candolle (1838) also maintained the same treatment but incorporated *W. mocinniana* DC. from the Sierra de los Cuchumatanes in northern Guatemala as a new species. The inclusion of this species extended the distribution area of *Werneria* to include Central America.

After the publication of the genus in 1818, the first significant taxonomic contribution was made by the German botanist Schultz Bipontinus (1856). He described six new species on the basis of Lechler's material from Peru. In the same year, Weddell (1856) published his *Werneria* treatment in *Chloris Andina*. He recognized 17 species in the Andes, 8 of which were described by him. A few years later, Gray (1861) added three new species. Likewise, several taxonomic novelties were presented by Philippi (1873, 1891) and Hieronymus (1895, 1901).

The original concept of *Werneria* was tentatively broadened by Bentham (1873), who commented on the possibility of including species from Africa and Asia without providing further details. Some nonneotropical species were subsequently transferred to *Werneria* (e.g., *W. africana* Oliv. & Hiern, *W. antinorii* Avetta, *W. ellisii* Hook.f.). Following this treatment, Hoffmann (1892) included *Werneria* in the subtribe Othonninae along with several genera that are well represented in southern Africa. Such a decision was motivated by the fact that the basally fused involucral bracts are a frequent character in this subtribe (e.g., genus *Othonna* L.). The placement of these old-world species in *Werneria* was discussed by Blake (1928), who did not reject this taxonomic decision because of a lack of collections that were available to him for study. His work, however, focused on the South American species. With the inclusion of 10 new species, Blake (1928) estimated the number of *Werneria* species to be between 55 and 62. He organized them in eight informal groups (not recognized herein) and presented a dichotomous key.

The first comprehensive taxonomic revision of the genus was published in 1939 by the German biologist Rockhausen. This author recognized 37 species and excluded the species from Africa and Asia, restricting *Werneria* again to the neotropics. An infrageneric taxonomy composed of two subgenera and six sections was proposed. Subsequent contributions to the taxonomy of *Werneria* mainly consisted of the publication of new species (Cuatrecasas, 1954, 1956, 1970).

At the end of the twentieth century, the circumscription of *Werneria* was significantly narrowed after transferring several species to the new genus *Xenophyllum* (Funk, 1997a; as outlined in the Introduction). This treatment is currently widely accepted, and it has been adopted by most authors working on this plant group (Nordenstam, 1999; Freire and Ariza-Espinar, 2014; Jørgensen, 2014; Beltrán, 2017; Calvo et al., 2017; Calvo and Beltrán, 2019).

MATERIAL AND METHODS

This contribution is mostly based on the revision of 2,144 herbarium specimens (duplicates excluded) kept at the following herbaria: A, B, BA, BM, BOLV, BR, C, CAS, CAUP, COL, CONC, CUVC, F, G, GB, GH, GOET, HA, HSB, HSP, HUSA, HUTPL, K, LE, LIL, LOJA, LPB, MA, MERL, MO, NY, P, Q, QAP, QCA, QCNE, QPLS, RB, SGO, UC, US, USM, and W. Additionally, digital herbarium specimens or supplementary information were obtained from AAU, CORD, CUZ, DS, E, ICESI, KW, LD, LL, LP, M, PH, PR, S, SI, and UDBC; herbarium acronyms follow Thiers (2020). Intensive field work in southern Colombia, Ecuador, southern Peru, Bolivia, northwestern Argentina, and northern Chile was also conducted. These collection trips yielded ~200 new herbarium specimens.

A comprehensive synonymy of the genus *Werneria* was compiled. Types of all accepted names and synonyms were studied. However, we did not locate the original material of *W. caespitosa* var. *haenkei* Wedd. and *W. nubigena* subvar. *erioscapa* Wedd. These appear in Unverified Names, and we suggest their application on the basis of the opinion of previous authors or the original descriptions.

A general description of the genus and detailed species descriptions were prepared. For this, qualitative characters were studied with the aid of a binocular dissecting microscope when needed, whereas quantitative characters were recorded using a Mitutoyo digital caliper, CD-15DC. A Standard 16WL microscope was used for examination of the achene trichomes of *W. nubigena*. Information concerning the habitat, elevation, and flowering period of each species was obtained from the herbarium specimen labels.

The names to be excluded from *Werneria* are detailed in Appendix A. Accepted species are presented in alphabetical order and are listed in Appendix B. Likewise, all studied exsiccatae can be found in Appendix C. Finally, an index of all scientific names is provided at the end of this publication. When herbarium specimens from a political division have not been studied but the presence of the respective species is expected there, the name of that political division is included and marked accordingly in the Distribution and Habitat section.

Abbreviations

Distribution Maps

ARG	Argentina
BOL	Bolivia
BR	Brazil
CH	Chile
COL	Colombia
CR	Costa Rica
ECU	Ecuador
GUA	Guatemala
MEX	Mexico
PAN	Panama
PER	Peru
VEN	Venezuela

Herbaria

A	Harvard University
AAU	Aarhus University
B	Botanischer Garten und Botanisches Museum Berlin-Dahlem, Zentraleinrichtung der Freien Universität Berlin
BA	Museo Argentino de Ciencias Naturales "Bernardino Rivadavia"
BM	The Natural History Museum
BOLV	Centro de Biodiversidad y Genética, Universidad Mayor de San Simón
BR	Meise Botanic Garden
C	University of Copenhagen
CAS	California Academy of Sciences
CAUP	Universidad del Cauca
COL	Universidad Nacional de Colombia
CONC	Universidad de Concepción
CORD	Herbario del Museo Botánico de Córdoba
CUVC	Universidad del Valle
CUZ	Universidad Nacional de San Antonio Abad del Cusco
DS	California Academy of Sciences
E	Royal Botanic Garden Edinburgh
F	Field Museum of Natural History
G	Conservatoire et Jardin botaniques de la Ville de Genève
GB	University of Gothenburg
GH	Harvard University
GOET	Universität Göttingen
HA	Universidad del Azuay
HSB	Herbario del Sur de Bolivia
HSP	Instituto Científico Michael Owen Dillon
HUSA	Universidad Nacional de San Agustín de Arequipa
HUT	Universidad Nacional de Trujillo
HUTPL	Universidad Técnica Particular de Loja
ICESI	Universidad Icesi
K	Royal Botanic Gardens
KW	M. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine
LD	Lund University
LL	University of Texas at Austin
LE	Komarov Botanical Institute, Russian Academy of Sciences
LIL	Fundación Miguel Lillo
LOJA	Universidad Nacional de Loja
LP	Museo de La Plata
LPB	Herbario Nacional de Bolivia, Universidad Mayor de San Andrés
M	Botanische Staatssammlung München
MA	Real Jardín Botánico
MERL	Instituto Argentino de Investigaciones de las Zonas Áridas
MO	Missouri Botanical Garden
MOL	Universidad Nacional Agraria La Molina
NY	The New York Botanical Garden
P	Muséum National d'Histoire Naturelle
PH	Academy of Natural Sciences
PR	National Museum in Prague
Q	Universidad Central
QAP	Universidad Central
QCA	Pontificia Universidad Católica del Ecuador
QCNE	Museo Ecuatoriano de Ciencias Naturales del Instituto Nacional de Biodiversidad
QPLS	Biblioteca Ecuatoriana Aurelio Espinosa Pólit
RB	Jardim Botânico do Rio de Janeiro
S	Swedish Museum of Natural History
SGO	Museo Nacional de Historia Natural
SI	Instituto de Botánica Darwinion
UC	University of California
UDBC	Universidad Distrital "Francisco José de Caldas"
US	Smithsonian Institution
USM	Universidad Nacional Mayor de San Marcos
W	Naturhistorisches Museum Wien

Specimen Label Abbreviations

alred.	alrededor [around, surroundings]
Cbba	Cochabamba [city in central Bolivia]
c./co.	cerro [hill, mount]
comp.	compañía [company]
dist./distr.	distrito [district]
depto./dpto.	departamento [department]
EMAP	Empresa Municipal de Agua Potable [Municipal Potable Water Enterprise]
hda.	hacienda
hwy./Hwy	highway
lag./lgn.	laguna [lagoon]
mi.	miles

mt.	mount
nev.	nevado [snow-covered]
occ.	occidental
östl.	östlich [east]
P.N.	Parque Nacional [National Park]
PN-ANMI	Parque Nacional y Área Natural de Manejo Integrado [National Park and Integrated Management Natural Area]
P.N.N.	Parque Nacional Natural [National Natural Park]
pr.	prope [near]
prov.	provincia [province]
rd.	road
rt./rte.	route
Sta.	Santa [Saint]
sup.	superior [upper]

MORPHOLOGY

Habit

Two main habits can be differentiated within *Werneria*. Species with a sessile capitulum are described as rosettiform (e.g., *W. aretioides* Wedd., *W. rockhauseniana* H. Beltrán, Trinidad, & J. Calvo), whereas the term scapiform is applied to species with a well-developed peduncle (e.g., *W. glandulosa* Wedd., *W. plantaginifolia* Wedd. ex Klatt). The peduncle length is quite variable in some species, such as *W. nubigena*, which has sessile and pedunculate forms.

The growth form of *Werneria* varies from solitary plants (e.g., *W. pumila* [not strictly]) to forming clumps (e.g., *W. orbignyana* Wedd.) or dense mats (e.g., *W. aretioides*). This character has been included in the descriptions, but it should be noted that it has no taxonomic value because it is highly variable and difficult to determine from dried specimens.

Three types of rhizomes are differentiated according to their position with respect to the ground surface: horizontal (~0°), oblique (~45°), and vertical (~90°).

Leaves

The leaves are simple, alternate, and usually rosulate. They are linear, spatulate, or oblanceolate and entire to pinnatisect. Most species have a sheathing leaf base, which is more or less noticeable depending on the amount of indumentum at the leaf attachment. The leaf length provided in the descriptions of these species strictly corresponds to the length of the lamina because their leaves are considered sessile. When a pseudopetiole (interpreted as a petioliform base) can be differentiated from the lamina, the leaf is considered petiolate, and each part is described accordingly. This is the case for the following species: *W. glandulosa*, *W. pinnatifida* J. Rémy, *W. plantaginifolia*, *W. rockhauseniana*, *W. solivifolia* Sch. Bip., *W. spathulata* Wedd., and *W. weberbaueriana* Rockh.

Although the leaf arrangement of all species is considered rosulate, some species develop aerial, horizontal stem-like rhizomes. These rhizomes can bear a few alternate and distantly arranged leaves (e.g., *W. microphylla* H. Beltrán & S. Leiva, *W. pygmaea* Gillies ex Hook. & Arn.).

The leaf margin is denticulate or entire and has a relevant taxonomic value. The group with a denticulate margin encompasses *W. aretioides*, *W. cochlearis* Griseb., *W. glaberrima* Phil., and *W. orbignyana*. Among the species with an entire margin, *W. pectinata* Lingelsh. and *W. castroviejoi* J. Calvo & H. Beltrán are characterized by their cilia on the margin (only concentrated on the distal part and sometimes very scattered in *W. castroviejoi*).

The leaf texture can be coriaceous or fleshy, drying rather chartaceous in a few species. Some species have leaves that are ornamented with papillae (e.g., *W. aretioides*) or even with minute verrucae (e.g., *W. weberbaueriana*), whereas others have a waxlike covering that confers a shiny texture (e.g., *W. graminifolia*). The leaves range from flat to strongly curved forward.

Most species have glabrous or glabrescent leaves. *Werneria glandulosa*, *W. lanatifolia* J. Calvo & R. I. Meneses, and *W. pinnatifida* are the only species characterized by being covered with trichomes, at least on the adaxial leaf surface. *Werneria apiculata* Sch. Bip. usually displays glabrous leaves but sometimes has scattered long trichomes.

Involucre

Werneria has been traditionally characterized as having involucral bracts that are fused at the base (Nordenstam, 2007), which has been used to discriminate its species from those of *Senecio*. However, some Andean *Senecio* species display involucral bracts that are only partially fused at the base (Calvo et al., 2019). In addition, a few species of *Werneria* have a strongly partite involucre (i.e., *W. glandulosa*, *W. plantaginifolia*, *W. staticifolia* Sch. Bip., and sometimes *W. nubigena*). This character therefore cannot be used in isolation when assigning a species to a genus.

Likewise, the absence of supplementary bracts is not a character shared by all *Werneria* species. *Werneria pumila* and *W. villosa* A. Gray are exceptions and have (3–)7–16 supplementary bracts. It is noteworthy that some species can bear one or two bracts at the base of the involucre (e.g., *W. pinnatifida*). These should be considered peduncle bracts that reach the involucre rather than true supplementary bracts.

The involucre length corresponds to the distance from the apex of the involucral bracts to the peduncle attachment point.

Capitulum

Most species have radiate capitula (24 species). A discoid capitulum is found in two species (*W. pinnatifida* and *W. solivifolia*), and one species displays disciform capitula (*W. carnulosa* A. Gray).

A useful taxonomic character among the radiate species is ray corolla color, which allows one to discriminate between the group with yellow ray corollas and the group displaying white ray corollas. The white rays are sometimes bluish or

purplish on the abaxial surface (usually only on the distal part). Likewise, the yellow rays are often dark reddish below. The ray corollas usually conspicuously surpass the involucre; however, in *W. rockhauseniana* and *W. weberbaueriana* the ray corollas are shorter than or as long as the involucral bracts.

Floral Microcharacters

The filament collar is balusterform, which agrees with the placement of the genus *Werneria* within the subtribe Senecioninae (Nordenstam et al., 2009). The anther bases are rather auriculate. In all species examined the style branch apices are truncate with a crown of sweeping hairs.

Achenes

The achenes are homomorphic, cylindrical, ribbed, mostly glabrous, and papillose in a few species. *Werneria nubigena* usually has dense white villous trichomes (not myxogenic), but specimens with glabrous or scattered trichomes are also found. In other species, some specimens have scattered arachnoid trichomes near the base, but this character does not appear to be consistent, and therefore, it does not provide reliable taxonomic information. It should be noted that a proper description of the achenes (length, width) could not be provided for some species because of a lack of collections with mature achenes.

TAXONOMIC TREATMENT

Werneria Kunth, Nov. Gen. Sp. (folio ed.) 4: 148. 1818. *Werneria* subg. *Euwerneria* Rockh., Bot. Jahrb. Syst. 70: 285. 1939, *pro parte, nom. inval.* (Turland et al., 2018, International Code of Nomenclature Article(s) [ICN Art.] 21.3, 22.2, and 38.1). *Werneria* sect. *Graminifoliae* Rockh., Bot. Jahrb. Syst. 70: 278, 300. 1939, *nom. inval.* (Turland et al., 2018, ICN Art. 22.2). Type: *Werneria graminifolia* Kunth, designated by Cabrera (1971: 275).

Oresigonia Willd. ex Less., Syn. Gen. Compos.: 393. 1832, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Oribasia Moc., Sessé, & Cerv. ex DC., Prodr. 6: 324. 1838, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria [unranked] *Euwerneria* J. Rémy, Fl. Chil. 4: 214. 1849, *nom. inval.* (Turland et al., 2018, ICN Art. 21.3).

Werneria [unranked] *Anactis* J. Rémy, Fl. Chil. 4: 216. 1849. *Werneria* subg. *Anactis* (J. Rémy) Rockh., Bot. Jahrb. Syst. 70: 281. 1939. *Werneria* sect. *Pinnatifoliae* Rockh., Bot. Jahrb. Syst. 70: 275, 281. 1939, *nom. inval.* (Turland et al., 2018, ICN Art. 22.2), **syn. nov.** Type: *Werneria pinnatifida* J. Rémy (see Turland et al., 2018, ICN Art. 10.2 and 10.3).

Werneria sect. *Integrifoliae* Rockh., Bot. Jahrb. Syst. 70: 276, 284. 1939, **syn. nov.** Type: *Werneria carnulosa* A. Gray, **designated here**.

Werneria sect. *Spathulifoliae* Rockh., Bot. Jahrb. Syst. 70: 280, 323. 1939, **syn. nov.** Type: *Werneria spathulata* Wedd. (see Turland et al., 2018, ICN Art. 10.8).

Rhizomatous herbs, rosettiform or scapiform, forming mats, lax clumps, or solitary plants, 1–55 cm tall. **Rhizome** 1–20 cm long, 0.1–5 cm in diameter, horizontal to vertical, glabrous to covered with long, silky trichomes and/or leaf base remnants. **Leaves** simple, alternate, extending into a sheath-like base or pseudopetiolate, typically rosulate (rarely distichously arranged); leaf lamina linear, linear-oblong, spatulate, elliptic, or oblanceolate, 2–360 mm long, 0.4–30 mm wide, entire, denticulate, ciliate, pinnatifid, or pinnatisect, obtuse to aristate at the apex, not narrowed to cuneate at the base, flat to strongly curved forward in cross section (rarely elliptical or nearly terete), glabrous (rarely with scattered long trichomes or lanate above), 0–1-nerved to pinnately veined above, 0–6-nerved to pinnately veined beneath, coriaceous or fleshy (drying chartaceous in a few species), matte to shiny, sometimes papillose or papillose-verrucose near the apex; pseudopetiole absent or 4.6–160 mm long. **Capitulum** usually radiate (two species discoid and one disciform), solitary, terminal, sessile to pedunculate; peduncle up to 390 mm long, glabrous to lanate, without bracts to bearing foliose bracts. **Involucre** cupuliform, with uniseriate bracts fused at the base (strongly partite in a few species), 3.7–35 mm long, 2.3–29 mm wide, glabrous to lanate in the lower half; involucral bracts 8–33, 1.8–30 mm long, 0.8–5.5 mm wide at the base, acute to obtuse at the apex, greenish to dark purplish; supplementary bracts usually absent (rarely (3–)7–16); receptacle epaleaceous, rather flat, smooth or seldom alveolate. **Ray florets** 3–43, pistillate, fertile; corolla 4.1–55 mm long, 0.5–6.6 mm wide, 3–5(–10)-veined (rarely inconspicuous), subentire to 3-toothed at the apex, surpassing or not the involucre, white or yellow (disciform species has peripheral florets with corollas reduced to a vestigial tube). **Disc florets** 7 to ~400, hermaphrodite; corolla tubular, 3–13.1 mm long, 5-lobed, whitish to yellow; style branches truncate with a crown of sweeping hairs, whitish, yellow, or purplish; anther bases rather auriculate. **Achenes** 1.3–4.6 mm long, 0.5–1.3 mm wide, cylindrical or fusiform, 6–10-ribbed, usually glabrous (sometimes covered with white villous trichomes or with some scattered arachnoid trichomes near the base), papillose in a few species; pappus capillary with bristles 2.7–24 mm long, barbellate, whitish (sometimes dark purplish or partially rose colored). Chromosome number $n = 50$, $2n = 42–212$, but frequently around 100–212 (Diers, 1961; Beaman and Turner, 1962; Turner et al., 1967; Waisman et al., 1986).

Distribution. Central America (Mexico [S Chiapas], Guatemala, Costa Rica, Panama), South America (Venezuela, Colombia, Ecuador, Peru, Bolivia, Argentina, Chile). *Werneria* species thrive in the paramo, jalca, puna, southern Andean steppe, Patagonian steppe, and the highlands of the Central American montane forests, between elevations of (1,050–)3,000 and 5,000(–6,040) m (Figure 2).

Etymology. The generic name *Werneria* honors the Prussian mineralogist Abraham G. Werner (1749–1817), eminent professor at the University of Freiburg. Alexander von Humboldt, among others, was his pupil.

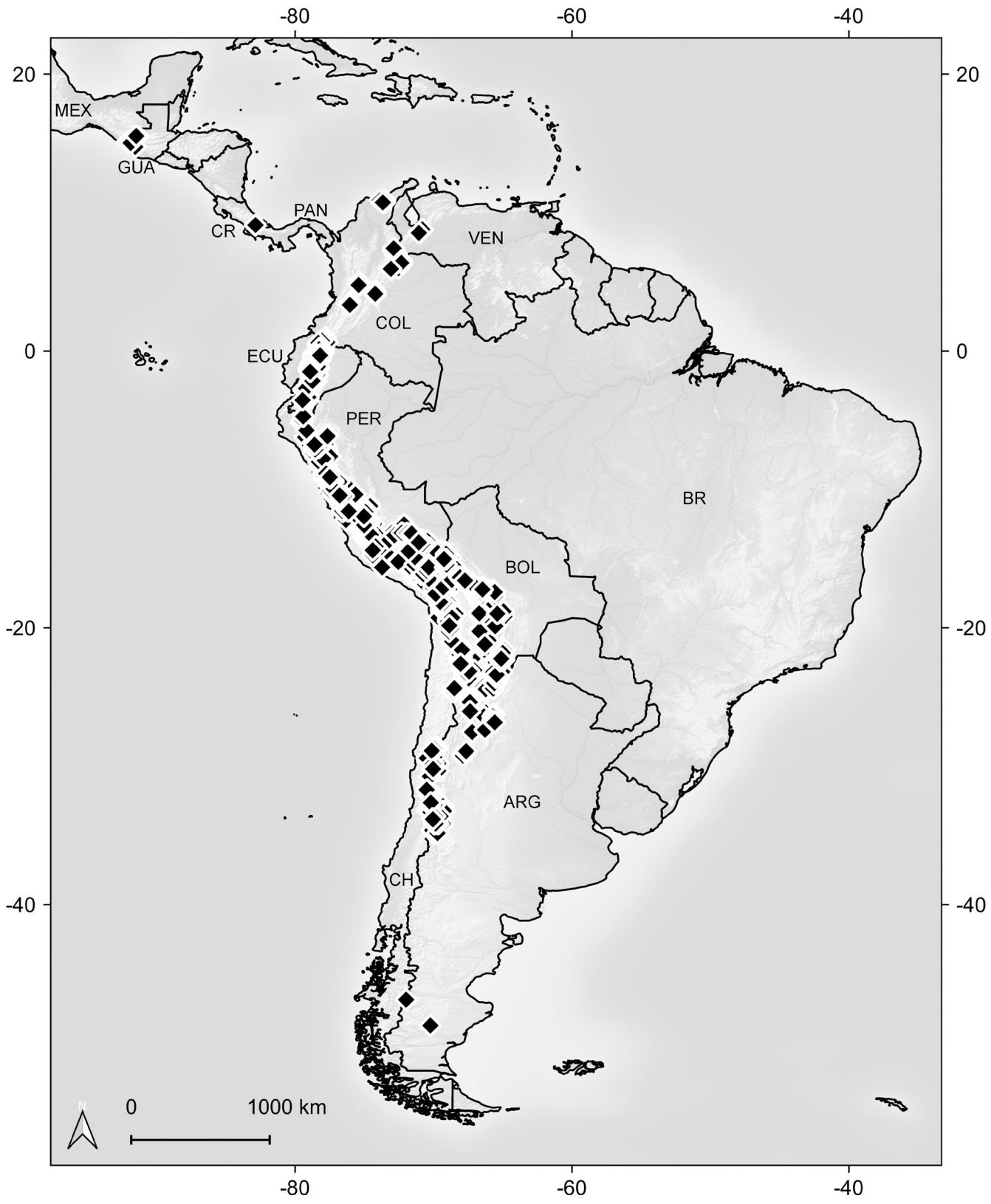

FIGURE 2. Distribution map of the genus *Werneria*.

Notes. The African genus *Euryops* (Cass.) Cass. was considered a priority name for *Werneria* Kunth by Cassini (1820). However, it has been firmly demonstrated that this species group is only distantly related to *Werneria*. Indeed, *Euryops* belongs to the subtribe Othonninae, whereas *Werneria* belongs to Senecioninae (Nordenstam et al., 2009).

Rémy (1849) did not specify the rank of his infrageneric divisions "§. I. EUWERNERIA" and "§. II. ANACTIS." The symbol § is interchangeably used for subdivisions of a genus as well as for suprageneric divisions (see Rémy, 1849: 5). In the same volume the author divided the genus *Senecio* into two informal sections; although they are invalid (Turland et al., 2018, ICN Art. 32.1b), the term "SECCION" (section) is explicitly stated (see Rémy, 1849: 133, 160). Apparently, nowhere in any of the volumes of this work is the symbol § defined. For that reason, both infrageneric divisions of *Werneria* are here considered as unranked.

KEY TO THE SPECIES OF *WERNERIA*

1. Capitulum discoid or disciform 2
   Capitulum radiate 4
2. Capitulum disciform (peripheral corollas reduced to a vestigial tube 2–2.5 mm long); leaf lamina entire . . . . . **5. *W. carnulosa***
   Capitulum discoid (all corollas tubular); leaf lamina pinnatifid to pinnatisect 3
3. Leaf lamina pinnatifid to 1–2-pinnatisect, 10–15 lobes per side; disc florets 40–60 . . . . . **18. *W. pinnatifida***
   Leaf lamina 1-pinnatisect, 3–4 lobes per side; disc florets 16–28 . . . . . **23. *W. solivifolia***
4. Leaf margin denticulate or entire and ciliate 5
   Leaf margin entire, not ciliate 10
5. Leaf lamina entire and ciliate 6
   Leaf lamina denticulate, not ciliate 7
6. Leaf lamina linear-oblong, with cilia scattered and limited to the distal part of the leaf margin . . . **6. *W. castroviejoi***
   Leaf lamina narrowly spatulate to spatulate, with cilia regularly distributed along the whole margin . . . **17. *W. pectinata***
7. Leaf apex acute . . . . . **9. *W. glaberrima***
   Leaf apex obtuse to 3–7-dentate 8
8. Leaf lamina 2.7–8 mm long; involucre 3.7–7.1 mm long; involucral bracts 8–9(–11); plant forming mats . . . . . **2. *W. aretioides***
   Leaf lamina 9.4–92 mm long; involucre 9–30 mm long; involucral bracts (8–)11–13; plant forming clumps 9
9. Leaf apex obtuse; involucral bracts 5.1–8 mm long . . . . . **7. *W. cochlearis***
   Leaf apex minutely tridentate to conspicuously 3–7-dentate, rarely subentire; involucral bracts 6.4–18.2 mm long . . . . . **16. *W. orbignyana***
10. Leaf apex clearly truncate; well-developed ray corollas not surpassing the involucre 11
    Leaf apex aristate to obtuse; well-developed ray corollas conspicuously surpassing the involucre 12
11. Ray corollas yellow; leaf apex entire . . . . . **22. *W. rockhauseniana***
    Ray corollas white; leaf apex 5–7-notched . . . . . **27. *W. weberbaueriana***
12. Leaves pseudopetiolate; leaf lamina oblanceolate, elliptic, or spatulate 13
    Leaves extending into a sheath-like base (sessile); leaf lamina linear, narrowly oblanceolate, or narrowly elliptic 15
13. Plant 2–5 cm tall; involucral bracts 4.9–7.1 mm long, fused at the base; rhizome 0.1–0.2 cm in diameter . . . . . **24. *W. spathulata***
    Plant 7.5–55 cm tall; involucral bracts 7.3–21 mm long, strongly partite (barely fused at the base); rhizome 0.4–1 cm in diameter 14
14. Leaf lamina 20–43 mm long, pilose . . . . . **10. *W. glandulosa***
    Leaf lamina 45–190 mm long, glabrous . . . . . **19. *W. plantaginifolia***
15. Ray corollas yellow 16
    Ray corollas white 20
16. Involucre with supplementary bracts 17
    Involucre without supplementary bracts 18
17. Leaf lamina linear to narrowly oblanceolate (leaf width/length ratio of 0.06–0.12), finely papillose; involucre glabrescent to sparsely arachnoid at the base . . . . . **20. *W. pumila***
    Leaf lamina usually very narrow linear, rarely progressively broadened toward the apex (leaf width/length ratio of 0.01–0.03), not papillose; involucre floccose-arachnoid to lanate at the base . . . . . **26. *W. villosa***

18. Leaf lamina narrowly elliptic, 1.5–2.5 mm wide; involucral bracts 4–4.5 mm long ..... **12. *W. huascarana***
    Leaf lamina linear, 0.6–1.9 mm wide; involucral bracts 4.8–9 mm long 19
19. Leaf lamina 0.6–1.1 mm wide, acute to obtuse at the apex, rather straight, with canaliculate midrib; involucral bracts 15–21 ..... **4. *W. canaliculata***
    Leaf lamina 1.1–1.9 mm wide, clearly obtuse at the apex, usually falcate, with rather smooth midrib; involucral bracts 11–13 ..... **8. *W. cornea***
20. Leaf apex aristate (arista 0.5–0.8 mm long, at least in young leaves) 21
    Leaf apex apiculate to obtuse 22
21. Leaf lamina coriaceous, (8–)12–25 mm long, flat in cross section; involucral bracts 13–20 ..... **3. *W. caespitosa***
    Leaf lamina fleshy, 2.5–5.7 mm long, elliptical to terete in cross section; involucral bracts 8–13 ..... **14. *W. microphylla***
22. Involucre with supplementary bracts ..... **26. *W. villosa***
    Involucre without supplementary bracts 23
23. Adaxial leaf surface lanate ..... **13. *W. lanatifolia***
    Adaxial leaf surface glabrous (rarely with a few scattered long trichomes) 24
24. Leaf lamina coriaceous, shiny 25
    Leaf lamina rather fleshy, matte 26
25. Leaf lamina usually linear-subulate, progressively narrowing upward, acute to apiculate at the apex, rarely somewhat obtuse; leaf margin not hyaline ..... **1. *W. apiculata***
    Leaf lamina perfectly linear, obtuse at the apex; leaf margin minutely hyaline ..... **11. *W. graminifolia***
26. Involucral bracts (8–)11–13(–14), 3.2–6.3 mm long ..... **21. *W. pygmaea***
    Involucral bracts (12–)20–33, (6.2–)15–30 mm long 27
27. Leaf lamina strictly linear; ray corollas (13.7–)27–34(–55) mm long; rhizome 5–9 cm long ..... **15. *W. nubigena***
    Leaf lamina linear to narrowly oblanceolate (usually slightly narrowed at the base); ray corollas (9.8–)17.5–22.7 mm long; rhizome 7–20 cm long ..... **25. *W. staticifolia***

1. ***Werneria apiculata*** Sch. Bip., Bonplandia (Hannover) 4: 52, 55. 1856. *Werneria pygmaea* var. *apiculata* (Sch. Bip.) Wedd., Chlor. Andina 1: 84. 1856. Type. Peru. Puno: pr. Azángaro, Jun 1854, *W. Lechler 1737* (lectotype: Lechler's collection as the first-step lectotype, designated as "typus" by Rockhausen [1939: 314]; P-02088534 [digital image!] as the second-step lectotype, designated by Freire and Ariza-Espinar [2014: 224]; isolectotypes: BR s.n.!, G-00305499 [digital image!], GOET s.n.!, K-000527601 [digital image!], LE s.n.!, P-02088532 [digital image!], S-R-6521 [digital image!], W 9100!, W 217399!).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 2–3 cm tall. **Rhizome** 3–4 cm long, 0.7–1.2 cm in diameter, horizontal to oblique, covered with long, silky trichomes and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, silky trichomes, helicoidally or distichously arranged; leaf lamina linear-subulate, progressively narrowing upward, 20–42 mm long, 1.7–3.4 mm wide (at the base), entire, acute to apiculate, rarely somewhat obtuse at the apex, not narrowed at the base, flat in cross section, glabrous or with scattered long trichomes, 0–1-nerved above (barely visible), 1–6-nerved beneath (more prominent towards the base), coriaceous, shiny. **Capitulum** radiate, solitary, terminal, sessile (rarely shortly pedunculate). **Involucre** cupuliform, with bracts fused at the base, 6.7–12 mm long, 5.5–10 mm wide, glabrous; involucral bracts 11–14, 3–6.4 mm long, 1.4–2 mm wide at the base, acute at the apex, greenish, usually purple-edged, shiny; supplementary bracts absent. **Ray florets** 12–18; corollas 6.4–9.5 mm long, 1.2–2 mm wide, 3–4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 29–50; corollas 4.3–6 mm long, 5-lobed, whitish to creamy, usually purple tipped; style branches truncate with a crown of sweeping hairs, whitish, purple tipped. **Achenes** 2.7–4.2 mm long, ~1 mm wide, cylindrical, 8–9-ribbed, glabrous or with some scattered arachnoid trichomes near the base; pappus 6.6–8.2 mm long, barbellate, whitish. Chromosome number $2n = 206$ (±8) (Diers, 1961) (Figure 3).

Additional Iconography. Cabrera (1978: 470, fig. 198A–F); Beltrán (2017: 61, fig. 3A, as photo).

Distribution and Habitat. Argentina (Jujuy, Salta, Tucumán), Bolivia (Chuquisaca, Cochabamba, La Paz, Oruro, Potosí, Tarija), Peru (Ancash, Apurímac, Arequipa, Ayacucho, Cajamarca, Cusco, Huancavelica, Huánuco, Junín, La Libertad [expected], Lima, Moquegua, Pasco, Puno, Tacna). It grows in open plains, rocky slopes, and grasslands of the puna ecoregion, in both dry places and moist places that are not waterlogged, between elevations of 3,000 and 5,000 m (Figure 4).

Phenology. Flowering nearly all year round.

Etymology. The epithet *apiculatus* describes the leaves ending abruptly in a short point or apiculum. This character is quite variable in this species.

Notes. *Werneria apiculata* has coriaceous, linear-subulate, flat, shiny leaves, with an acute to apiculate (rarely somewhat obtuse) apex. The leaf arrangement is also quite

FIGURE 3. *Werneria apiculata*. **A.** Peru, Moquegua, near Anillune (not collected); photograph by Mauricio Diazgranados. **B.** Bolivia, Oruro, Livichuco (not collected); photograph by Joel Calvo. **C.** Peru, Moquegua, Perusa (not collected); photograph by Joel Calvo. **D.** Bolivia, Potosí, cordillera Kari Kari (*J. Calvo & M. Zárate 7861*, BOLV); photograph by Joel Calvo.

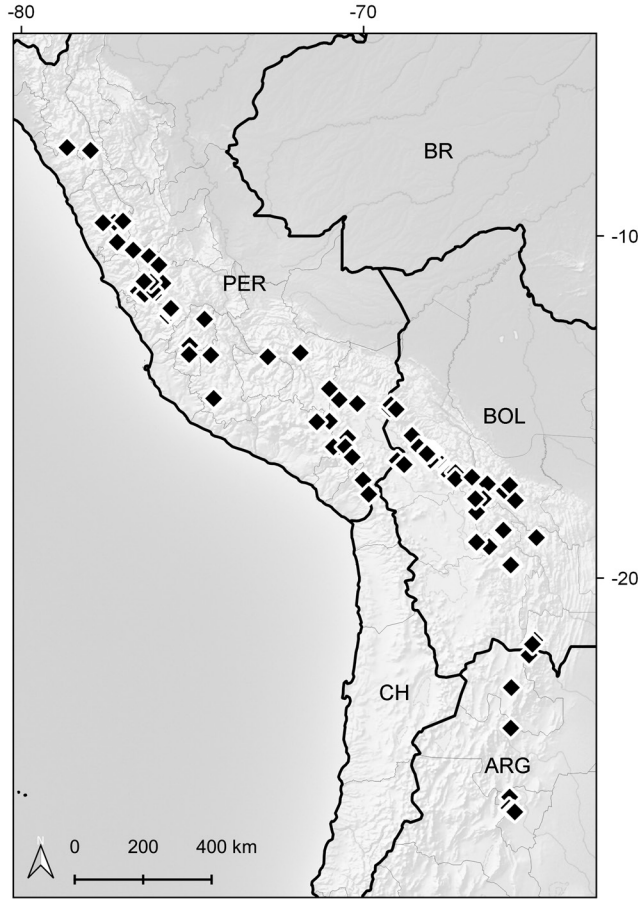

FIGURE 4. Distribution map of *Werneria apiculata*.

variable, from almost distichous to helicoidal. Although most specimens are glabrous, some individuals have a few scattered long trichomes along the lamina (e.g., *Jiménez & Villegas 7467*, LPB).

Plants with a helicoidal leaf arrangement have a broad leaf base (up to 3.4 mm) that becomes progressively narrower upward and ends in an acute or apiculate tip (e.g., *Hutchison et al. 5901*, US, USM). Individuals with a rather distichous leaf arrangement have a narrower leaf base, and the leaf apex is occasionally somewhat obtuse (e.g., *Menhofer 2126*, LPB, US). These different morphologies are not recognized as taxonomically distinct because we found that variation in these characters is continuous. Although the helicoidal form is common in central Peru, we studied a few specimens from Bolivia with the same morphology (e.g., *Hensen 815*, BOLV, LPB; *Gutiérrez et al. 463*, BOLV). Likewise, the distichous form is frequent in southern Peru and Bolivia, but some populations also occur in central Peru, where they co-occur with the helicoidal form.

This species has often been confused with *W. pygmaea*; however, characters related to the leaves and rhizome are useful to discriminate them. The leaves of *W. apiculata* are coriaceous, flat in cross section, and shiny, with somewhat conspicuous nerves (graminoid appearance), whereas those of *W. pygmaea* are rather fleshy, elliptical to terete in cross section, and matte, with barely visible or unnoticeable nerves. The rhizome of *W. apiculata* is usually more robust than that of *W. pygmaea* and shows the broadened and sclerified sheath-like base of the leaves and long, silky trichomes. In contrast, the rhizome of *W. pygmaea* is covered with an arachnoid-lanate indumentum, and the leaf bases are not clearly sclerified, which is likely associated with the wetter habitats that the latter species thrives in. *Werneria apiculata* may also be confused with *W. caespitosa* Wedd., *W. graminifolia*, and *W. lanatifolia* (see comments under those species).

Among the original material cited in the protologue of *W. apiculata*, Rockhausen (1939) selected *Lechler 1737* as the "typus" of this name. Since the gathering consists of several duplicates, this action is accepted as a first-step lectotypification, which was further narrowed by Freire and Ariza-Espinar (2014) by designating P-02088534 as the lectotype. It should be noted that specimen P-02088533 is excluded from the type material because the individuals mounted on the sheet mostly belong to *Distichia muscoides* and *Carex sp*.

Additional Specimens Examined. **ARGENTINA. Jujuy:** Humahuaca, mina Aguilar, 23°12′S, 65°41′W, 23 Feb 1963, *A. L. Cabrera et al. 15451* (MA); Humahuaca, mina Aguilares, entre la mina y el molino, 23°12′S, 65°41′W, 29 Mar 1952, *E. Petersen & J. P. Hjerting 117* (LIL); Humahuaca, cerro La Soledad, 21 Mar 1929, *S. Venturi 8629* (LIL, US). **Salta:** Sta. Victoria, Lizoite, 22°15′S, 65°10′W, 1 Apr 1940, *T. Meyer & M. B. Bianchi s.n.* (LIL); Caldera, subida al Nevado del Castillo por Mal Paso, 24°23′S, 65°42′W, 15 Mar 1952, *H. Sleumer & F. Vervoorst 2921* (LIL). **Tucumán:** Trancas, La Cruz, 23 Apr 1946, *J. P. Bellomo 296* (LIL); Tafí, Mesada de los Yutos [Yugos], 26°50′S, 65°35′W, 16 Mar 1962, *A. Krapovickas, C. L. Cristóbal & P. R. Legname 10674* (LIL); Tafí, Mesada de los Yutos [Yugos], 26°50′S, 65°35′W, 16 Mar 1962, *A. Krapovickas, C. L. Cristóbal & P. R. Legname 10678* (LIL); Tafí, Infiernillo, subiendo la quebrada hacia el refugio de Mansilla, 26°43′S, 65°45′W, 15 Feb 1965, *P. R. Legname 4321* (LIL); cumbre de Malamala, 26°48′S, 65°38′W, 7 Apr 1904, *M. Lillo 3521* (LIL); Trancas, cumbre de Lara, 26°24′S, 65°44′W, 23 Apr 1926, *S. Venturi 4101* (LIL, LP n.v.).

BOLIVIA. Chuquisaca: Zudáñez, Corralón Mayo, 18°49′S, 64°57′W, 3 Apr 1987, *O. M. R. Cordech 7* (LPB). **Cochabamba:** Ayopaya, cuenca río Tambillo, estancia Pajchanti, 17°3′S, 66°50′W, 8 May 1989, *R. Baar 389* (LPB); Tapacarí, de Challa unos 15 km hacia Oruro, cerro de Condorkhiña, 25 Apr 1989, *S. G. Beck, E. Gómez, & Z. Rúgolo 18129* (LPB); Arque, 6 km E de Challa (camino), 31 Mar 1979, *S. G. Beck 966* (LPB); Mizque, Sacha Loma, al NW de Mizque, 17°44′S, 65°34′W, 9 Mar 2003, *E. Gutiérrez, E. Zurita, & R. Soto 435* (BOLV [mixed with *Novenia acaulis* (Benth. & Hook. f. ex B. D. Jacks.) S. E. Freire & F. H. Hellw.]); Mizque, Sacha Loma, al NW de Mizque, 17°44′S, 65°34′W, 18 Mar 2003, *E. Gutiérrez, E. Zurita, & P. Altamirano 463* (BOLV); Quillacollo, camino Sipe Sipe-Lipichi, 9 May 1990, *I. Hensen 815* (BOLV, LPB); cordillera del Tunari, área de Tahua Cruz, en el camino a Morochata, 18 Feb 1990, *G. Navarro 555* (BOLV); Tapacarí, Qelani, Aynoka de Quinua, 3 km al E de Japo K'asa (km 125 en la carretera Cbba–Oruro), 17°41′S, 66°44′W, 8 Feb 1995, *H. U. Pestalozzi 345* (LPB); Tapacarí, Chilliwa, al E de Japo K'asa (km 125 en la carretera Cbba–Oruro), 17°40′S, 66°45′W, 9 Feb 1995, *H. U. Pestalozzi 370* (BOLV); Arque, camino a Oruro, entrando por el km 86, camino a Huancani, 17°41′S, 66°30′W, 10 Mar 1992, *P. Rojas 1198* (BOLV); Arque, camino a Oruro, entrando por el km 86, camino a Huancani, en Sayari, 17°41′S, 66°30′W, 1 Apr 1992, *P. Rojas 1255B* (BOLV); Arque, camino a Oruro, entrando por el km 86, camino a Huancani, 17°41′S, 66°30′W, 1 Apr 1992, *P. Rojas 1279* (BOLV); prov. Ayopaya, Passhöhe von Tabacruz, 28 May 1929, *J. Steinbach 9756* (LIL); prov. Chapare, San Benito-pass, 17°27′S, 65°53′W, 11 Jun 1929, *J. Steinbach 9826* (LIL); Tiraque, 30–33 km along old Chapare road from main Cochabamba to Chapare highway, 18 Apr 1998, *J. R. I. Wood 13532* (BOLV, LPB); Tiraque, P.N. Carrasco, cordillera Ronco, 17°17′S, 65°44′W, 17 Mar 2001, *M. Zárate & D. Méndez 1049* (BOLV, LPB); Bolívar, Tanqa Tanqa, 18°4′S, 66°42′W, 26 Apr 2009, *M. Zárate 3349* (BOLV); Bolívar, Tanqa Tanqa, 18°4′S, 66°42′W, 26 Apr 2009, *M. Zárate 3350* (BOLV [mixed with *W. pectinata*]); Quillacollo, cordillera alta del Tunari, subiendo del camino de Morochata al Jalsuri, alrededores de la represa, 17°15′S, 66°23′W, 3 Apr 2011, *M. Zárate et al. 3905* (BOLV); Quillacollo, cordillera alta del Tunari, subiendo del camino de Morochata al Jalsuri, alrededores de la represa, 17°15′S, 66°23′W, 6 Apr 2011, *M. Zárate, D. Agreda, & D. Soux 3962* (BOLV). **La Paz:** Franz Tamayo, Ulla Ulla, 15°2′S, 69°15′W, 6 May 1980, *C. Barcena 1015* (LPB); Ingavi, Guaqui 22 km hacia Aguallamaya, cerca al río Desaguadero, 16°34′S, 69°1′W, 9 Jul 1985, *S. G. Beck 11293* (LPB, QCNE); Murillo, valle de Zongo, cerca estación sismográfica, 7 Apr 1979, *S. G. Beck 1274A* (LPB); Murillo, valle de Zongo, cerca estación sismográfica, 7 Apr 1979, *S. G. Beck 1291* (LPB); Murillo, La Paz hacia los Yungas, la cumbre, 22 Mar 1987, *S. G. Beck 13560* (LPB); Ingavi, Huacullani cerca de la cumbre de "Lomas de Rosapata," 15 May 1979, *S. G. Beck 1650* (LPB, US); Murillo, bajando de la cumbre 17 km, entrando por la antigua gravera, pasando la mina Lourdes, subiendo 3 km, PN-ANMI Cotapata, Kalasani, 16°18′S, 67°58′W, 1 Mar 2003, *S. G. Beck, E. Emshwiller, & S. Laegaard 28720* (LPB); Murillo, fin del valle Kaluyo pasando el pueblo de Chacaltaya, Pampalarama, 150 m por debajo del glaciar, 16°19′S, 68°4′W, 14 Mar 2013, *S. G. Beck, D. Ibáñez, & C. Beck 34087* (LPB); Loayza, Caxata 7 km hacia Quime, 17°6′S, 67°19′W, 19 Feb 1981, *S. G. Beck 4356* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 9 Apr 1957, *J. Cañigueral 442* (LPB); Murillo, pie del Illimani, Aug 1987, *R. Chevalier s.n.* (LPB); Murillo, Achachicala 15 km al N de La Paz, 7 Apr 1975, *R. Cordero 521** (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 19 Feb 1983, *D. K. de Ávila 32* (LPB); Franz Tamayo, estación experimental de Ulla Ulla, pampa N of station, 15°3′S, 69°14′W, 7 Oct 1982, *A. Dennis 861* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 298a* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 314a* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 363* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, 7 Feb 1988, *S. Estenssoro 622* (LPB); Yungas, 16 May 1991, *C. Feuillet 15006* (LPB); valle de Zongo, 4 km avant la cumbre, 16°16′S, 68°7′W, 24 Apr 1988, *A. Fournet 837* (BOLV); Murillo, 6.7 km E of la cumbre (pass) and 8.3 km W of Pongo on rd. to Unduavi, 1 km along old rd. that leads down into valley, 16°19′S, 68°1′W, 16 Apr 1995, *V. A. Funk 11349* (LPB [mixed with *W. pygmaea*]); Murillo, Zongo valley, lgn. Pata Kkota, 1.5 km S of pass, 16°18′S, 68°7′W, 11 Apr 1995, *V. A. Funk & N. Bernal 11261* (LPB); Murillo, Zongo valley, lgn. Pata Kkota, 1.5 km S of pass, 16°18′S, 68°7′W, 11 Apr 1995, *V. A. Funk & N. Bernal 11262* (LPB); Murillo, Zonga valley, lgn. Pata Kkota, 1.5 km S of pass, 16°18′S, 68°7′W, 11 Apr 1995, *V. A. Funk & N. Bernal 11264* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and above

lake on abandoned rd., 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11327* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and above lake on abandoned rd., 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11329* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and high above marker cross, along rd. into mountains, 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11334* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and high above marker cross, along rd. into mountains, 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11335* (LPB); Murillo, 7.3 km NE of la cumbre (pass) on rd. to Unduavi, and 8 km W of Pongo, on N side of rd., 16°19′S, 68°1′W, 15 Apr 1995, *V. A. Funk 11341* (LPB); Loayza, Viloco mine, near Araca, high valley above pueblo of Viloco, 16°55′S, 67°30′W, 22 Apr 1995, *V. A. Funk & M. Estarez 11363* (LPB); Loayza, Viloco mine, near Araca, high valley above pueblo of Viloco, 16°55′S, 67°30′W, 22 Apr 1995, *V. A. Funk & M. Estarez 11364* (LPB); Loayza, along narrow winding rd. from Viloco to Caxata, 12.3 km from Viloco, 16°58′S, 67°30′W, 23 Apr 1995, *V. A. Funk & M. Estarez 11365* (LPB); Loayza, along narrow winding rd. from Viloco to Caxata, 16.7 km from Viloco, 16°58′S, 67°30′W, 23 Apr 1995, *V. A. Funk & M. Estarez 11367* (LPB); Los Andes, Hichu-Kkota valley, at base of lgn. Khara Kkota near school, 16°10′S, 68°23′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11381* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11384* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11389* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11391* (LPB); Omasuyos, 1 km beyond cumbre (4,200 m) on road from Achacachi to Sorata, 21 km from Achacachi, 15°50′S, 68°35′W, 28 Apr 1995, *V. A. Funk 11396* (LPB); Omasuyos, 1 km beyond cumbre (4,200 m) on road from Achacachi to Sorata, 21 km from Achacachi, 15°50′S, 68°35′W, 28 Apr 1995, *V. A. Funk 11397* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lag. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11406* (LPB); Murillo, nev. Chacaltaya, road to Cabaña del Club Andina, 4.7 km from turn off on road to Zonga, 16°22′S, 68°9′W, 30 Apr 1995, *V. A. Funk 11416* (LPB); Ingavi, comunidad Tacaca, cerro Callejas, 16°41′S, 68°50′W, 17 Apr 1988, *I. Hinojosa & C. Silva 32* (LPB); Inquisivi, 200 m below the power station at the head of the valley of the río Angostura, 1 km NE of mina Argentina and 10 km S of Choquetanga, 16°55′S, 67°19′W, 6 Mar 1991, *M. Lewis 38132* (LPB); Murillo, camino a los Yungas km 16 de La Paz, 6 Apr 1985, *M. Liberman 860A* (LPB); Murillo, en las nacientes del valle Hampaturi-Irpavi, alrededores de la laguna Ajuan Kkota, 16°23′S, 68°0′W, 6 Apr 1985, *M. Liberman 885* (LPB); Murillo, near summit of La Paz–Lambate rd., ~20 km E of Ventilla, 16°32′S, 67°49′W, 26 May 1990, *J. L. Luteyn & L. J. Dorr 13806* (LPB); Murillo, near summit of La Paz–Lambate rd., ~20 km E of Ventilla, 16°32′S, 67°49′W, 26 May 1990, *J. L. Luteyn & L. J. Dorr 13811* (LPB); Murillo, Milluni, planicie frente al centro Milluni, 16°19′S, 68°9′W, 6 May 1995, *R. I. Meneses 208* (LPB); Murillo, Milluni, frente al centro Milluni, 16°19′S, 68°9′W, 9 May 1995, *R. I. Meneses 292* (LPB); Murillo, Milluni, frente al centro Milluni, 16°19′S, 68°9′W, 19 May 1995, *R. I. Meneses 328* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 19 May 1995, *R. I. Meneses 364* (LPB); Murillo, Milluni, a 18 km NE de La Paz, frente al centro Milluni, 16°19′S, 68°9′W, 20 May 1995, *R. I. Meneses 389* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 9 Feb 1996, *R. I. Meneses 558* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 24 Apr 1995, *R. I. Meneses 74* (LPB); Franz Tamayo, Ulla Ulla, 15°2′S, 69°15′W, 15 Apr 1982, *X. Menhofer 1157* (LPB); Bautista Saavedra, más arriba de Calaya, 15°4′S, 69°3′W, 1 Mar 1983, *X. Menhofer 2060* (LPB); Camacho Pacobamba, 29 Mar 1983, *X. Menhofer 2126* (LPB, US); Franz Tamayo, Ulla Ulla, cerca de la laguna Kellu, 14°56′S, 69°12′W, 4 May 1982, *X. Menhofer 2205* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1095* (LPB); Los Andes, por debajo de la represa Condoriri, bordes del río proveniente del glacial Condoriri, 16°12′S, 68°15′W, 24 Mar 2010, *T. Ortuño, A. P. Sandoval, & N. Pyrooz 978* (LPB); Los Andes, por encima de la represa Condoriri, cerca al glacial Condoriri, 27 Mar 2010, *T. Ortuño & A. P. Sandoval 997* (LPB); Murillo, Ceja de El Alto, 5.8 km N of the La Paz–Tiquina road on the road to Milluni, 16°26′S, 68°9′W, 25 Apr 1985, *J. C. Solomon & M. Moraes 13402* (LPB); Murillo, trail from mina San Francisco to the pass, 11 km N of Ventilla along the río Choquekkota, 16°29′S, 67°54′W, 19 May 1985, *J. C. Solomon 13790* (LPB); Murillo, mina Lourdes, 2.7 km al N del camino entre La Paz y Unduavi, a lo largo del río Kkota khuchu (~14 km al E de la cumbre), 16°18′S, 67°58′W, 25 Apr 1987, *J. C. Solomon & R. Chevalier 16627* (LPB); Murillo, 4.3 km toward Collana, from road between Calacoto and Palca, 16°33′S, 68°3′W, 17 Aug 1981, *J. C. Solomon 6090* (LPB); Chacaltaya, Ingenio, 16°22′S, 68°9′W, 21 Apr 1928, *C. Troll 1933* (CONC); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 15 Mar 1989, *X. Villavicencio 162* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 22 Mar 1989, *X. Villavicencio 355* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 7 Apr 1989, *X. Villavicencio 378* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 8 Apr 1989, *X. Villavicencio 456* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 8 Apr 1989, *X. Villavicencio 489* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 8 Apr 1989, *X. Villavicencio 500* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de

Guaqui, 16°41′S, 68°49′W, 8 Apr 1989, *X. Villavicencio 500a* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 9 Apr 1989, *X. Villavicencio 574a* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 14 Mar 1989, *X. Villavicencio 60* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 18 Apr 1989, *X. Villavicencio 948* (LPB); Murillo, 1–2 km along road leading off from near la cumbre on Yungas road toward S side of reservoir in valley above La Paz, 16°22′S, 68°2′W, 16 Mar 2007, *J. R. I. Wood, D. J. N. Hind, & M. Mendoza 23168* (LPB); altiplano rte. de Chacaltaya, 27 Mar 1979, *J. P. Ybert 740* (LPB); cumbre vers Yungas, 9 Apr 1981, *J. P. Ybert 863* (LPB). **Oruro:** Eduardo Abaroa, carretera a Potosí, antes de Cruce Culta, localidad Tirani, subiendo hacia los arbustales de keñua, 19°5′S, 66°20′W, 28 Feb 2016, *I. Jiménez & R. Villegas 7890* (LPB); Eduardo Abaroa, Challapata, desde Challapata subiendo hasta el final del camino hacia Azanaque, 18°57′S, 66°42′W, 3 Mar 2016, *I. Jiménez, L. Vargas, & R. Villegas 8110* (LPB); Abaroa, Challapata, cordillera Azanaques, 18°56′S, 66°43′W, 5 Mar 2006, *L. Torrico & G. Castillo 408* (BOLV); Cercado, km 122 from Cochabamba on highway to Oruro, 8 Mar 1997, *J. R. I. Wood 11825* (BOLV, LPB). **Potosí:** cordillera Kari Kari, ~3.2 km arriba de la laguna San Sebastián, 19°37′S, 65°42′W, 13 Feb 2019, *J. Calvo & M. Zárate 7861* (BOLV); Chayanta, Pocoata, trayecto Sarijchi a Colquechaca, 18°36′S, 65°55′W, 1 Feb 2016, *I. Jiménez 7431* (LPB); Chayanta, trayecto Sarijchi a Colquechaca, pasando laguna Soqoncocha, 18°39′S, 65°59′W, 1 Feb 2016, *I. Jiménez & R. Villegas 7467* (LPB); Tomás Frías, serranía del Khare-Khare [Kari Kari], arriba de la ciudad de Potosí, a orillas de la laguna Chalviri, 19°39′S, 65°41′W, 20 Feb 1988, *M. Schulte 150* (LPB); Tomás Frías, Khare-Khare [Kari Kari], arriba de la fundición de Karachipampa, 19°34′S, 65°42′W, 13 Mar 1988, *M. Schulte 171* (LPB); Tomás Frías, ~20 km S of Ventanilla toward Potosí, 25 Feb 1997, *J. R. I. Wood 11775* (HSB, LPB); Tomás Frías, cerro Rico by road to Tarija, 19°37′S, 65°44′W, 31 Mar 1997, *J. R. I. Wood 11982* (HSB, LPB); Tomás Frías, by road from cerro Rico to las lagunas in cordillera Kari Kari, 19°38′S, 65°43′W, 20 Mar 1999, *J. R. I. Wood 14708* (HSB, LPB); Tomás Frías, between laguna Chalviri and mina Illimani, cordillera Kari Kari, 19°39′S, 65°42′W, 20 Mar 1999, *J. R. I. Wood 14725* (LPB [mixed with *W. pygmaea*]); Tomás Frías, near laguna Illimani, cordillera Kari Kari, 19°38′S, 65°40′W, 20 Mar 1999, *J. R. I. Wood 14745* (LPB). **Tarija:** José María Avilés, Tajzara, cerca Arenales, 21°49′S, 65°0′W, 11 Mar 1986, *E. Bastián 1043* (LPB, US); puna Patanca, 21°56′S, 65°4′W, 26 Mar 1904, *K. Fiebrig 3183* (CONC).

PERU. Ancash: cordillera Negra, pr. Coris, 9°37′S, 77°37′W, 17 May 2013, *C. Aedo & J. Molina 20204* (MA); San Marcos, Huari, compañía minera Antamina, botadero este, 9°36′S, 77°1′W, 13 Aug 2011, *H. Beltrán et al. 7325* (USM); Huari, Yanacancha, San Marcos (campamento de la minera Altamina), 9°34′S, 77°2′W, 15 May 2003, *A. Cano et al. 13311* (USM); Bolognesi, Parianaccra, pampa de Lampas, Chiquián, 10°11′S, 77°12′W, 2 May 1952, *E. Cerrate 1471* (USM [mixed with *W. caespitosa*]); Huari, camino Olleros a Chavín, desde el abra hasta el lado oriental de la cordillera Blanca, 9°36′S, 77°17′W, 21 Oct 1999, *J. Roque & K. Young 1232* (USM); collado de Calca, 16 Mar 1983, *O. Tovar et al. 9515* (USM). **Apurímac:** Abancay, road from Abancay to Cuzco, 38 km NE of Abancay, 13°32′S, 72°48′W, 22 Apr 1982, *V. A. Funk, J. L. Cracraft, & H. Bedell 3585* (US). **Arequipa:** Caylloma, Callalli, alrededor de la Apacheta, camino a Tisco, 15°26′S, 71°22′W, 27 May 2017, *V. Quipuscoa et al. 5735* (HSP); San Juan de Tarucani, a 3.9 km al SO de Carmen de Chaclaya, 16°10′S, 70°53′W, 24 Mar 2013, *C. Tejada, D. Montesinos, & D. Figueroa 82* (HSP). **Ayacucho:** Huamanga, Ocollo, hacia abra Apacheta, 13°29′S, 74°28′W, 26 Jun 2010, *A. Cano et al. 19867* (USM); Lucanas, Pampa Galeras, a 3–4 km del campamento, 14°45′S, 74°23′W, 7 Apr 1970, *O. Tovar 6731* (USM). **Cajamarca:** Cajabamba, Sitacocha, 7°30′S, 77°59′W, 26 Apr 2013, *E. Cochachin, H. Castillo, & S. Castillo 277* (USM); Contumazá, alrededores del pozo Kuan, 7°25′S, 78°40′W, 13 Jun 1981, *A. Sagástegui et al. 10046* (US). **Cusco:** Calca, Písac, 13°25′S, 71°51′W, Apr 1944, *F. Marin 382* (LIL); La Raya, 14°28′S, 71°0′W, 22 Apr 1925, *F. W. Pennell 13490* (CONC); alrededores de Cusco, May 1938, *C. Vargas s.n.* (USM). **Huancavelica:** Huaytará, Pilpichaca, 13°28′S, 75°6′W, 20 Jun 2001, *J. Roque & C. Arana 3083* (USM); Tayacaja, arriba de la hda. Tocas, entre Colcabamba y Paucarbamba, 12°26′S, 74°39′W, 23 Apr 1954, *O. Tovar 2089* (USM [mixed with *W. pinnatifida*]); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2867* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2919* (USM [mixed with *W. pygmaea*]). **Huánuco:** Raura, alrededores de Tinquicocha, 10°25′S, 76°44′W, 9 May 2010, *A. Cano & N. Valencia 19912* (USM); Lauricocha, Cauri, alrededores de las lagunas Tinkicocha, Lauricocha, Tauricocha y Patarcocha, 10°24′S, 76°45′W, 8 Sep 2012, *P. Gonzáles & N. Valencia 1915* (USM); Lauricocha, San Miguel de Cauri, laguna Tactapata, 10°22′S, 76°46′W, 8 Dec 2003, *F. Salvador, M. A. Alonso, & J. Monerris 649b* (USM); Lauricocha, San Miguel de Cauri, riachuelo entre laguna Tinquicocha y Chusqui, 10°24′S, 76°44′W, 5 Dec 2004, *F. Salvador, S. Ríos, & E. Arias 858a* (USM). **Junín:** abra de la Viuda, 11°20′S, 76°25′W, 26 Mar 2005, *C. Aedo & A. Galán 10886* (MA); Yauli, La Oroya - Paccha, 11°39′S, 76°4′W, 7 May 2011, *H. Beltrán 7154* (USM); Yauli, Anticona, 11°35′S, 76°10′W, 25 Apr 1971, *E. Cerrate et al. 4903* (USM); entre Junín y Cerro Pasco, laguna de Capillacocha, 10°51′S, 75°59′W, 10 Aug 1948, *R. Ferreyra 3927* (USM); Chupaca, San José de Quero, límite con la provincia de Yauyos en el distrito de Tomas, 12°7′S, 75°38′W, 21 Jun 2011, *P. Gonzáles 1533* (USM); Tarma, la cumbre en medio de Tarma a la Oroya, 11°23′S, 75°52′W, 21 Aug 1976, *R. Palmer 96* (USM); Yauli, hda. Corpacancha, 11°21′S, 76°13′W, Aug 1969, *O. Tovar 6339* (USM). **Lima:** Yauyos, Laraos, camino Jalcacha a Palca, 12°20′S, 75°43′W, 25 May 1995, *H. Beltrán 1718* (USM); Huarochirí, desvío de carretera central hacia Chinchan y Marcapomacocha, 11°34′S,

76°15′W, 23 Sep 2014, *H. Beltrán & W. Aparco 7739* (USM); Yauyos, Tomas, abra Chaucha, 12°14′S, 75°38′W, 10 Aug 2017, *H. Beltrán 8472* (USM); Huarochirí, alrededores de la laguna de Tuctucocha, 11°42′S, 76°24′W, 14 May 1953, *E. Cerrate 1864* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 24 May 2010, *P. Gonzáles & E. Navarro 1274* (USM); Canta, La Viuda (km 165 carretera Lima-cerro de Pasco), 11°21′S, 76°26′W, 7 Aug 1964, *I. Meza 226* (USM); Canta, Lachaqui, arriba de Pumapanca, 11°33′S, 76°36′W, 19 Jun 1993, *G. Vilcapoma 2557* (USM). **Moquegua:** pr. Tiriti, 16°28′S, 70°20′W, 10 Apr 2005, *C. Aedo & A. Galán 11255* (USM); General Sánchez Cerro, Ichuña y Miraflores, encima del pueblo de Ichuña, 16°10′S, 70°32′W, 6 Apr 2011, *P. Gonzáles 1475* (USM); General Sánchez Cerro, Ubinas, cumbre nevada del cerro Pirhuani Querala, 16°9′S, 70°43′W, 7 Apr 2011, *D. Montesinos 3108* (HSP, USM). **Pasco:** on the road to Huánuco, 6.5 km N of and below Cerro de Pasco, 10°36′S, 76°16′W, 15 Jul 1964, *P. C. Hutchison, J. K. Wright, & R. M. Straw 5901* (US, USM). **Puno:** Puno to Arequipa via old Panamerican Hwy, road from Mañazo to abra Toroya and on to Arequipa city, near abra Toroya, 15°54′S, 70°28′W, 17 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13189* (USM); Chuquibambilla, 14°47′S, 70°43′W, 19 Apr 1925, *F. W. Pennell 13414* (CONC); Lampa, Santa Lucía, alrededor de la represa de Bamputañe, 15°25′S, 71°0′W, 17 May 2017, *V. Quipuscoa et al. 5556* (HSP). **Tacna:** Tarata, Vilacota, 17°8′S, 70°1′W, 2 Apr 1998, *A. Cano 8397* (USM); Tarata, cordillera del Barroso Chico, 17°33′S, 69°51′W, 28 Mar 1998, *M. I. La Torre 2234* (USM).

2. ***Werneria aretioides*** Wedd., Chlor. Andina 1: 86. 1856. Type. Bolivia. Potosí: [sur les montagnes] de las lagunas de Potosí, Mar [without year], *A. D. d'Orbigny 1400* (lectotype: P-02088552 [digital image!], designated by Freire and Ariza-Espinar (2014: 221); isolectotypes: BR s.n.!, P-02088553 [digital image!], W-115301!).

Werneria minima var. *pygmaea* Walp., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 277. 1843. Type. Chile/Peru. ["Tacora, 1833, F.J.F. Meyen s.n." according to Rockhausen (1939: 325)] (B, destroyed). Neotype, **designated here**: Chile. Arica y Parinacota: rt. A23 from rt. 11 NW to Tacora, slopes of co. de Tarapacá, 17.6 km from rt. 11, 18°04′S, 69°32′W, 4,692 m, 7 Mar 2014, *V. A. Funk, M. Diazgranados, & J. M. Bonifacino 13109* (US-01278819!).

Rhizomatous herb, rosettiform, forming mats, 1–2 cm tall. **Rhizome** 2–5 cm long, 0.2–0.4 cm in diameter, horizontal to oblique, glabrous. **Leaves** extending into a glabrous sheath-like base; leaf lamina narrowly spatulate to spatulate, 2.7–8 mm long, 1.4–2.3 mm wide, denticulate, sometimes barely visible or only in the lower half, obtuse to truncate and thickened at the apex, narrowed at the base, curved forward in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath, fleshy, matte, papillose. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 3.7–7.1 mm long, 2.3–5 mm wide, glabrous; involucral bracts 8–9(–11), 1.8–2.1(–4.2) mm long, 0.8–1.9 mm wide at the base, acute to obtuse at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** (3–)5–10; corollas 4.1–6.7 mm long, 0.5–1.1 mm wide, 2-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 7–22; corollas 3.6–3.7 mm long, 5-lobed, whitish, usually purple tipped; style branches truncate with a crown of sweeping hairs, yellowish or purplish. **Achenes** 2–2.5 mm long, 0.6–1.2 mm wide, cylindrical to somewhat fusiform, 7–9-ribbed, glabrous; pappus 2.8–6 mm long, barbellate, whitish to partially rose colored. Chromosome number unknown (Figures 5, 6, 7A,B).

Additional Iconography. Cabrera (1978: 470, fig. 198G,H); Freire and Ariza-Espinar (2014: 222, *W. aretioides* A–G).

Distribution and Habitat. Argentina (Jujuy, Salta), Bolivia (La Paz, Oruro, Potosí), Chile (Antofagasta, Arica y Parinacota, Tarapacá), Peru (Moquegua, Tacna, Puno [expected]). It grows on exposed rocky slopes and bare sandy soils of the dry puna ecoregion, between elevations of 3,500 and 5,000 m (Figure 8).

Phenology. Flowering from January to July (also collected in bloom in October).

Etymology. The epithet *aretioides* refers to the similarity of this plant to species of the genus *Aretia* L. (=*Androsace* L., Primulaceae).

Notes. *Werneria aretioides* is a tiny species usually forming large mats that are appressed to the ground. It is characterized by its short leaves, which are narrowly spatulate to spatulate, obtuse to truncate, and denticulate (sometimes barely visible or visible only in the lower half). Another diagnostic character is the distally thickened leaf margin. It belongs to a group with white ray corollas and denticulate leaves that also includes *W. cochlearis*, *W. glaberrima*, and *W. orbignyana*.

Its morphologically closest species is *W. cochlearis*, with which it partially overlaps in distribution around southern Jujuy and Salta. They can be differentiated by leaf length (2.7–8 mm in *W. aretioides* vs. 9.4–22 mm in *W. cochlearis*), involucre length (3.7–7.1 mm in *W. aretioides* vs. 9–12 mm in *W. cochlearis*), and the number of involucral bracts (8–9[–11] in *W. aretioides* vs. [8–]11–13 in *W. cochlearis*). Moreover, *W. aretioides* grows in dense mats, whereas *W. cochlearis* tends to form sparser clumps. However, some specimens of *W. aretioides* display longer leaves and are difficult to identify with certainty (e.g., *Funk & Katinas 11183*, US); see comments under *W. cochlearis*.

The name *W. minima* var. *pygmaea* was included in the synonymy of *W. aretioides* by Rockhausen (1939), who studied the type specimen and stated that it was mixed with individuals of *Senecio humillimus* Sch. Bip. This material was kept at B and apparently destroyed in 1943. Consequently, a neotype collected near the type locality (Tacora Volcano) is designated here.

Additional Specimens Examined. **ARGENTINA. Jujuy:** Tilcara, above San Gregorio, 23°35′S, 65°16′W, 11 Feb 1939, *E. K. Balls 6010* (E, K, UC, US); Humahuaca, mina

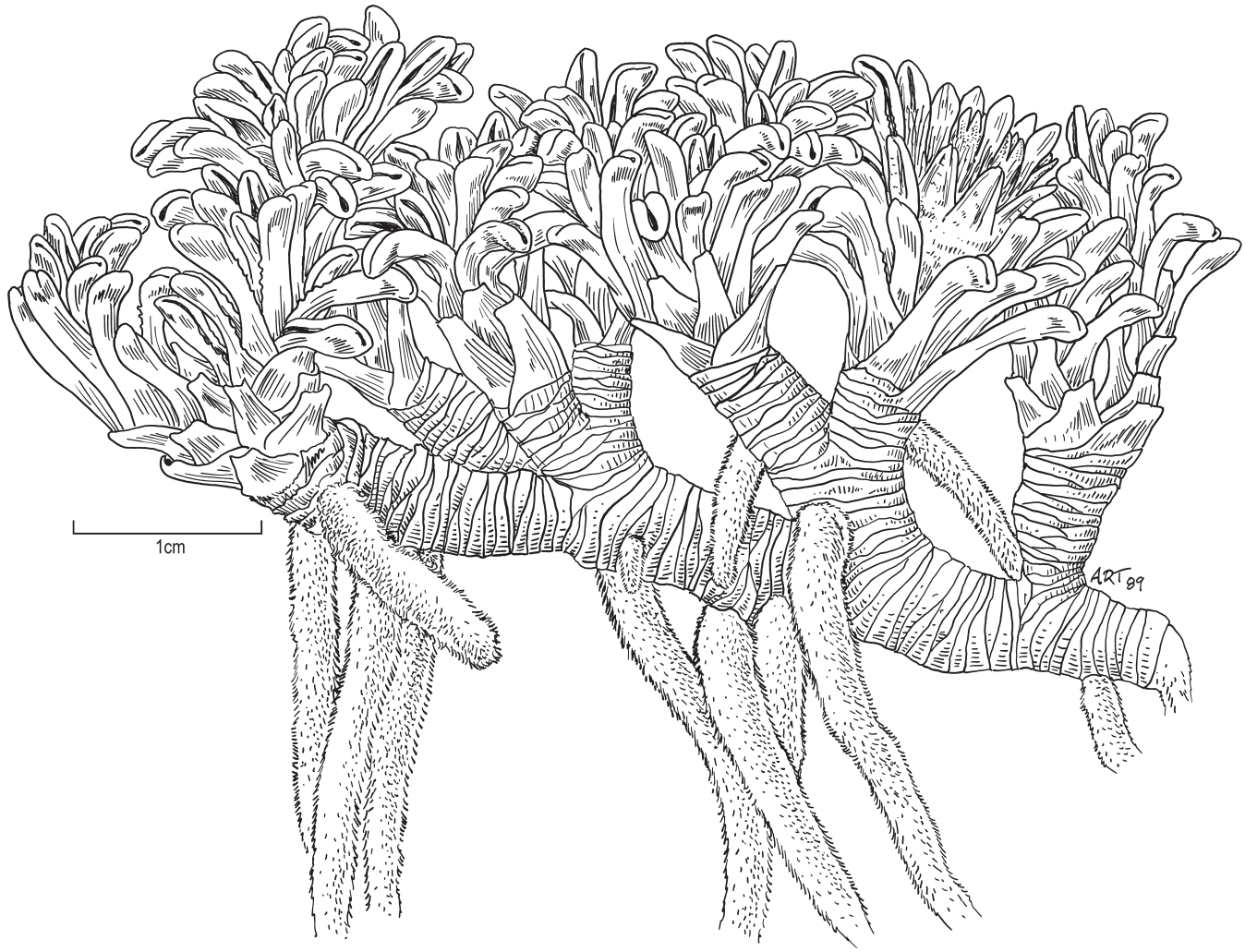

FIGURE 5. *Werneria aretioides*. Habit (drawn from *E. Werdermann 1155,* G). Illustration by Alice Tangerini.

Aguilar, 23°12′S, 65°41′W, 23 Feb 1963, *A. L. Cabrera 15486* (CONC, MA, NY); Susques, cerro Tuzgle, 24°3′S, 66°29′W, 2 Mar 1944, *A. L. Cabrera 8360* (CONC, F); old rd. behind hill of Mina Aguilar, 23°9′S, 65°43′W, 10 Mar 1993, *V. A. Funk & L. Katinas 11183* (US); Humahuaca, mina Aguilar, cerca de la mina, 23°12′S, 65°41′W, 29 Mar 1952, *E. Petersen & J. P. Hjerting 130* (LIL); Humahuaca, mina Aguilar, arriba del Molino, 23°12′S, 65°41′W, 16 Jan 1953, *H. Sleumer 3432* (LIL); Humahuaca, mina Aguilar, 23°12′S, 65°41′W, 18 Jan 1953, *H. Sleumer 3467* (LIL); Yavi, rincón de Cajas, 22°15′S, 65°17′W, 31 Jan 1953, *H. Sleumer 3617* (LIL); Humahuaca, cerro La Soledad, 22 Mar 1929, *S. Venturi 8598* (GH, LIL, UC, US). **Salta:** abra del Gallo, 7 km SW on rd. to Sta. Rosa de los Pastos Grandes (rt. 129) from junction with rt. 51, 24°30′S, 66°30′W, 4 Mar 1993, *V. A. Funk, L. Katinas, & V. Núñez 11136* (US); 1 km E of abra Lizote, E of La Quiaca on road to Sta. Victoria, 35 km E of bridge over río Yaví and pueblo Yaví, 22°30′S, 65°30′W, 7 Mar 1993, *V. A. Funk & L. Katinas 11149* (US).

BOLIVIA. La Paz: Pacajes, a 4.5 km al NE de Vichaya, 17°5′S, 68°44′W, 20 Jul 1995, *N. Massy 1611* (LPB). **Oruro:** Sajama, cerro Jasasuni, 18°9′S, 68°52′W, 27 Mar 2005, *S. G. Beck 31143* (LPB); Sabaya, bajando de la cumbre del Pumire, 18°59′S, 68°24′W, 7 Feb 2019, *J. Calvo 7843* (LPB); Challapata, Livichuco, Tarpata, estribaciones del cerro Toro cerca del collado antes de las lagunas, 18°56′S, 66°25′W, 15 Feb 2019, *J. Calvo & M. Zárate 7880* (BOLV); Sajama, S side of nev. Sajama just below snowline on E side of río Sururia, N walk up from 4,300 m where rd. circles nev., 18°8′S, 68°53′W, 19 Apr 1995, *V. A. Funk 11353* (LPB, US); Eduardo Abaroa, carretera a Potosí, cerro Toro, ingresando por Ichurata, 18°57′S, 66°27′W, 27 Feb 2016, *I. Jiménez, L. Vargas, & R. Villegas 7794* (LPB);

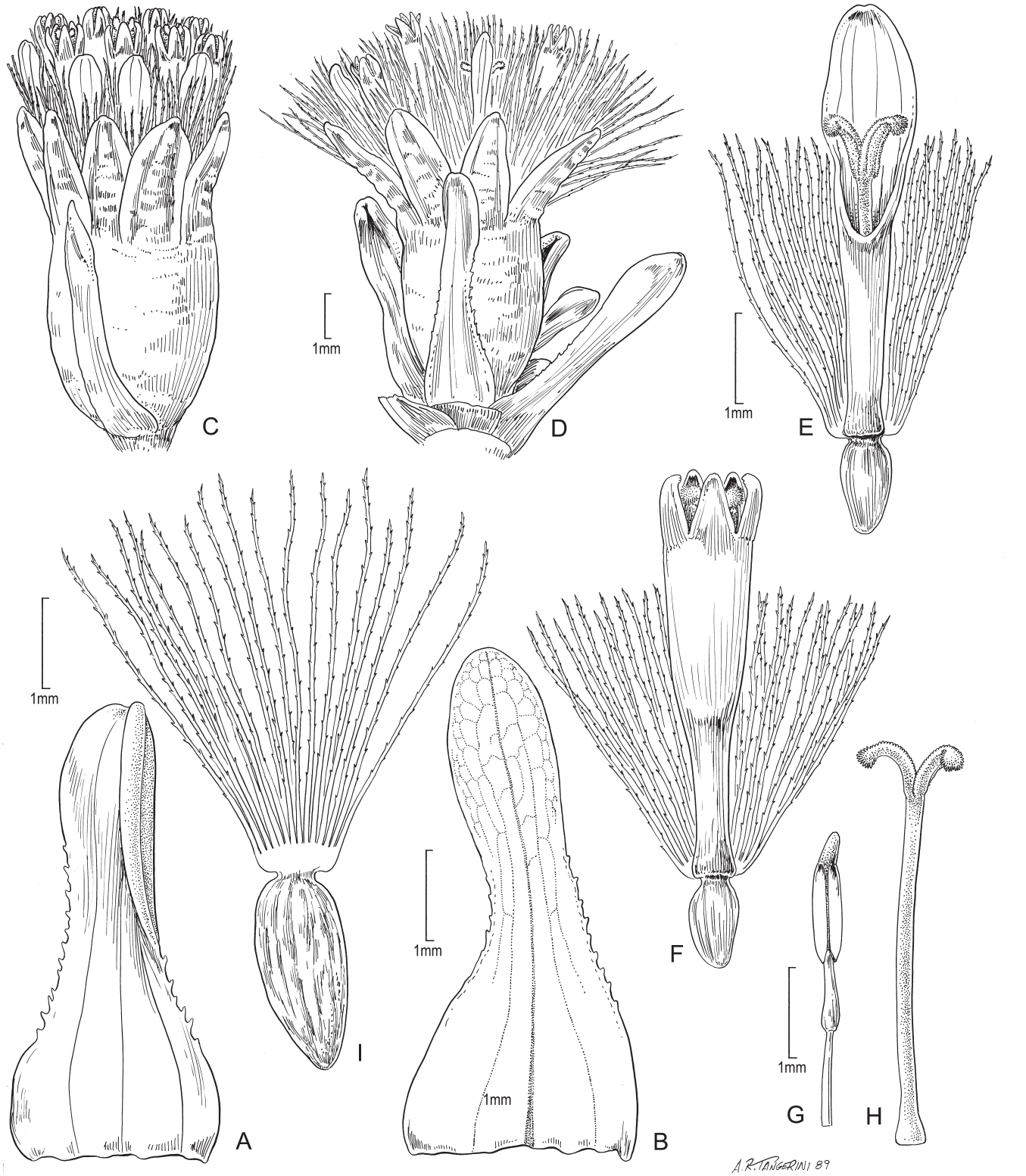

FIGURE 6. *Werneria aretioides*. **A.** Adaxial leaf surface. **B.** Abaxial leaf surface. **C.** Capitulum. **D.** Mature capitulum. **E.** Ray floret (frontward bristles removed). **F.** Disc floret (frontward bristles removed). **G.** Stamen. **H.** Style. **I.** Achene with pappus. All details are drawn from *E. Werdermann 1155* (G) except for C, D, I (drawn from *O. P. Pearson 46*, UC). Illustration by Alice Tangerini.

FIGURE 7. A, B. *Werneria aretioides*. A. Bolivia, Oruro, Sabaya (*J. Calvo 7843*, LPB); photograph by Joel Calvo. B. Chile, Arica y Parinacota, Colpitas–Caquena (*A. Moreira-Muñoz & F. Luebert 2385*, SGO); photograph by Andrés Moreira-Muñoz. **C, D.** *Werneria rockhauseniana*. Peru, Lima, Cajatambo (not collected); photographs by Huber Trinidad. **E, F.** *Werneria weberbaueriana*. Peru, Ancash, Lebrón Lagoon (*A. Cano et al. 19373*, USM); photographs by Asunción Cano.

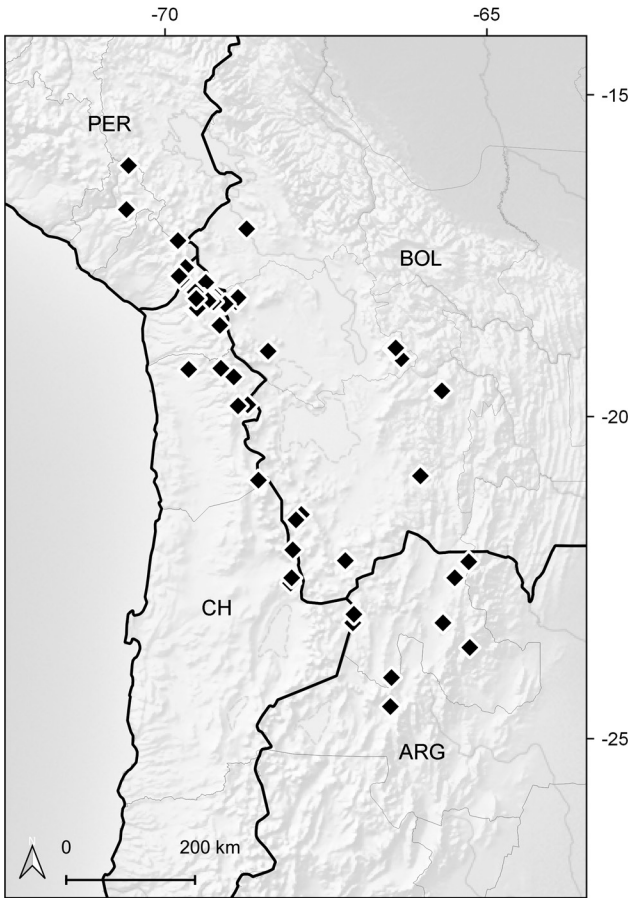

FIGURE 8. Distribution map of *Werneria aretioides*.

Eduardo Abaroa, carretera a Potosí, antes de Cruce Culta, localidad Tirani, subiendo hacia los arbustales de keñua, 19°6′S, 66°20′W, 28 Feb 2016, *I. Jiménez & L. Vargas 7917* (LPB); Sajama, nevado Sajama, valle del río Sururia, 18°13′S, 68°54′W, 23 Feb 1980, *E. Jordan 79* (LPB); Sajama, ladera del río Sururia, 18°13′S, 68°54′W, 7 May 1981, *M. Liberman 336* (LPB). **Potosí:** Sud Lípez, Quetana Chico, 25 km hacia el volcán Uturuncu, 22°14′S, 67°12′W, 26 Sep 2006, *S. G. Beck 32466* (LPB); Sud Lípez, cerro Aguas Calientes, 21°36′S, 67°58′W, 20 May 1989, *E. García 1119* (LPB); Sud Lípez, cerro Tapaquillcha, 21°31′S, 67°53′W, 13 Apr 1980, *M. Liberman 207* (LPB); Sud Chichas, 20 mi. [~32.2 km] E of Atocha and 1.5 mi. [~2.4 km] above Santa Bárbara on the SW face of nevado Choroloque [Chorolque], 20°55′S, 66°2′W, 15 Mar 1993, *P. M. Peterson et al. 12952* (LPB, US); Sud Lípez, Uturuncu, 22°14′S, 67°12′W, 4 Aug 2001, *B. J. Ruthsatz 10586* (LPB); Tomás Frías, cerro Rico above Tarija road leading out of Potosí, 19°36′S, 65°44′W, 19 Feb 1996, *J. R. I. Wood 10715* (LPB); Tomás Frías, on the summit between laguna Mazuni and laguna Ulistia, cordillera Kari Kari, 19°36′S, 65°44′W, 6 Mar 1999, *J. R. I. Wood 14619* (HSB, LPB).

CHILE. Antofagasta: El Loa, cerro Curutu, lado S del Paso Jama, 23°12′S, 67°5′W, 7 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97248* (CONC); El Loa, cerro Nevados de Poquis, ladera SO, 23°4′S, 67°4′W, 9 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97380* (CONC); El Loa, cerro Nevados de Poquis, ladera SO, 23°4′S, 67°4′W, 9 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97399* (CONC); El Loa, camino entre volcán San Pablo y el Tatio, cerca de Linzor, 22°4′S, 68°1′W, 13 Mar 1993, *G. Baumann 203* (CONC); Machuca, 22°35′S, 68°3′W, 17 Feb 1885, *F. Philippi s.n.* (SGO); camino al volcán Tatio, 22°30′S, 68°2′W, 5 Apr 1961, *M. Ricardi, C. Marticorena, & O. Matthei 474* (CONC). **Arica y Parinacota:** Parinacota, 18°13′S, 69°14′W, 7 Mar 1984, *M. Arroyo 84-682* (CONC); above road to Tacora (rt. A23), slope of co. de Llancoma, 18°10′S, 69°31′W, 7 Mar 2014, *V. A. Funk, M. Diazgranados, & J. M. Bonifacio 13107* (US); Portezuelo de Chapiquiña, faldeos al lado norte del campamento, 18°19′S, 69°30′W, 10 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 108* (CONC); camino de Chucuyo a la laguna de Cotacotani, km 8, 18°13′S, 69°15′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 230* (CONC); camino Putre–Chungará, vista panorámica a los volcanes, 18°10′S, 69°24′W, 25 May 2011, *A. Moreira-Muñoz, M. Muñoz, & V. Morales 1610* (CONC, SGO); ruta 127 Colpitas–Caquena, km 5.5 pasado estancia Taypinta, 17°55′S, 69°22′W, 16 Mar 2015, *A. Moreira-Muñoz & F. Luebert 2385* (SGO); camino internacional entre Putre y Chungará, 28 Dec 1999, *M. Muñoz 4030* (SGO); Parinacota, Surire a Guallatiri, km 38, 18°35′S, 69°9′W, 20 May 1989, *H. Niemeyer, C. Fernández, & A. Hoffmann 89110* (CONC); Portezuelo de Chapiquiña, 18°19′S, 69°30′W, 26 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 213* (B, CONC); Arica, pampa Río Blanco, 18°20′S, 69°32′W, 7 Sep 1963, *F. Schlegel 4770* (CONC); Cotacotani, 18°9′S, 69°13′W, 28 Feb 1948, *F. Sudzuki 476* (SGO); Parinacota, 18°12′S, 69°16′W, 29 Feb 1948, *F. Sudzuki 510* (SGO); Tacora–Humapalca–río Azufre, 17°52′S, 69°45′W, 10 Aug 2012, *S. Teillier & J. Delaunoy 7727* (CONC); Tacora-Humapalca-río Azufre, 17°49′S, 69°47′W, 4 Jan 2013, *S. Teillier 7739* (CONC); Parinacota, Portezuelo de Putre, 18°12′S, 69°20′W, 18 May 1979, *C. Villagrán et al. 1180* (CONC); Arica, Tambo Quemado, límite chileno-boliviano, 18°15′S, 69°4′W, 20 May 1979, *C. Villagrán et al. 1276* (CONC); cordillera volcán Tacora, Chislluma, 17°41′S, 69°41′W, Apr 1926, *E. Werdermann 1155* (B, BM, CAS, CONC, F, G, GH, K, NY [mixed with *S. humillimus*], LIL, LPB, MO, UC, US, US-00622668 [mixed with *S. humillimus*]). **Tarapacá:** Iquique, camino de Cancosa a Pampa Lirima, km 15, 19°49′S, 68°43′W, 25 Mar 1992, *G. Arancio 92-413* (CONC); Tamarugal, camino desde géisers Puchuldiza a Mauque, en sector de "llaretas," 19°23′S, 68°56′W, 20 Jun 2014, *V. Ardiles & J. Arriagada s.n.* (SGO); camino de Huara a Cancosa, km 112, Pampa Lirima, 19°50′S, 68°52′W, 18 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 387* (CONC); Iquique, salar de Michincha, 20°59′S, 68°33′W, Dec 2006, *L. Rojas s.n.* (CONC); Iquique, Colchane, P.N. Isluga, 19°16′S, 69°38′W, 21 Mar 1982, *C. Villagrán & M. Arroyo*

4123 (CONC); Iquique, trayecto entre Enquelca y Berenguela, 19°15′S, 69°8′W, 9 Sep 1997, *C. Villagrán, F. Hinojosa, & C. Latorre 9242* (CONC).

PERU. Moquegua: General Sánchez Cerro, Ichuña, Yanapuquio, 16°6′S, 70°34′W, 17 Apr 2012, *D. Montesinos 3852* (HSP, USM); Carumas, near volcano Ticsani, 16°47′S, 70°36′W, 27 Feb 1925, *A. Weberbauer 7314* (CONC, US). **Tacna:** pampa de Titire, 29 km NE of Tarata, 17°16′S, 69°48′W, 14 Apr 1952, *O. P. Pearson 46* (CONC, F, UC).

3. ***Werneria caespitosa*** Wedd., Chlor. Andina 1: 83. 1856. Type. Peru ["Pérou"]. [Without locality or date], *J. Dombey 964* (lectotype: P-02088564 [digital image!], **designated here**).

Werneria haenkei Sch. Bip. ex Wedd. ["Haenkei"], Chlor. Andina 1: 83. 1856, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria acicularis A. Gray ex Rockh., Bot. Jahrb. Syst. 70: 315. 1939, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Rhizomatous herb, rosettiform, forming clumps, 1.5–3 cm tall. **Rhizome** 2–4 cm long, 0.4–0.6 cm in diameter, horizontal to oblique, covered with long, silky trichomes and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, silky trichomes; leaf lamina linear, (8–)12–25 mm long, 0.4–1.2 mm wide, entire, aristate at the apex (arista up to 0.6 mm long), not narrowed at the base, flat in cross section, glabrous, 0–1-nerved above (barely visible), 0–2-nerved beneath (more prominent towards the base), coriaceous, shiny. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 9–9.6 mm long, 4.3–7.3 mm wide, glabrous; involucral bracts 13–20, 4.7–6.7 mm long, 1.2–1.5 mm wide at the base, acute at the apex, greenish; supplementary bracts absent. **Ray florets** 16–21; corollas (5–)10–11.3 mm long, 1.6–1.8 mm wide, 4-veined, 2–3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 38–50; corollas 3.4–4.7 mm long, 5-lobed, whitish to creamy, usually purple tipped; style branches truncate with a crown of sweeping hairs, yellowish, purple tipped. **Achenes** 1.3–2.6 mm long, 0.5–0.8 mm wide, cylindrical, ~9-ribbed, with arachnoid trichomes near the base; pappus 4.8–5.6 mm long, barbellate, whitish. Chromosome number $2n = 154(\pm 6)$ (Diers, 1961) (Figure 9A,B).

Additional Iconography. Weddell (1856: pl. 17C); Beltrán (2017: 61, fig. 3B, as photo).

Distribution and Habitat. Bolivia (Cochabamba, La Paz), Peru (Ancash, Cusco, Huancavelica, Huánuco, Junín, Lima, Pasco, Puno). This species grows in grasslands, open areas, and dry, rocky hillsides of the puna ecoregion, between elevations of 3,900 and 5,600 m (Figure 10).

Phenology. Flowering from March to October.

Etymology. The adjective *caespitosus, -a, -um* refers to plants that grow in tufts.

Notes. The leaves of *W. caespitosa* are linear, coriaceous, flat in cross section, glabrous, shiny, and aristate at the apex (arista up to 0.6 mm long). The arista is especially noticeable in young leaves. The rhizome bears long, silky trichomes and leaf base remnants.

Some specimens from Puno display leaves that are ~8 mm long and have very short ray corollas (e.g., *Funk et al. 13164*, US, USM; *Funk et al. 13179*, US, USM). Otherwise, they show the diagnostic features of *W. caespitosa*.

Werneria caespitosa shows morphological affinities with *W. apiculata* and *W. canaliculata* Sch. Bip. It can be distinguished from *W. apiculata* by the narrower leaf base (0.4–1.2 mm vs. 1.7–3.4 mm in *W. apiculata*) and the leaf apex (aristate in *W. caespitosa* vs. acute to apiculate, rarely somewhat obtuse in *W. apiculata*). Furthermore, the leaves of *W. caespitosa* are more densely placed and appear to be rather erect (usually decumbent in *W. apiculata*). Some herbarium specimens are a mixture of plants from both species, for example, *Cerrate 1471* (USM). For a comparison with *W. canaliculata*, see the comments under that species.

Following the suggestions for holotype recognition by McNeill (2014), the specimen at P is designated as the lectotype because it cannot be established that the author used only this element and that the gathering is represented by a single specimen. The same criterion has been adopted for the typification of the names *W. carnulosa*, *W. glandulosa*, *W. pectinata*, and *W. solivifolia*.

Additional Specimens Examined. **BOLIVIA. Cochabamba:** Tunari, 17°17′S, 66°23′W, 4 May 1892, *O. Kuntze 964* (US). **La Paz:** Murillo, la cumbre (pass) on rd. to Unduavi, near Inca trail, 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11324* (LPB); Murillo [near estación La Cumbre, from coordinates], 16°22′S, 68°2′W, 24 Mar 2010, *E. Urtubey et al. 476* (LPB, SI n.v.); Murillo [near estación La Cumbre, from coordinates], 16°21′S, 68°2′W, 24 Mar 2010, *E. Urtubey et al. 482* (LPB, SI n.v.); Inquisivi, cumbre en el camino entre Quime y la carretera La Paz-Oruro, pasando 1 km al N por el camino hacia una mina, 17°4′S, 69°18′W, 13 Mar 2003, *J. R. I. Wood & T. Ortuño 19327* (LPB); cumbre Yungas, 9 Apr 1981, *J. P. Ybert 825* (LPB).

PERU. Ancash: San Marcos, mina Antamina, 9°30′S, 77°3′W, 23 May 2013, *C. Aedo & J. Molina 20374* (MA); Huaylas, Pamparomás, Carhuacocha, 9°2′S, 77°55′W, 1 Oct 1992, *J. Albán et al. 7793* (USM); San Marcos, Ccolla Chica, 9°40′S, 77°3′W, 4 May 2008, *H. Beltrán 6477* (USM); Huaylas, alrededores del abra de Tres Cruces, 18 May 2000, *A. Cano et al. 10403* (USM); Recuay, carretera a Pachacoto, 9°51′S, 77°25′W, 28 May 2001, *A. Cano et al. 11423* (USM); Recuay, carretera a Pachacoto, abra de Yanashallash, 9°50′S, 77°8′W, 28 May 2001, *A. Cano et al. 11483* (USM); Recuay, Huancapeti, en la carretera Recuay–Aija, 9°44′S, 77°1′W, 25 Mar 2002, *A. Cano, I. Salinas, & F. Mellado 12103* (USM); Pallasca, Pampas, cordillera Pelagatos, 8°12′S, 77°47′W, 20 Apr 2011, *A. Cano et al. 20277* (USM); Huaylas, Riurín y zonas aledañas, Taqtza Pampa, Huachoq, Hirca, 9°12′S, 77°47′W, 18 May 1999, *A. Cano et al. 9113* (USM); Huaylas, Riurín y zonas aledañas, Taqtza Pampa, Huachoq, Hirca, 9°12′S, 77°47′W, 18 May 1999, *A. Cano et al. 9130* (USM); Bolognesi, Parianaccra, pampa de Lampas,

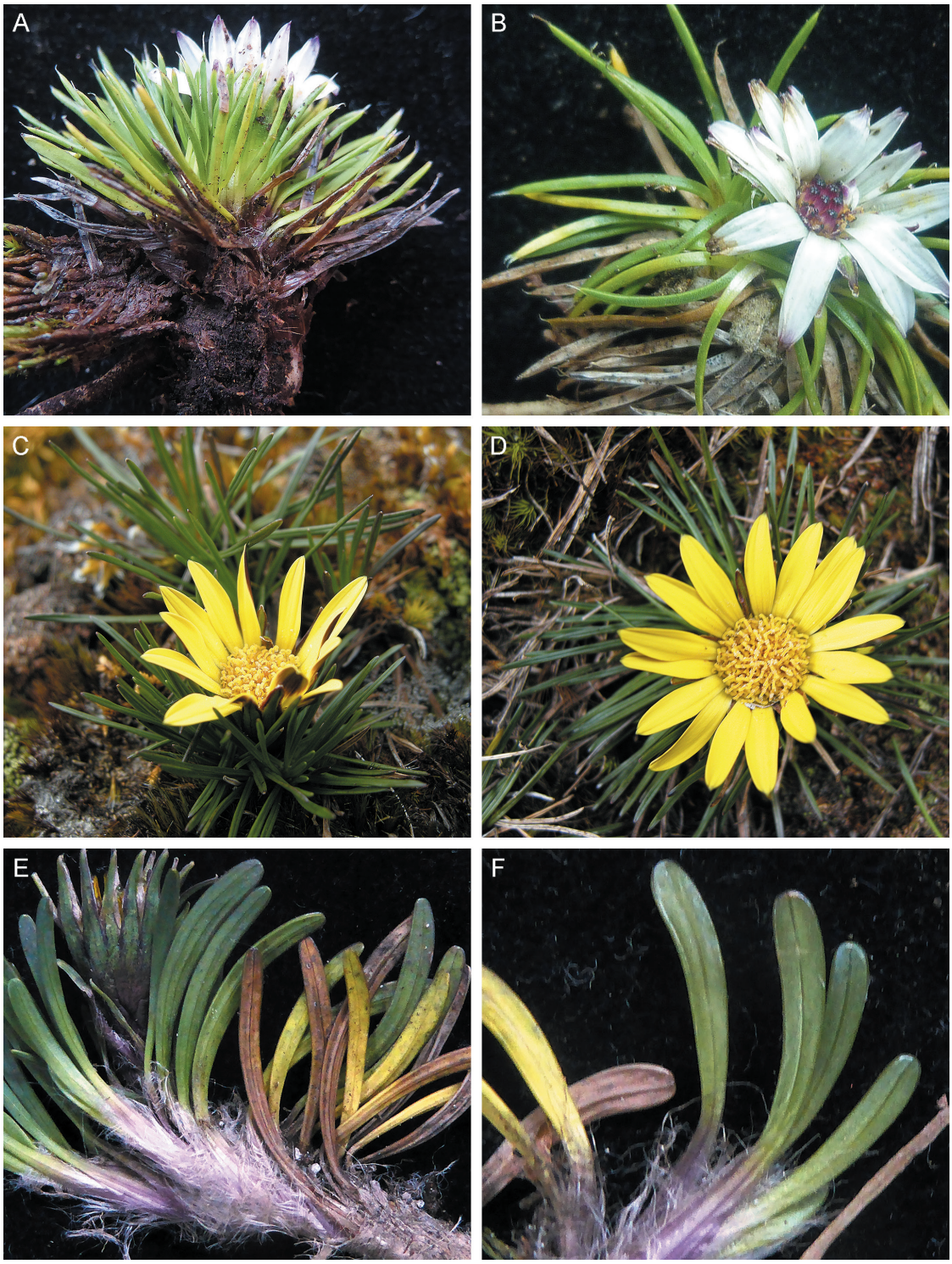

FIGURE 9. A, B. *Werneria caespitosa*. A. Peru, Lima, Río Blanco (*H. Beltrán 8722*, USM [herbarium specimen not seen]); photograph by Hamilton Beltrán. B. Peru, Lima, Laraos (*H. Beltrán 4206*, USM); photograph by Hamilton Beltrán. **C, D.** *Werneria canaliculata*. Bolivia, La Paz, Toilcacocha (*M. P. Paco et al. 46*, LPB); photographs by Alfredo Fuentes. **E, F.** *Werneria cornea*. Peru, Pasco, Huayllay (*S. Castillo 1528*, USM); photographs by Hamilton Beltrán.

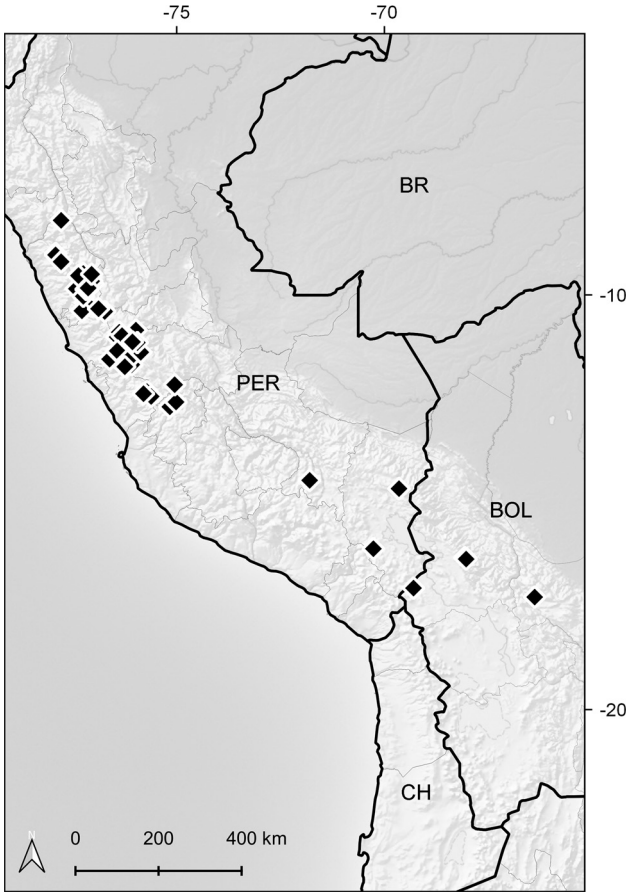

FIGURE 10. Distribution map of *Werneria caespitosa*.

Chiquián, 10°11′S, 77°12′W, 2 May 1952, *E. Cerrate 1471* (USM [mixed with *W. apiculata*]); Bolognesi, borde de laguna Condorcocha, 10°23′S, 77°17′W, 20 Aug 1981, *E. Cerrate, B. León, & J. Albán 8182* (USM); Recuay, Huascarán N.P., pass between nevado Pasto Ruri and nevado Raria, río Pachacoto drainage, 9°52′S, 77°11′W, 31 Mar 1985, *D. N. Smith & F. Escalona 10175* (USM); Recuay, Huascarán N.P., mouth of quebrada Quenua Ragua, 10°2′S, 77°15′W, 10 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10618* (LPB, QCNE, USM); Huaraz, Huascarán N.P., quebrada Rajucolta, 9°32′S, 77°22′W, 17 Apr 1986, *D. N. Smith, R. Valencia, & M. Buddensiek 12191* (LPB, USM); Huari, Huascarán N.P., quebrada Rima Rima, a lateral valley of quebrada Carhuazcancha, 9°29′S, 77°15′W, 6 May 1986, *D. N. Smith et al. 12238* (USM); collado encima río Pumapampa, 18 Mar 1983, *O. Tovar et al. 9645* (USM); entre Huaraz y La Unión, 22 Mar 1983, *O. Tovar et al. 9844* (USM); entre Huaraz y La Unión, 22 Mar 1983, *O. Tovar et al. 9847* (USM); Huaylas, Pamparomás, alrededores de la laguna Negrahuacanan, 9°0′S, 77°55′W, 8 May 1994, *G. Yarupaitán & J. Albán 1393* (USM). **Cusco:** Velille, Uchucarco, alrededores de la mina Constancia, 14°28′S, 71°48′W, 23 Apr 2015, *P. Gonzáles 3589* (USM). **Huancavelica:** Occoro, entre Conaica y Tansiri, 12°35′S, 75°1′W, 3 Apr 1953, *O. Tovar 1205* (USM); Huaytamayoc-Tansiri, 12°42′S, 75°10′W, May 1956, *O. Tovar 2548* (USM). **Huánuco:** Lauricocha, entre la laguna Tinquicocha y Patarcocha, 10°24′S, 76°44′W, 24 Jun 2000, *A. Cano & N. Valencia 10728* (USM). **Junín:** Capillacocha, 10°51′S, 75°59′W, 6 May 1948, *P. Aguilar s.n.* (USM); Carhuamayo, alrededor del área de amortiguamiento de la RNJ, 11°9′S, 75°57′W, 7 May 2011, *H. Beltrán 7155* (USM); Huancayo, Pucara, comunidad de Patala, laguna Yauricocha, 12°10′S, 75°3′W, 30 May 2017, *H. Beltrán & S. Castillo 8079* (USM); Yauli, alturas del centro minero, 11°41′S, 76°5′W, 8 Jun 1984, *E. Carrillo 1316* (USM); entre Junín y Ondores, alrededor de la laguna, 11°8′S, 76°4′W, 9 Mar 1979, *A. Ceballos et al. 100* (MA); Tarma, cumbre, entre Tarma y Oroya, 11°23′S, 75°52′W, 29 Jun 1948, *R. Ferreyra 3806* (USM); Tarma, along the road near "cumbre" W of Tarma (between Tarma and the road La Oroya-Junín), 11°23′S, 75°52′W, 16 Sep 1983, *W. Morawetz & B. Wallnöfer 24-16985* (USM); Ondonores, 11°4′S, 76°9′W, 10 Jul 1976, *U. Pettersson 123* (USM); pampa de Junín, cerca a laguna de Junín, 30 Jun 1954, *O. Tovar 2382* (USM [mixed with *W. pygmaea*]); arriba de Capillacocha, cerca a Carhuamayo, 10°51′S, 75°59′W, 1 Jul 1954, *O. Tovar 2407* (USM). **Lima:** Yauyos, Laraos, camino Jalcacha a Palca, 12°20′S, 75°43′W, 25 May 1995, *H. Beltrán 1720* (USM); Yauyos, Laraos, pampas de Quiray cerca a la laguna de Huinso, 12°23′S, 75°48′W, 4 Feb 2000, *H. Beltrán 3411* (USM); Yauyos, Laraos, Viscollo, 12°27′S, 75°37′W, 12 May 2001, *H. Beltrán 4206* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7997* (USM); Cajatambo, Copa, anexo Huayllapa, 10°20′S, 76°53′W, 2 Aug 2017, *H. Beltrán, S. Castillo, & S. Rivera 8142* (USM); Río Blanco, 11°44′S, 76°15′W, 8 May 1922, *J. F. Macbride & F. Featherstone 816* (CONC, US); Canta, cerro de la Viuda, 11°21′S, 76°26′W, 13 Apr 1964, *I. Meza 221* (USM); Canta, Lachaqui, camino hacia Pozo, 11°33′S, 76°37′W, 29 Jun 1999, *G. Vilcapoma 4929* (USM); Canta, Lachaqui, Cullhuay, laguna de Chuchún, 11°22′S, 76°26′W, 17 May 2003, *G. Vilcapoma 6062* (USM). **Pasco:** Huayllay, ladera este al centro poblado Quimacocha, 11°1′S, 76°26′W, 15 Jun 2015, *S. Castillo 1521* (USM); Conoc, 10°54′S, 76°23′W, 7 Aug 1950, *J. Infantes 2473* (USM); Huayllay, bosque de piedra, 10°59′S, 76°19′W, 8 Jun 1976, *N. Urquizo 20* (USM). **Puno:** above San Antonio de Esquilache (new SAE) on alternate road out of valley, 16°7′S, 70°16′W, 14 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13164* (US, USM); unpaved track across pampa to the N and W of the road between abra Pampilla and Ananea, 14°40′S, 69°39′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13179* (US, USM).

4. ***Werneria canaliculata*** Sch. Bip., Bonplandia (Hannover) 4: 52. 1856. *Werneria pumila* var. *pinifolia* Wedd., Chlor. Andina 1: 82. 1856. Type. Peru. Puno: Tabina, Jul 1854, *W. Lechler 2048* (lectotype: P-02088555 [digital image!],

designated here; isolectotypes: G-00305798 [digital image!], G-00305799 [digital image!; excluding the individual in the envelope because it corresponds to *W. pygmaea*], GOET s.n.!, K s.n.!, P-02088556 [digital image!], P-02088557 [digital image!], W s.n.!).

Rhizomatous herb, rosettiform, forming clumps, 1–3 cm tall. **Rhizome** 4–10 cm long, ~0.5 cm in diameter, horizontal to oblique, covered with arachnoid-lanate indumentum. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear, 8–37 mm long, 0.6–1.1 mm wide, entire, acute to obtuse, usually with tiny protuberances at the apex, not narrowed at the base, flat in cross section, glabrous, 1-nerved above, 1-nerved beneath (remarkably prominent and usually canaliculate), rather coriaceous, matte, papillose. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 8–10.9 mm long, 7.2–10 mm wide, glabrous; involucral bracts 15–21, 5.5–9 mm long, 1.2–1.5 mm wide at the base, acute at the apex, greenish to dark purplish; supplementary bracts absent. **Ray florets** 16–21; corollas 8.9–11.6 mm long, 1.5–1.6 mm wide, 4-veined, subentire at the apex, conspicuously surpassing the involucre, yellow. **Disc florets** 55–120; corollas 4.3–5.5 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** cylindrical, glabrous or with some scattered arachnoid trichomes near the base (immature); pappus 5.1–5.6 mm long, barbellate, whitish. Chromosome number unknown (Figure 9C,D).

Distribution and Habitat. Bolivia (La Paz), Peru (Cusco, Huancavelica, Junín, Puno). This species grows on moist grassy slopes and in open areas of the subhumid and humid puna ecoregions, between elevations of 3,500 and 4,800 m (Figure 11).

Phenology. Flowering from January to September.

Etymology. The adjective *canaliculatus, -a, -um* means furrowed, channeled, which describes the characteristic leaf midrib of this species.

Notes. *Werneria canaliculata* is characterized by its linear leaves with the midrib remarkably prominent beneath, usually clearly canaliculate (resembling pine needles), and by having a sessile or subsessile capitulum with yellow ray corollas. These latter two characters place *W. canaliculata* morphologically close to *W. cornea* S. F. Blake and *W. pumila*. It differs from the former by having strictly linear leaves (leaf width/length ratio of 0.03–0.08 vs. leaf width/length ratio of 0.09–0.18 in *W. cornea*), an acute to obtuse leaf apex (vs. clearly obtuse in *W. cornea*), and a midrib that is usually canaliculate (vs. rather smooth in *W. cornea*). Moreover, the leaves of *W. canaliculata* are rather straight, whereas those of *W. cornea* are usually falcate with a remarkably thickened margin. It can be differentiated from *W. pumila* by the leaf width (0.6–1.1 mm wide vs 2.1–4.8 mm wide in *W. pumila*), leaf midrib (prominent, usually canaliculate vs. sunken, smooth in *W. pumila*), and the absence of true supplementary bracts (vs. 12–16 supplementary bracts in *W. pumila*).

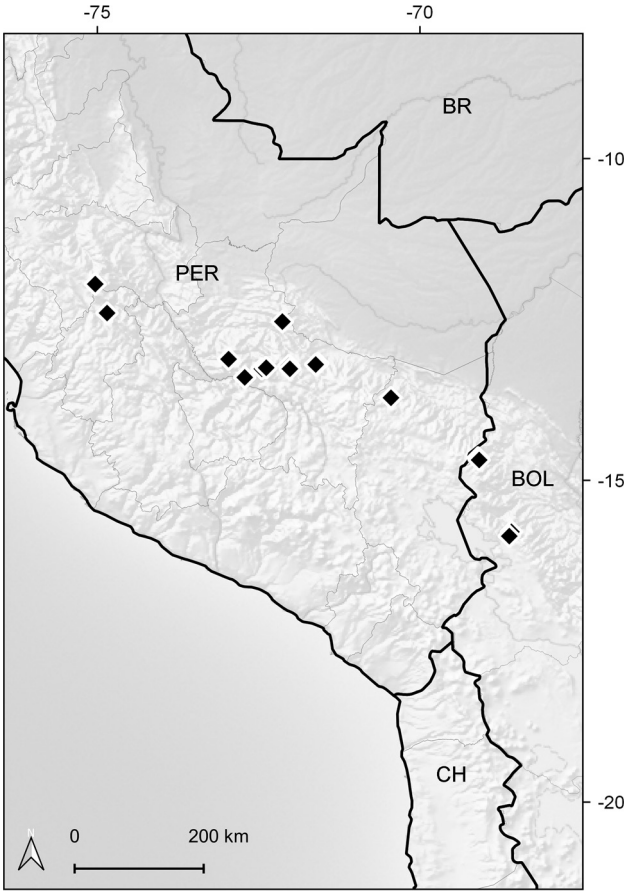

FIGURE 11. Distribution map of *Werneria canaliculata*.

Even though *W. canaliculata* has yellow ray corollas and those of *W. caespitosa* are white, dried specimens may be confused because of the superficial resemblance of their leaves. However, the leaves of *W. caespitosa* have a graminoid appearance, are aristate at the apex, and usually become curved forward when dried. In contrast, *W. canaliculata* has leaves resembling pine needles that are acute to obtuse at the apex and rather flat when dried. The indumentum covering the rhizome is also slightly different (arachnoid-lanate in *W. canaliculata* vs. composed of long, silky trichomes and leaf base remnants in *W. caespitosa*).

Among similar species, the distribution of *W. canaliculata* partially overlaps with that of *W. caespitosa* in southeastern Peru and northwestern Bolivia. Likewise, some overlap with *W. cornea* exists in northern Huancavelica and southern Junín (Peru). *Werneria pumila* occurs farther north and is geographically distant to *W. canaliculata*.

In the protologue of *W. canaliculata*, Schultz Bipontinus (1856) indicated two collections as original material, that is, *Lechler 2048* and *2111*. However, he pointed out that *Lechler 2111* might be a different species and provided a short diagnosis. Indeed, in agreement with Weddell (1856) and Rockhausen

(1939), this collection unequivocally corresponds to *W. staticifolia*. For that reason, the collection *Lechler 2048* is selected to serve as type material. Rockhausen (1939) did not study it, which would explain his decision not to recognize *W. canaliculata*; he followed Weddell's treatment and considered *Lechler 2048* as *W. pumila*.

Additional Specimens Examined. **BOLIVIA. La Paz:** Franz Tamayo, P.N. Madidi, entre Puina y Keara, 14°39′S, 69°6′W, 22 Jun 2005, *A. Fuentes 8587* (LPB); Larecaja, viciniis Sorata, Millipaya prope [. . .], inter Anilaya et Tacacoma, 15°52′S, 68°37′W, Jan 1859, *G. Mandon 103* (BM, F, G, GH, K, NY, P, W); Franz Tamayo, área natural de manejo integrado Apolobamba, Queara, Toilcacocha, 14°41′S, 69°5′W, 11 Apr 2008, *M. P. Paco et al. 46* (LPB, MO n.v.); Larecaja, Sorata, nevado Illampu, between Totisani and laguna Chulata [Chillata], 15°48′S, 68°35′W, 20 Jul 1996, *J. R. I. Wood 11283* (LPB). **PERU. Cusco:** valle de Urubamba, alrededores laguna Yanacocha, 13°15′S, 72°23′W, 3 Jun 1995, *S. Agüero s.n.* (USM); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7666* (USM); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7668* (USM); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7702* (USM [mixed with *W. pygmaea*]); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7706* (USM); Paucartambo, Parque Nacional del Manu, Challabamba, Qollatambo, 13°12′S, 71°37′W, 9 Sep 1990, *A. Cano 4210* (USM); Paucartambo, Parque Nacional del Manu, Qollatambo, 13°12′S, 71°37′W, 10 Sep 1990, *A. Cano 4273* (USM); Paucartambo, Parque Nacional del Manu, Acjanaco, cerro Inanbari [Inambari], 13°11′S, 71°35′W, 21 Mar 1992, *A. Cano 5223* (USM); La Convención, Vilcabamba, 13°7′S, 72°58′W, 31 May 2002, *W. Galiano et al. 4105* (CUZ); La Convención, Echarate, camino de quebrada Lorohuachana hacia Tres Claveles, Santuario Nacional Megantoni, 12°32′S, 72°8′W, 23 Jun 2008, *L. Hernani 1058* (HUSA); Calca, bosque de Polylepis de Sacsamonte, 13°13′S, 72°2′W, 13 Sep 1998, *W. Mendoza & G. Servat 48* (CUZ); Calca, immediate east of the prominent tower known by locals as "Kontorqayku," 5 km NE of Huarán, 13°16′S, 72°1′W, 6 May 2011, *S. P. Sylvester 1199* (LPB, USM); Urubamba, Machu Picchu, Cusichaca, de Sisaypmapa a la base del Salkantay, 13°16′S, 72°27′W, 27 Jun 2001, *A. Tupayachi et al. 5115* (CUZ). **Huancavelica:** Tayacaja, Pampas, 12°24′S, 74°51′W, 8 Aug 1973, *P. Gutte 1070* (USM [mixed with *W. villosa*]). **Junín:** Huaytapallana, 11°57′S, 75°2′W, 28 May 1960, *G. Kunkel 732* (US).

5. ***Werneria carnulosa*** A. Gray, Proc. Amer. Acad. Arts 5: 140. 1861. Type. Peru. Junín/Lima: Andes of Peru, between Casa Cancha and Culnai, [without date], *Capt. Wilkes Expedition s.n.* (lectotype: GH s.n., **designated here**; isolectotype: US-00037298 [individual on the right!]).

Rhizomatous herb, rosettiform, forming clumps, 1–2 cm tall. **Rhizome** ~3 cm long, 0.2–0.3 cm in diameter, horizontal to oblique, glabrous. **Leaves** simple, alternate, extending into a glabrous sheath-like base; leaf lamina linear-oblong, 5–9 mm long, 1.5–1.9 mm wide, entire, thinly hyaline at the margin, obtuse at the apex, not narrowed at the base, flat in cross section, glabrous except for some tiny trichomes on the margin, inconspicuously nerved above, 0–1-nerved beneath (barely visible), fleshy, matte. **Capitulum** disciform, solitary, terminal, sessile. **Involucre** narrowly cupuliform, with bracts fused at the base, 8.8–9 mm long, 5.5–6.7 mm wide, glabrous; involucral bracts (8–)10–12, 4–6.2 mm long, 1.5–2.5 mm wide at the base, rather obtuse at the apex, greenish to dark purplish; supplementary bracts absent. **Peripheral florets** 11–13, pistillate; corollas reduced to a vestigial tube 2–2.5 mm long. **Disc florets** 31–32; corollas 7–8.2 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** cylindrical, glabrous (immature); pappus 9.2–9.7 mm long, barbellate, whitish. Chromosome number unknown (Figure 12A,B1,B2).

Distribution and Habitat. Endemic to Peru (Ancash, Junín, Lima, Pasco). It grows on exposed rocky slopes and cryoturbated soils of the puna ecoregion, between elevations of 4,625 and 4,925 m (Figure 13).

Phenology. Collected in bloom in May and August.

Etymology. The adjective *carnulosus, -a, -um* is the diminutive of *carnosus, -a, -um*, and it refers to the fleshy leaves of this species.

Notes. It is unique among *Werneria* species in having a disciform capitulum, that is, displaying 11–13 peripheral pistillate florets with a corolla reduced to an ~2–2.5 mm long vestigial tube. The leaves are linear-oblong, 5–9 mm long, obtuse at the apex, entire, and thinly hyaline at the margin (sometimes with tiny marginal trichomes). The involucral bracts are clearly fused at the base.

Werneria carnulosa has been collected infrequently and has often been misidentified as *Senecio gamolepis* Cabrera (Figure 12B3,B4), a species with which it co-occurs in central Peru. Their general appearance is quite similar, but the following characters reveal unequivocal differences: capitulum type (disciform in *W. carnulosa* vs. discoid in *S. gamolepis*), involucral bracts (fused at the base in *W. carnulosa* vs. partially partite in *S. gamolepis*), supplementary bracts (absent in *W. carnulosa* vs. 5–6 in *S. gamolepis*), and corolla length (7–8.2 mm in *W. carnulosa* vs. 6.5–6.8 mm in *S. gamolepis*).

See comments under *W. caespitosa* for further details about the lectotypification of the name *W. carnulosa*.

Additional Specimens Examined. **PERU. Ancash:** abra Yanashalla, 9°51′S, 77°4′W, 25 May 2013, *C. Aedo & J. Molina 20438* (MA). **Lima:** Yauyos, dist. Tomas, abra Chaucha, 12°14′S, 75°38′W, 10 Aug 2017, *H. Beltrán 8473* (USM); Canta, dist. de Huaros, cordillera La Viuda, 11°20′S, 76°25′W, 26 May 2018, *H. Beltrán 8950* (USM); Huarochirí, San Mateo, Río Blanco, 11°55′S, 76°6′W, 16 Aug 2018, *H. Beltrán 8984* (USM); Huarochirí, San Lorenzo de Quinti, cerca al abra, 11°55′S, 76°6′W, 16 Aug 2018, *H. Beltrán 9066* (USM); Anticona, orientación S, 11°35′S, 76°12′W, 5 Aug 2012, *E. Linares & A. Galán 3095* (USM); Casapalca, 11°38′S, 76°13′W, 21 May 1922,

FIGURE 12. A, B1, B2. *Werneria carnulosa*. Peru, Lima, abra Chaucha (*H. Beltrán 8473*, USM); photographs by Hamilton Beltrán. **B3, B4.** *Senecio gamolepis*. Peru, Lima, abra Chaucha (*H. Beltrán 8470*, USM); photograph by Hamilton Beltrán. **C, D.** *Werneria castroviejoi*. Peru, Lima-Junín, cordillera La Viuda (not collected); photographs by Hamilton Beltrán. **E, F.** *Werneria pectinata*. Peru, Moquegua, Matazo-Chaclaya (*D. Montesinos & J. Calvo 5905*, HSP); photographs by Joel Calvo.

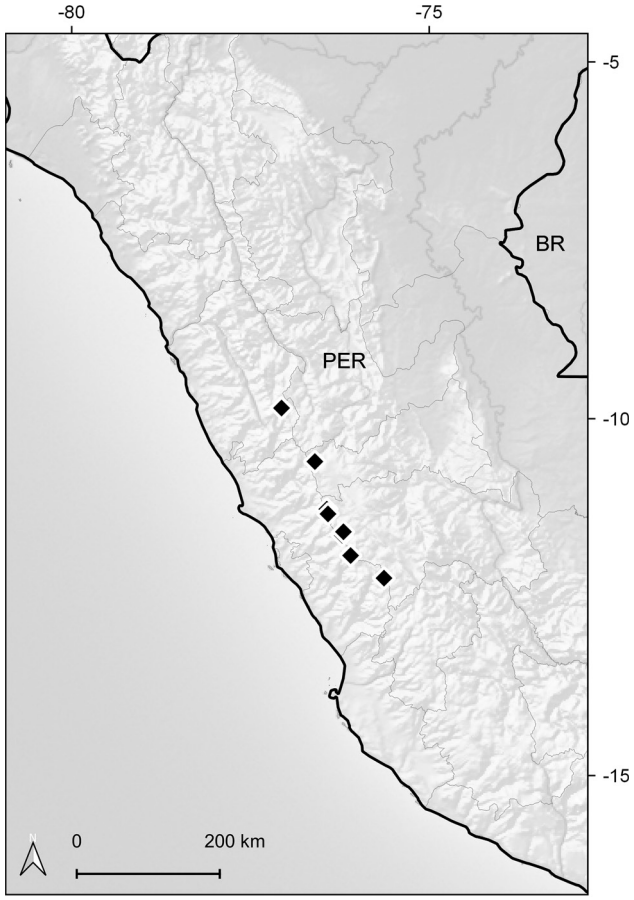

FIGURE 13. Distribution map of *Werneria carnulosa*.

J. F. Macbride & F. Featherstone 855 (F, GH, US). **Pasco:** Oyón, abra Oyón, carretera hacia Huánuco, encima de mina, 10°36′S, 76°36′W, 25 May 2018, *H. Beltrán 8882* (USM).

6. ***Werneria castroviejoi*** J. Calvo & H. Beltrán, Phytotaxa 408(2): 139. 2019. Type. Peru. Lima: [Huarochirí], límite con dpto. Junín, entre Casapalca y Ticlio, [11°35′S, 76°11′W], 4,840 m, 1 Dec 1977, *S. Castroviejo, M. Costa, & E. Valdés-Bermejo 1112* (holotype: MA-867835!).

Rhizomatous herb, rosettiform, forming mats or dense clumps, 1–2 cm tall. **Rhizome** ~4 cm long, ~0.4 cm in diameter, horizontal to oblique, covered with indumentum and leaf base remnants resembling paleae. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear-oblong, 2.8–4.1 mm long, 1.1–1.3 mm wide, entire and distally ciliate (cilia ~0.6 mm long, sometimes very scattered), obtuse to truncate at the apex, not narrowed at the base, flat in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, rather matte. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** broadly cupuliform, with bracts fused at the base, 6.5–7.6 mm long, 5.5–6.5 mm wide, glabrous; involucral bracts ~13, 4.1–4.9 mm long, 1.6–2.7 mm wide at the base, rather obtuse at the apex, usually dark purplish; supplementary bracts absent. **Ray florets** 12–13; corollas 5.6–6 mm long, ~1.2 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** ~44; corollas 3.1–3.5 mm long, 5-lobed, yellowish to creamy; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** cylindrical, glabrous (immature); pappus 2.7–2.8 mm long, barbellate, whitish. Chromosome number unknown (Figure 12C,D).

Additional Iconography. Calvo and Beltrán (2019: 140, fig. 4A–C, as photos).

Distribution and Habitat. Endemic to Peru (Ancash, Huánuco [expected], Junín, La Libertad, Lima, San Martín [expected]). It grows on exposed rocky slopes and in wet places of the puna ecoregion, between elevations of 4,500 and 4,900 m (Figure 14).

Phenology. Collected in bloom from September to February.

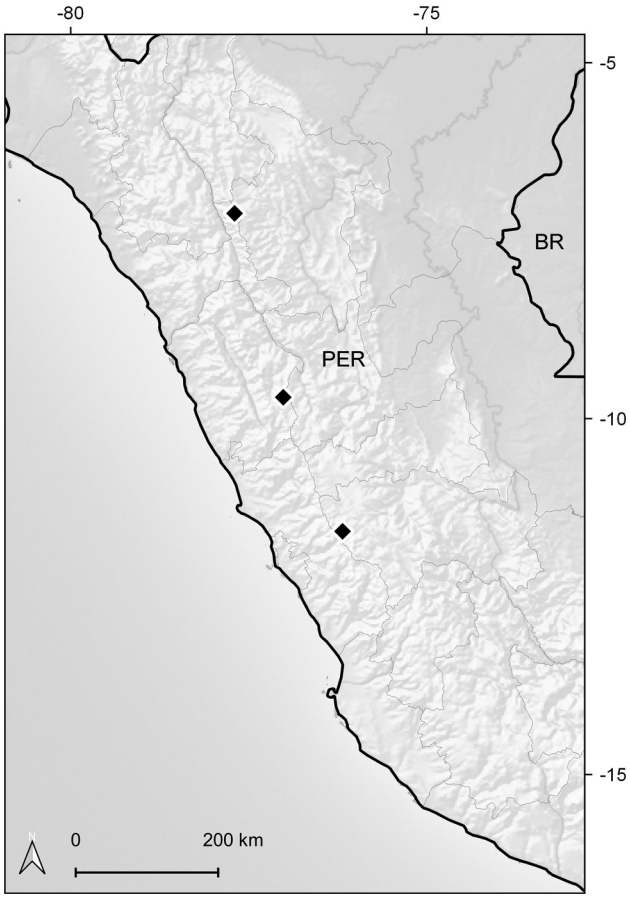

FIGURE 14. Distribution map of *Werneria castroviejoi*.

Etymology. The epithet honors the Spanish botanist Santiago Castroviejo (1946–2009), who devoted part of his life to plant collecting and led the outstanding *Flora iberica* project.

Notes. *Werneria castroviejoi* can be readily distinguished by its linear-oblong leaves with scattered cilia on the distal part of the margin, rhizomes covered with indumentum and leaf base remnants resembling paleae, and its white ray corollas.

This species shows a slight morphological affinity with *W. pectinata*, mainly because both have ciliate leaves. However, in *W. pectinata* the cilia are regularly distributed along the whole leaf margin, whereas in *W. castroviejoi* they are scattered and limited to the distal part. Moreover, they differ in the leaf shape (narrowly spatulate to spatulate in *W. pectinata* vs. linear-oblong in *W. castroviejoi*). Their distribution areas partially overlap around the border between the departments of Lima and Junín.

Additional Specimens Examined. **PERU. Ancash:** Bolognesi, road from Huallanca to San Marcos via lago Canrash, north of lago Canrash, 9°42′S, 77°1′W, 9 Oct 2007, *M. Weigend, H. H. Hilger, & A. Cano 8834* (USM). **Junín:** Anticona pass, ~140 km E of Lima on Hwy. to La Oroya, 11°35′S, 76°11′W, 16 Dec 1978, *M. Dillon & B. L. Turner 1303* (F, USM). **La Libertad:** Bolívar, cerca de los nevados de Cajamarquilla, 7°7′S, 77°42′W, 12 Sep 1946, *R. Ferreyra 1344* (USM). **Lima:** Ticlio, 11°35′S, 76°11′W, 14 Feb 1954, *W. Rauh & G. Hirsch s.n.* (NY).

7. ***Werneria cochlearis*** Griseb., Abh. Königl. Ges. Wiss. Göttingen. 24: 208. 1879. Type. Argentina. Salta: La Caldera, alrededores del Nevado del Castillo, 19/23 Mar 1873, *P. G. Lorentz & G. Hieronymus 114* (lectotype: GOET s.n.!, designated by Cabrera [1948: 60]; isolectotypes: CORD-00006520 [digital image!], F s.n.!, K-000527749 [digital image!], US-00037300!).

Werneria brachypappa Phil., Anales Univ. Chile 43: 501. 1873 ["brachypappus"], *nom. illeg.* (Turland et al., 2018, ICN Art. 53.1), replaced name, *non W. brachypappa* Sch. Bip. 1856. *Werneria denticulata* S. F. Blake, Contr. U.S. Natl. Herb. 22: 651. 1924, replacement name. Type. Argentina. Catamarca: salitreras de Antofagasta, 1872, *G. Döll s.n.* (Döll's collection at SGO as the first-step lectotype, designated by Cabrera [1948: 58]; SGO-000006428! as the second-step lectotype, designated by Calvo and Moreira-Muñoz [2019: 174]; isolectotypes: LP-010363 n.v., SGO-000006429!).

Rhizomatous herb, rosettiform, forming clumps, 1–2 cm tall. **Rhizome** 3–8 cm long, 0.2–0.4 cm in diameter, horizontal to oblique, glabrous. **Leaves** extending into a glabrous sheath-like base; leaf lamina narrowly spatulate to spatulate, 9.4–22 mm long, 2–4.8 mm wide, denticulate, obtuse at the apex, narrowed at the base, curved forward in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile to subsessile (sometimes shortly pedunculate). **Involucre** broadly cupuliform, with bracts fused at the base, 9–12 mm long, 9.6–13 mm wide, glabrous; involucral bracts (8–)11–13, 5.1–8 mm long, 1.8–2.3 mm wide at the base, rather acute at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 12–14; corollas 8–9.8 mm long, 1–1.9 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 25–40; corollas 5.4–6.3 mm long, 5-lobed, whitish to creamy; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** 3.2–3.4 mm long, 0.9–1.1 mm wide, cylindrical, 7–8-ribbed, glabrous, papillose; pappus 6–8.7 mm long, barbellate, whitish to partially rose colored. Chromosome number unknown (Figures 15, 16).

Additional Iconography. Cabrera (1948: 58, fig. 5, sub *W. denticulata*; 1948: 60, fig. 6 [the leaf margin should be denticulate]).

Distribution and Habitat. Endemic to Argentina (Catamarca, Jujuy, La Rioja, Salta, Tucumán). It grows in somewhat humid, exposed places of the dry and subhumid puna ecoregions, between elevations of 3,900 and 5,000 m (Figure 17).

Phenology. Flowering from January to April (also collected in bloom in October).

Etymology. The adjective *cochlearis, -e* means concave like a spoon, that is, spoonlike. It refers to the leaf shape.

Notes. The circumscription of *W. cochlearis* has been a matter of controversy, and different treatments have been proposed. Cabrera (1948, 1978) treated this species in its narrowest sense, that is, including only plants with spatulate leaves, but he inaccurately described this species as having leaves with an entire margin (e.g., *Rodríguez 1375*, A, BA, BR, CONC, F). He accepted the name *W. denticulata* for plants with oblanceolate-spatulate leaves with a denticulate margin (e.g., *Fries 709*, UPS, US, W). A few years earlier, the name *W. denticulata* was treated as a dubious species by Rockhausen (1939). On the other hand, Ariza-Espinar (2007) considered the plants that Cabrera (1948, 1978) identified as *W. denticulata* as falling within the morphological variation of *W. cochlearis*. However, he oddly synonymized *W. denticulata* with *W. pygmaea*, a species with an entire leaf margin that exhibits few morphological affinities with the group having a denticulate margin (i.e., *W. aretioides*, *W. cochlearis*, *W. glaberrima*, and *W. orbignyana*). Because Cabrera failed to note that *W. cochlearis* is a species with a denticulate leaf margin, the only difference that would support the recognition of *W. denticulata* is in leaf shape (spatulate in *W. cochlearis* vs. oblanceolate-spatulate in *W. denticulata*). As stated by Calvo and Moreira-Muñoz (2019), we were not able to find any other diagnostic character to discriminate both species because of the presence of forms that are morphologically intermediate. Recognizing two different taxonomic entities would therefore confuse the taxonomy of this complex group, which is not desirable considering that morphological overlap with a third species also exists. Some individuals of *W. orbignyana* from its southern distribution limit are smaller than typical forms and have linear to narrowly oblanceolate leaves without the characteristic tridentate leaf apex (e.g., *Moreira-Muñoz & Diazgranados 2626*, SGO; *Naessany 18*, LPB). These plants are difficult to separate

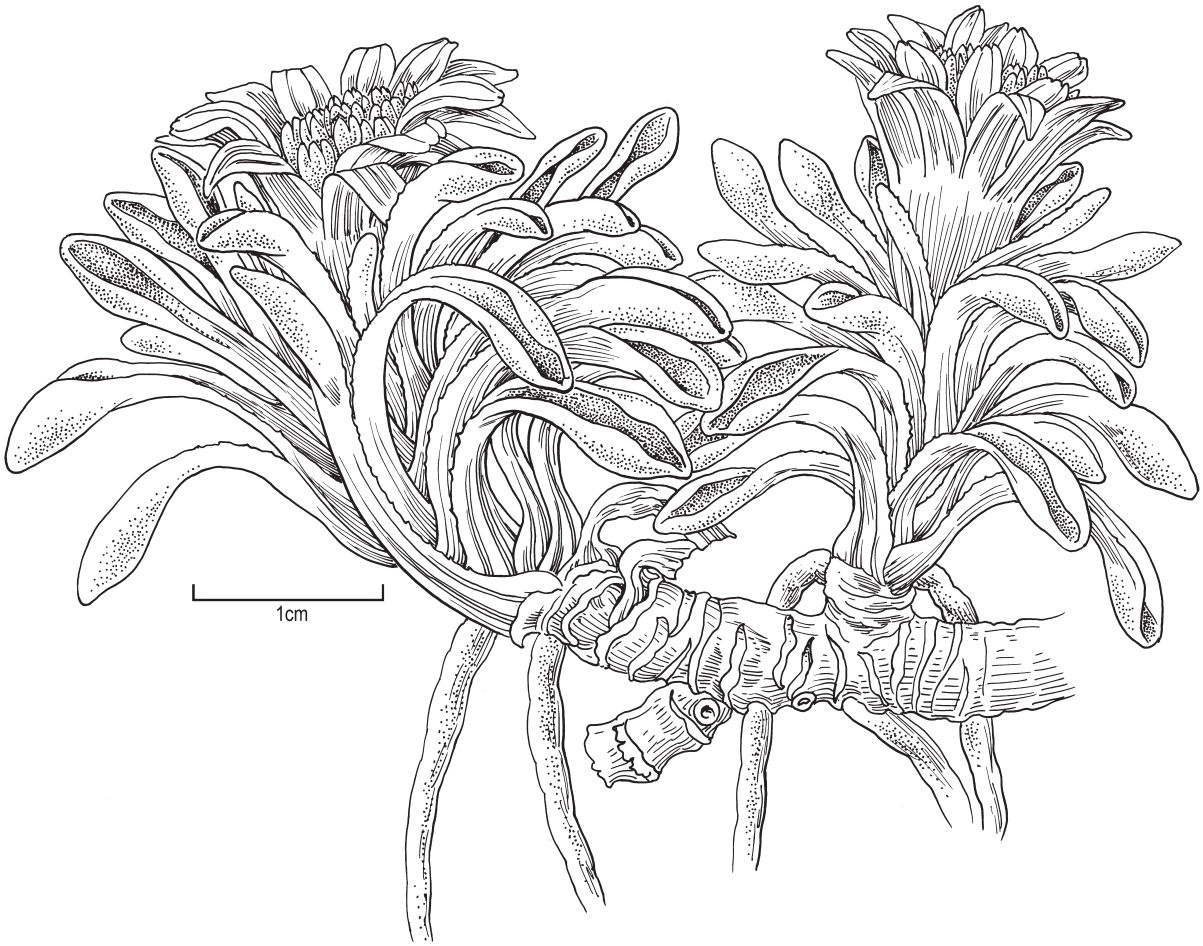

FIGURE 15. *Werneria cochlearis*. Habit (drawn from *B. Sparre 8821,* W). Illustration by Alice Tangerini.

from forms of *W. cochlearis* displaying narrowly oblanceolate leaves. This is the case for a Chilean collection from eastern Antofagasta (*Philippi s.n.*, SGO) that we previously identified as *W. cochlearis* (Calvo and Moreira-Muñoz, 2019). A recent collection from almost the same locality (*Calvo 7922*, SGO) shows plants with very narrowly oblanceolate leaves reaching 5 cm long, and these fit better in *W. orbignyana*. On this basis, the former identification is corrected, and both collections are considered as *W. orbignyana*. Since Philippi's specimen is the type of the name *W. pygmaea* var. *rhodopappa* Phil., this name is here synonymized with *W. orbignyana* instead of with *W. cochlearis* (Calvo and Moreira-Muñoz, 2019). Genetic studies are needed to determine if the overlap in morphology between both species is a result of introgression and/or hybridization. Likewise, the smallest individuals of *W. cochlearis* are difficult to separate from *W. aretioides* (e.g., *Sparre 9668*, C, LIL); see comments under the latter species.

See Calvo and Moreira-Muñoz (2019) for further details and comments on the nomenclature of this taxon.

Additional Specimens Examined. **ARGENTINA. Catamarca:** Andalgalá, c. Aconquija, 12 Apr 1917, *P. Jörgensen 75* (GH, US); valle del Cajón, 26°11′S, 66°10′W, 22 Jan 1914, *sine collector s.n.* (LIL); Andalgalá, río Potrero sup., abra Grande, 27°22′S, 66°17′W, 28 Feb 1951, *H. Sleumer 1878* (LIL); Belén, faldeo S de las cumbres de Las Bayas [Vallas], arriba de la quebrada de los Potrerillos (cerca de Granadillas), 27°32′S, 67°13′W, 1 Feb 1952, *H. Sleumer & F. Vervoorst 2631* (LIL, UC, US); Santa María, Sierra del Aconquija, laguna del Tesoro, 27°1′S, 65°57′W, 3 Mar 1924, *S. Venturi 6346* (US); Santa María, Sierra del Aconquija, 27°2′S, 65°58′W, 19 Jan 1925, *S. Venturi 6632* (US). **Jujuy:** Est. Volcán, 23°54′S, 65°27′W, Feb 1920, *L. Castillón 7023* (LIL); Tumbaya, cerro de Chañi, 23°51′S, 65°35′W, 1 Feb 1929, *S. Venturi 9258* (GH, US). **La Rioja:** Famatina, Sierra de Famatina, Los Bayos, 28°59′S, 67°44′W, 26 Apr 1951, *B. Sparre 8821* (LIL, W); Famatina, en las cercanías de la mina Yareta, 25 Jan 1879, *G. Hieronymus & G. Niederlein 811* (CORD); Famatina, vega del Real Viejo, 29°14′S, 67°53′W, 5/6 Mar 1907, *F. Kurtz 14783* (CORD). **Salta:** Incachuli,

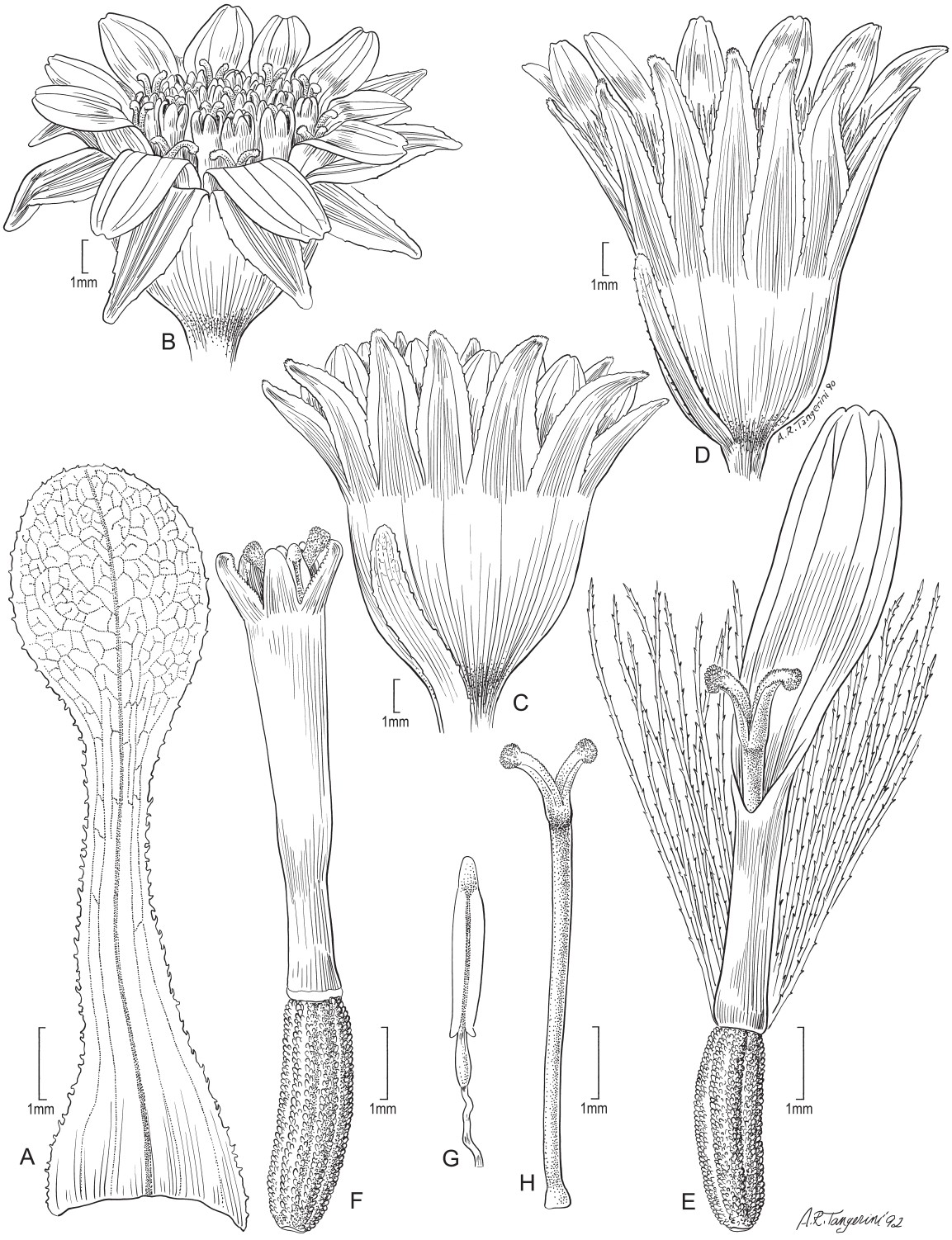

FIGURE 16. *Werneria cochlearis*. **A.** Leaf. **B–D.** Capitula at different stages of development. **E.** Ray floret (frontward bristles removed). **F.** Disc floret (pappus removed). **G.** Stamen. **H.** Style. All details are drawn from *B. Sparre 8821* (W), except for A, D (drawn from *D. Rodríguez 1375,* A) and B (drawn from *H. Sleumer & F. Vervoorst 2920,* US). Illustration by Alice Tangerini.

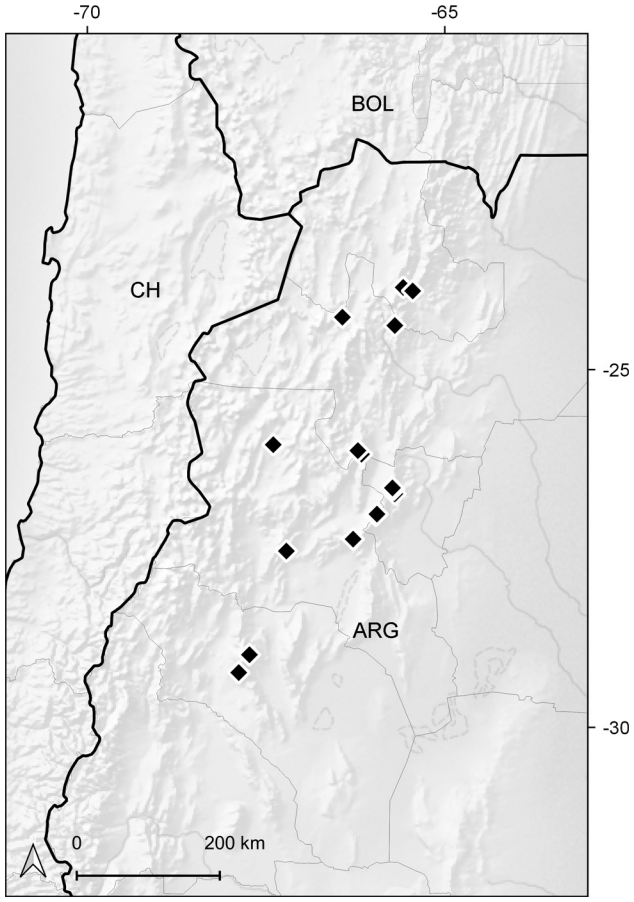

FIGURE 17. Distribution map of *Werneria cochlearis*.

pr. San Antonio de los Cobres, 24°16′S, 66°26′W, 30 Oct 1901, *R. E. Fries 709* (UPS, US, W); sierra del Cajón, 26°8′S, 66°13′W, Feb 1914, *D. Rodríguez 1375* (A, BA, BR, CONC, F); Caldera, subida al Nevado del Castillo por Mal Paso, 24°23′S, 65°42′W, 15 Mar 1952, *H. Sleumer & F. Vervoorst 2920* (US). **Tucumán:** cumbres Calchaquíes, entre lagunas de Huacahuasi y c. Calchaquíes, 26°40′S, 65°43′W, Feb 1914, *L. Castillón 3537* (LIL); Tafí, 1906, *L. Castillón 8223* (LIL); Tafí, cumbres Calchaquíes, 7 Jan 1908, *L. Castillón 8225* (LIL); cumbres Calchaquíes, Callejones, 15 Feb 1915, *L. Castillón s.n.* (LIL); Tafí del Valle, cumbres Calchaquíes, lag. Huaca Huasi, 26°39′S, 65°44′W, 19 Mar 2009, *S. Cuello 360* (LIL); Tafí, lagunas del Negrito, 26°39′S, 65°44′W, 6 Apr 1926, *sine collector 4238* (LIL); Tafí del Valle, cerro Sinuosa, lagunas de Huaca Huasi, cumbres Calchaquíes, 26°39′S, 65°44′W, 19 Mar 2009, *C. I. Sosa s.n.* (LIL); Tafí, cumbres Calchaquíes, El Alazán, 23 Mar 1951, *B. Sparre 8582* (LIL, W); Tafí, Calchaquíes, cerro Negrito, 26°44′S, 65°42′W, 8 Feb 1952, *B. Sparre 9432* (LIL); Tafí, Calchaquíes, Los Callejones, 14 Feb 1952, *B. Sparre 9580* (LIL); Tafí, Calchaquíes, quebrada Isabel, 8 Mar 1952, *B. Sparre 9668* (C, LIL).

8. ***Werneria cornea*** S. F. Blake, J. Washington Acad. Sci. 18: 497. 1928. Type. Peru. Ancash: Punco, estación 21 miles [~33.8 km] west of Huallanca, 4,115 m, 1 Oct 1922, *J. F. Macbride & W. Featherstone 2477* (holotype: F-518903!; isotype: US-00037301!).

Rhizomatous herb, rosettiform, forming clumps, 1–2.5 cm tall. **Rhizome** 4–6 cm long, 0.3–0.4 cm in diameter, horizontal to oblique, covered with arachnoid-lanate indumentum and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear, somewhat falcate, slightly broadened upward, 6–22 mm long, 1.1–1.9 mm wide, entire, remarkably thickened at the margin, obtuse at the apex, not narrowed at the base, flat in cross section, glabrous, 1-nerved above, 1–2-nerved beneath, coriaceous, matte. **Capitulum** radiate, solitary, terminal, sessile (rarely shortly pedunculate). **Involucre** cupuliform, with bracts fused at the base, 8.1–10.3 mm long, 6.5–7.3 mm wide, glabrous; involucral bracts 11–13, 4.8–6.5 mm long, 1.4–1.6 mm wide at the base, acute at the apex, greenish to dark purplish; supplementary bracts absent. **Ray florets** 11–13; corollas 6.6–7 mm long, 0.9–1.5 mm wide, 3–4-veined, 2–3-toothed at the apex, conspicuously surpassing the involucre, yellow, usually dark reddish beneath. **Disc florets** 33–35; corollas 4.4–4.5 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** cylindrical, with some scattered arachnoid trichomes near the base (immature); pappus 3.7–3.8 mm long, barbellate, whitish. Chromosome number unknown (Figure 9E,F).

Additional Iconography. Blake (1928: 496, fig. 1T,U); Beltrán (2017: 61, fig. 3C, as photo).

Distribution and Habitat. Endemic to Peru (Ancash, Huancavelica, Junín, La Libertad, Pasco). This species grows on rocky slopes and in moist areas of the subhumid puna ecoregion, between elevations of 4,050 and 4,800 m (Figure 18).

Phenology. Flowering from May to November.

Etymology. The epithet *cornea* refers to the corneous-thickened leaf margin that characterizes this species.

Notes. *Werneria cornea* can be differentiated by the combination of the following characters: leaves 6–22 mm long, 1.1–1.9 mm wide (leaf width/length ratio of 0.09–0.18), obtuse at the apex, slightly falcate, with the margin and the midrib thickened, and capitula with yellow ray corollas. It is morphologically similar to *W. canaliculata* (see comments under that species) and *W. pumila*. The latter species, however, usually has longer leaves (18–85 mm long) that are rather straight and lacks a thickened margin and midrib. The involucre has a higher number of involucral bracts (19–21 vs. 11–13 in *W. cornea*), and it bears 12–16 supplementary bracts at the base. In contrast, a few peduncle bracts can reach the involucre of *W. cornea*, but they are not true supplementary bracts.

Additional Specimens Examined. **PERU. Ancash:** Huari, Rajupampa, laderas hacia el nevado Santa Rosa, 9°29′S, 77°17′W, 7 Oct 2012, *A. Cano et al. 21348* (USM); Huaraz, Huascarán N.P., quebrada Llaca, NW side of valley,

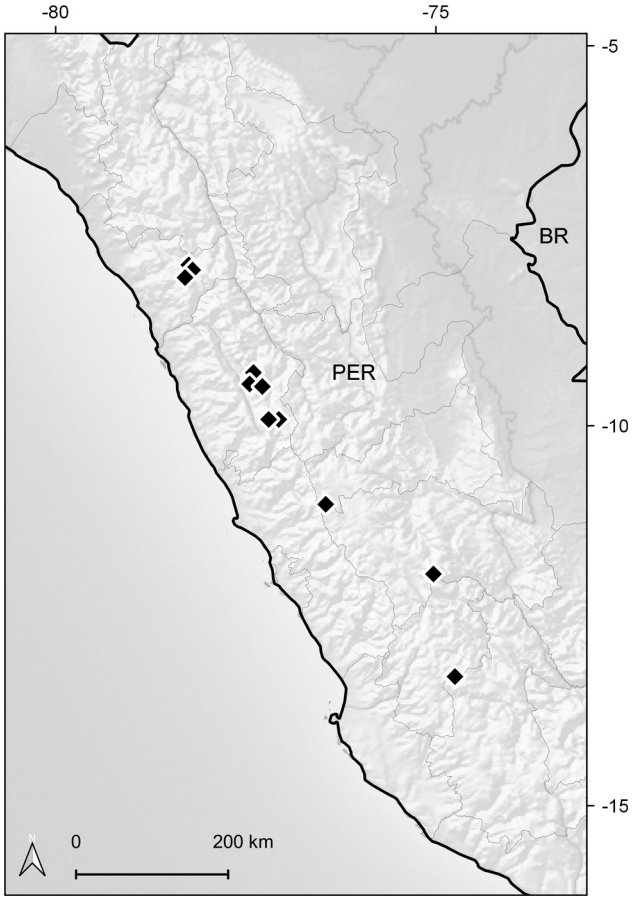

FIGURE 18. Distribution map of *Werneria cornea*.

9°27′S, 77°27′W, 24 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10796* (MO, US, USM); Recuay, Huascarán N.P., río Pachacoto drainage, below nevado Pasto Ruri, 9°55′S, 77°12′W, 13 Sep 1985, *D. N. Smith 11423* (MO, USM); Carhuaz, Huascarán N.P., quebrada Honda, from pass toward valley bottom, N side of valley, 9°18′S, 77°24′W, 3 Oct 1985, *D. N. Smith, M. Buddensiek, & R. Valencia 11648* (MO, USM). **Ayacucho:** Cangayllo-Huaytará, Paras-Pilpichaca, alrededor del abra Apacheta, 13°18′S, 74°46′W, 23 Aug 2014, *P. Gonzáles et al. 3325* (USM). **Huancavelica:** Huaytará, Pillpichaca (Llillinta-Ingahuasi), 13°18′S, 74°45′W, 26 Jun 2010, *A. Cano et al. 19859* (USM). **Junín:** Huaytapallana, 11°57′S, 75°2′W, 28 May 1960, *G. Kunkel 730* (US); Huancayo, Huaytapallana, 11°57′S, 75°2′W, 23 Jul 1977, *N. Pérez s.n.* (USM). **La Libertad:** Santiago de Chuco, Quiruvilca, alrededores de la mina Lagunas Norte, cerca al cerro Yananhuanca, 7°53′S, 78°15′W, 8 Sep 2014, *P. Gonzáles, A. Coz, & G. Muñoz 3339* (USM); Santiago de Chuco, Santiago–Shoreyo road, 35 km from Santiago, 8°3′S, 78°18′W, 26 Aug 1982, *D. N. Smith 2336* (USM); jalca de Quesquenda, about one hour E of Quiruvilca toward Huamachuco, 7°57′S, 78°12′W, 22 Jun 1964, *R. M. Straw 2533* (USM). **Pasco:** Huayllay, entre lagunas Shegue y Huaroncocha, Rosario, 11°2′S, 76°27′W, 5 Nov 2015, *S. Castillo 1528* (USM).

9. ***Werneria glaberrima*** Phil., Anales Mus. Nac. Santiago de Chile 8: 40. 1891. Type. Chile. Antofagasta: Copacoya-Colana, Linzor, 19 Feb 1885, *F. Philippi s.n.* (lectotype: SGO-000006430!, **designated here**; isolectotypes: LP-002606 [digital image!], SGO-060592!).

Rhizomatous herb, rosettiform, forming clumps, rarely solitary, 3–7 cm tall. **Rhizome** 5–10 cm long, 0.3–0.5 cm in diameter, horizontal to oblique, glabrous. **Leaves** extending into a glabrous sheath-like base; leaf lamina linear, usually slightly bent backward at the apex, 31–85 mm long, 2.1–5 mm wide, denticulate, acute, usually with a tiny hyaline mucro at the apex, barely narrowed at the base, curved forward in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, pedunculate; peduncle up to 50 mm long, glabrous, with or without a few bracts. **Involucre** narrowly cupuliform, with bracts fused at the base, 12–15 mm long, 9–11 mm wide, glabrous; involucral bracts 9–14, 7.1–10.4 mm long, 2.1–3.9 mm wide at the base, acute at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 9–16; corollas 9.9–11.1 mm long, 2.4–2.8 mm wide, 4–5-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, usually purplish beneath. **Disc florets** 13–60; corollas 5.3–7.9 mm long, 5-lobed, yellowish to creamy; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** 3.1–3.5 mm long, 1.1–1.3 mm wide, fusiform, 7–8-ribbed, glabrous; pappus 6.5–8.3 mm long, barbellate, whitish. Chromosome number unknown (Figure 19A,B).

Distribution and Habitat. Argentina [expected], Bolivia (Oruro, Potosí), Chile (Antofagasta, Arica y Parinacota, Tarapacá). It grows in exposed places on rocky and sandy soils of the desertic and dry puna ecoregions, between elevations of 3,350 and 4,900 m (Figure 20).

Phenology. Flowering from January to June (also collected in bloom in October).

Etymology. The adjective *glaberrimus, -a, -um* is the superlative of *glaber, -bra, -brum*, which refers to the absence of indumentum on all parts of this plant.

Notes. This species is well defined by its linear leaves, which are 31–85 mm long and 2.1–5 mm wide (leaf width/length ratio of 0.06–0.07), denticulate, acute at the apex, and usually slightly bent backward (i.e., somewhat reflexed). The involucre has 9–14 involucral bracts clearly acute at the apex. The erect position of the leaves is a characteristic feature of *W. glaberrima*.

We studied some specimens from Arica y Parinacota (Chile) that have shorter leaves than typical forms (e.g., *Niemeyer et al. 8988*, CONC; *Ricardi et al. 252*, CONC). These plants may be confused with forms of *W. orbignyana* with linear to narrowly oblanceolate leaves (useful characters to discriminate both species are presented under the latter species).

FIGURE 19. A, B. *Werneria glaberrima*. A. Bolivia, Oruro, Sabaya (*J. Calvo 7842*, LPB); photograph by Joel Calvo. B. Chile, Antofagasta, Inacaliri (*J. Calvo 7720*, SGO); photograph by Joel Calvo. **C–F.** *Werneria orbignyana*. C. Peru, Moquegua, near abra Huaytire (*V. A. Funk et al. 13144*, US); photograph by Mauricio Diazgranados. D. Chile, Arica y Parinacota, Umirpa-Tignamar (*A. Moreira-Muñoz & M. Diazgranados 2626*, SGO); photograph by Andrés Moreira-Muñoz. E, F. Bolivia, La Paz, near Rinconada (not collected); photographs by Joel Calvo.

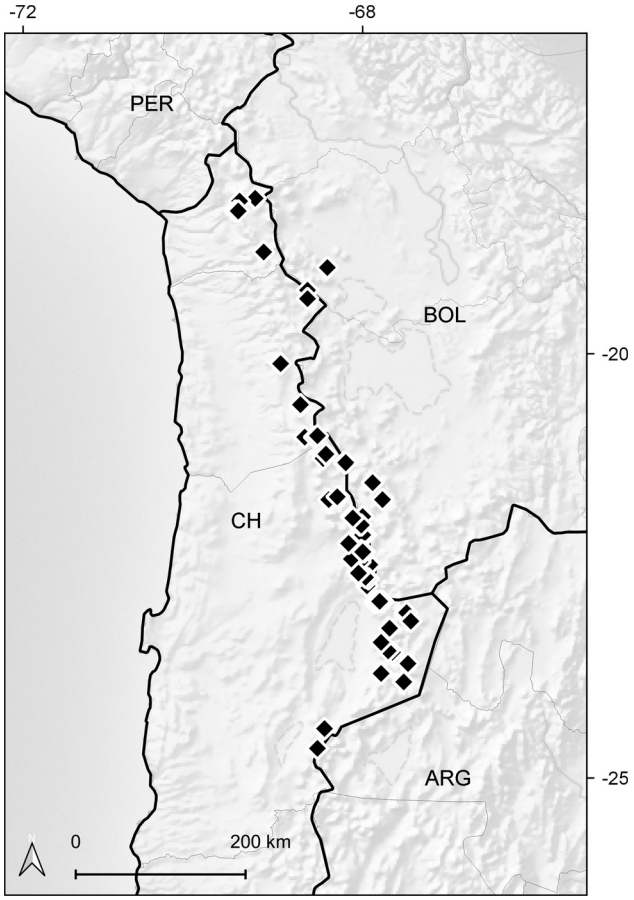

FIGURE 20. Distribution map of *Werneria glaberrima*.

Werneria glaberrima has never been recorded from Argentina, but its presence in that country is expected since it has been collected in Chile near the border with Argentina (e.g., on the Llullaillaco Volcano, Antofagasta-Salta limit). The collections from southern Peru identified as *W. glaberrima* by Beltrán (2017) should be referred to *W. orbignyana*.

Additional Specimens Examined. **BOLIVIA. Oruro:** Sabaya, cumbre del Pumire, 18°59′S, 68°25′W, 7 Feb 2019, *J. Calvo 7842* (LPB). **Potosí:** Sud Lípez, entre laguna Hedionda y laguna Colorada, Viscachitas, 39 km de la laguna Colorada, 21°55′S, 68°0′W, 24 Sep 2006, *S. G. Beck 32420* (LPB); Sur Lípez, 21°43′S, 67°46′W, 20 May 1989, *E. García 1105* (LPB, US); Sud Lípez, cerro Tapaquillcha, 21°31′S, 67°53′W, 11 Apr 1980, *M. Liberman 158* (LPB); Sud Lípez, 27 mi. [~43.4 km] SW of San Antonio de Lípez (Viejo) and 22 mi. [~35.4 km] NE of Quentena Chico, 21 Mar 1993, *P. M. Peterson, R. J. Soreng, & S. Laegaard 13052* (LPB); Sud Lípez, Tapaquillcha, 21°31′S, 67°53′W, 2 Oct 2001, *B. J. Ruthsatz 10576* (LPB).

CHILE. Antofagasta: Loa, San Pedro de Atacama, Guatin, quebrada Purificada, 22°44′S, 67°57′W, 3 Feb 2001, *M. Ackermann 8* (SGO); El Loa, llanos al S del volcán Licancabur, 22°56′S, 67°51′W, Jan 1997, *G. Arancio 10643* (CONC); El Loa, llanos al S del volcán Lascar, 23°24′S, 67°47′W, 17 Mar 1992, *G. Arancio 92-284* (CONC); El Loa, minas Sesil, camino a el Tatio, 22°38′S, 67°58′W, 19 Mar 1992, *G. Arancio 92-345* (CONC); camino de Monturaqui a cerro Guanaqueros, 24°25′S, 68°27′W, 11 Oct 1983, *M. Arroyo & C. Villagrán 831337* (CONC); El Loa, cerro Carasilla, lado NE, 21°41′S, 68°18′W, 27 Mar 1985, *M. Arroyo, C. Villagrán, & J. Armesto 85-348* (CONC); El Loa, transecto cerro Carasilla a salar Ascotán, ladera exposición N, 21°41′S, 68°17′W, 28 Mar 1985, *M. Arroyo, C. Villagrán, & J. Armesto 85-374* (CONC); El Loa, volcán Ollagüe, 21°17′S, 68°12′W, 31 Mar 1985, *M. Arroyo 85-465* (CONC); El Loa, cerro Aucanquilcha, interior de Ollagüe, 21°14′S, 68°28′W, 2 Apr 1985, *M. Arroyo 85-629* (CONC); El Loa, camino a portezuelo del Cajón, cerro Toco, ladera N, 22°55′S, 67°46′W, 3 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97030* (CONC); El Loa, camino al portezuelo del Cajón, ladera N del cerro Toco, 22°55′S, 67°48′W, 3 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97037* (CONC); El Loa, camino al portezuelo del Cajón, ladera N del cerro Toco, 22°55′S, 67°50′W, 4 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97065* (CONC); El Loa, cordón cerro de la Pacana, cuesta entre salar de Aguas Calientes y quebrada Quepiaco, 23°3′S, 67°29′W, 11 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97474* (CONC); El Loa, cordón cerro de la Pacana, cuesta entre salar de Aguas Calientes y quebrada Quepiaco, 23°4′S, 67°30′W, 11 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97499* (CONC); El Loa, Copacollo, 22°19′S, 68°1′W, 10 Aug 1979, *E. Aspillaga 1525* (CONC); El Loa, camino desde San Pedro de Atacama hacia el Paso Jama, 22°55′S, 67°49′W, 15 May 1997, *M. Baeza, P. Aqueveque, & G. Kottirsch 444* (CONC); El Loa, laguna Lejía, 23°30′S, 67°42′W, 18 May 1997, *M. Baeza, P. Aqueveque, & G. Kottirsch 560* (CONC); El Loa, entre laguna Lejía y paso de Guaitiquina, 23°39′S, 67°28′W, 18 May 1997, *M. Baeza, P. Aqueveque, & G. Kottirsch 570* (CONC); El Loa, sector géiser del Tatio, hacia al E, casi en el límite con Bolivia, 22°20′S, 67°59′W, 19 May 1997, *M. Baeza, P. Aqueveque, & G. Kottirsch 585* (CONC); Chiu Chiu, Inacaliri, falda SE del volcán Inacaliri, 22°1′S, 68°2′W, 14 May 2018, *J. Calvo 7711* (CONC, SGO); Chiu Chiu, Inacaliri, falda SE del volcán Inacaliri, 22°1′S, 68°1′W, 14 May 2018, *J. Calvo 7712* (CONC, SGO); Chiu Chiu, Inacaliri, cerros de Colana, 21°55′S, 68°8′W, 15 May 2018, *J. Calvo 7720* (CONC, SGO); Chiu Chiu, Inacaliri, cerros de Colana, 21°56′S, 68°7′W, 15 May 2018, *J. Calvo 7730* (CONC, SGO); Loa, Toconao, cordón S de los cerros de La Pacana, 23°9′S, 67°26′W, 4 Mar 2019, *J. Calvo 7907* (CONC, SGO); Loa, San Pedro de Atacama, Machuca, cerro atrás del pueblo, 22°35′S, 68°3′W, 5 Mar 2019, *J. Calvo 7918* (SGO); Ollagüe, volcán Aucanquilcha, ladera NE, cerca del campamento Aucanquilcha, 21°11′S, 68°26′W, 23 Apr 2019, *J. Calvo & A. Moreira-Muñoz 7936* (SGO); Tatio, 22°27′S, 68°2′W, 10 Feb 1962, *C. Castro s.n.* (SGO); transecto Lejía-Talabre, 23°25′S, 67°46′W, Apr 2012, *F. Díaz & C. Latorre 734* (CONC); El Loa, 92 km SE of San Pedro de Atacama toward paso Sico (52 km SE

of puente Toconao, 21 km above Talabre Viejo), 21 Feb 1997, *U. Eggli, B. E. Leuenberger, & S. Arroyo-Leuenberger 2721b* (CONC); El Loa, near the crater of El Tatio, second vega on rd. toward San Pedro de Atacama, 22°23′S, 68°0′W, 15 Mar 1993, *V. A. Funk & L. Katinas 11194* (SGO); El Loa, arroyo Coya, 22°25′S, 68°8′W, Nov 1996, *J. Gutiérrez & F. López 40* (CONC); cerro del Pajonal, 22°29′S, 67°55′W, 20 Aug 1963, *W. Hermosilla s.n.* (SGO); El Tatio, quebrada cerca del campamento de la CORFO, 22°22′S, 68°0′W, 26 Apr 1969, *M. Mahu 4109* (SGO); camino al salar de Tara, 22°55′S, 67°50′W, 17 Dec 1996, *A. Moreira-Muñoz 245* (CONC, SGO); P.N. Llullaillaco, volcán Llullaillaco, 24°39′S, 68°32′W, Feb 2001, *V. Pardo 19* (CONC); El Loa, el Tatio, 22°20′S, 68°1′W, 12 Mar 2014, *A. Paredes & F. López 6* (CONC); laguna Verde, 23°14′S, 67°41′W, 22 Feb 1960, *L. E. Peña s.n.* (CONC); Linzor-Tatio, 19 Feb 1960, *L. E. Peña s.n.* (CONC); El Loa, al N de la estación Polapi, 21°43′S, 68°24′W, 16 Jun 2006, *S. Pfanzelt 115* (CONC); camino a el Tatio, 4 Jan 1950, *A. Pfister s.n.* (CONC); el Tatio, 22°20′S, 68°0′W, 4 Jan 1950, *A. Pfister s.n.* (CONC); camino entre Est. San Pedro y el Tatio, 4 Jan 1950, *A. Pfister s.n.* (CONC); El Loa, volcán Ollagüe, azufrera Santa Rosa, 21°17′S, 68°13′W, 16 Jan 1943, *E. Pisano & J. Venturelli 1709* (SGO); El Loa, llaretera Potrero, al lado del volcán Linzor, 22°8′S, 68°0′W, 4 Feb 1943, *E. Pisano & J. Venturelli 1809* (SGO); El Loa, entre Machuca y Tatio, 15 Feb 1943, *E. Pisano & J. Venturelli 1886* (CONC, SGO); El Loa, laguna de Miñique, entre los cerros Miñique y Miscanti, 23°46′S, 67°47′W, 24 Feb 1943, *E. Pisano & J. Venturelli 1970* (SGO); San Pedro de Atacama, Casablanca, 22 Sep 1954, *M. Ricardi 2989* (CONC); El Loa, el Tatio, laderas de los cerros frente a los géiseres, 14 May 1972, *M. Ricardi, E. Weldt, & M. Quezada 373* (CONC); camino de San Pedro de Atacama al volcán Toco, 22°55′S, 67°50′W, 3 Oct 1958, *M. Ricardi & C. Marticorena 4828* (CONC, MA); géiseres del Tatio, 22°20′S, 68°0′W, 6 Apr 1961, *M. Ricardi, C. Marticorena, & O. Matthei 486* (CONC); El Loa, frente al volcán Licancabur, lado E, 22°55′S, 67°48′W, 24 Nov 1996, *R. Rodríguez 3222* (CONC); El Loa, N of San Pedro de Atacama, ~47 km from the town along the road to the géiser de Tatio, 22°39′S, 67°56′W, 11 Apr 1994, *C. M. Taylor & A. Pool 11556* (CONC); El Loa, San Pedro de Atacama, Socaire, camino a Paso Sico, sector Las Tecas, 23°52′S, 67°31′W, 7 Apr 1997, *S. Teillier 4098* (SGO); El Loa, portezuelo de los cerros León y Toconce, 22°14′S, 68°10′W, 7 Aug 1979, *C. Villagrán 1497* (CONC); El Loa, Altos de Cablor, 22°24′S, 68°5′W, 11 Dec 1995, *C. Villagrán 8761* (CONC); El Loa, trayecto entre Talabre y laguna Lejía, 23°31′S, 67°39′W, 3 Apr 1998, *C. Villagrán, F. Hinojosa, & C. Latorre 9344* (CONC); El Loa, quebrada Callejón, faldeo del cerro Jorquencal, 22°37′S, 68°2′W, 14 Jan 1999, *C. Villagrán, F. Hinojosa, & R. Villa 9558* (CONC). **Arica y Parinacota:** salar de Surire, proximidades del salar, 18°48′S, 69°10′W, 6 Aug 1986, *E. Belmonte 86143* (CONC); camino de Arica al Portezuelo de Chapiquiña, km 111, 9 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 94* (CONC); arriba de las Cuevas, cerro Milagro, 18°12′S, 69°27′W, 19 Jun 2015, *A. Moreira-Muñoz 2499* (SGO); Parinacota, Portezuelo de Chapiquiña, 18°19′S, 69°28′W, 17 May 1989, *H. Niemeyer, C. Fernández, & A. Hoffmann 8988* (CONC); camino de Arica al Portezuelo de Chapiquiña, 26 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 186* (CONC); cuesta de Chapiquiña, 2 km más abajo del portezuelo, 18°19′S, 69°30′W, 7 May 1972, *M. Ricardi, E. Weldt, & M. Quezada 252* (CONC); cerros de Parinacota, 18°10′S, 69°16′W, 29 Feb 1948, *F. Sudzuki 500* (SGO). **Tarapacá:** Iquique, Pica, near salar de Coposa, road A687 at km 111, 20°37′S, 68°44′W, 20 Feb 2003, *M. F. Gardner & S. G. Knees 6550* (SGO); camino de Huara a Cancosa, km 137, 18 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 374* (CONC); Carcañal de Michincha, 20°59′S, 68°34′W, 23 Jan 1993, *S. Teillier 3034* (SGO); Collaguasi, Rosario, 20°59′S, 68°41′W, 21 Jan 1994, *S. Teillier 3283* (CONC, SGO); Collahuasi, Carcañal de Michincha, 20°58′S, 68°32′W, 28 Jan 1995, *S. Teillier 3429* (SGO); Pica, quebrada Agua Verde, N del salar de Coposa, 20°36′S, 68°44′W, 18 Sep 2002, *S. Teillier & G. Mieres 5382* (CONC); cordillera al N de Colchane, 19°15′S, 68°39′W, 3 Mar 1998, *M. A. Trivelli s.n.* (SGO); Iquique, entre Sitani y Cariquima, a 12 km de Cariquima, 19°21′S, 68°39′W, 20 Mar 1982, *C. Villagrán & M. Arroyo 4136* (CONC); cordillera cerro Columtusca, Apacheta, 20°7′S, 68°58′W, Mar 1926, *E. Werdermann 1097* (CONC, LIL, LPB, US).

10. ***Werneria glandulosa*** Wedd., Chlor. Andina 1: 85. 1856. Type. Peru. Puno: Carabaya, Jun/Jul 1847, *H. A. Weddell s.n.* (lectotype: P-02088561 [digital image!], **designated here**). Epitype, **designated here:** Peru. Cusco: Paucartambo, Parque Nacional del Manu, Acjanaco, cerro Inanbari [Inambari], 3,850 m, 21 Mar 1992, *A. Cano 5241* (USM-107649!).

Rhizomatous herb, scapiform, forming lax clumps or solitary plants, 7.5–17 cm tall. **Rhizome** 3–5 cm long, 0.4–1 cm in diameter, oblique to vertical, covered with arachnoid-lanate indumentum and leaf base remnants. **Leaves** pseudopetiolate; leaf lamina elliptic to oblanceolate, 20–43 mm long, 6–15 mm wide, entire, acute to obtuse at the apex, attenuate at the base, flat in cross section, with 1–4 mm long multicellular trichomes, pinnately veined (more conspicuous beneath), somewhat fleshy, drying chartaceous, matte, dark purple beneath; pseudopetiole 7–37 mm long, with long multicellular trichomes. **Capitulum** radiate, solitary, terminal, pedunculate; peduncle up to 130 mm long, with the same indumentum as the leaves, bearing somewhat foliose bracts near the base that become linear upward. **Involucre** cupuliform, strongly partite (barely fused at the base), 12–18 mm long, 7–12.5 mm wide, with the same indumentum as the leaves (denser at the base); involucral bracts 12–19, 7.3–13 mm long, 1.9–2.6 mm wide at the base, acute at the apex, greenish to dark purplish; supplementary bracts absent. **Ray florets** (14–)20–23; corollas 10–13.3 mm long, 1.7–2 mm wide, 4–5-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, purple tipped beneath.

Disc florets 55–68; corollas 5.2–5.8 mm long, 5-lobed, whitish to yellowish; style branches truncate with a crown of sweeping hairs, whitish. **Achenes** ~2 mm long, ~0.7 mm wide, cylindrical, glabrous (immature); pappus 4.5–9.6 mm long, barbellate, whitish. Chromosome number unknown (Figure 21).

Distribution and Habitat. Bolivia (La Paz), Peru (Cusco, Puno). This species grows in very moist grasslands of the humid puna ecoregion, between elevations of 3,450 and 4,175 m (Figure 22).

The location on the map of the single studied specimen from Puno is approximate because the label information reads only "prov. de Carabaya."

Phenology. Collected in bloom in March and April.

Etymology. The adjective *glandulosus, -a, -um* means glandular. However, the indumentum of this species is pilose instead of glandular (see further comments below).

Notes. This species is morphologically close to *W. plantaginifolia*, but it can be easily differentiated by the

FIGURE 21. A–D. *Werneria glandulosa*. A–C. Bolivia, La Paz, Keara–Mojos (*A. Fuentes 20067*, LPB); photographs by Alfredo Fuentes. D. Bolivia, La Paz, Toilcacocha (*M. P. Paco et al. 94*, LPB); photograph by Alfredo Fuentes.

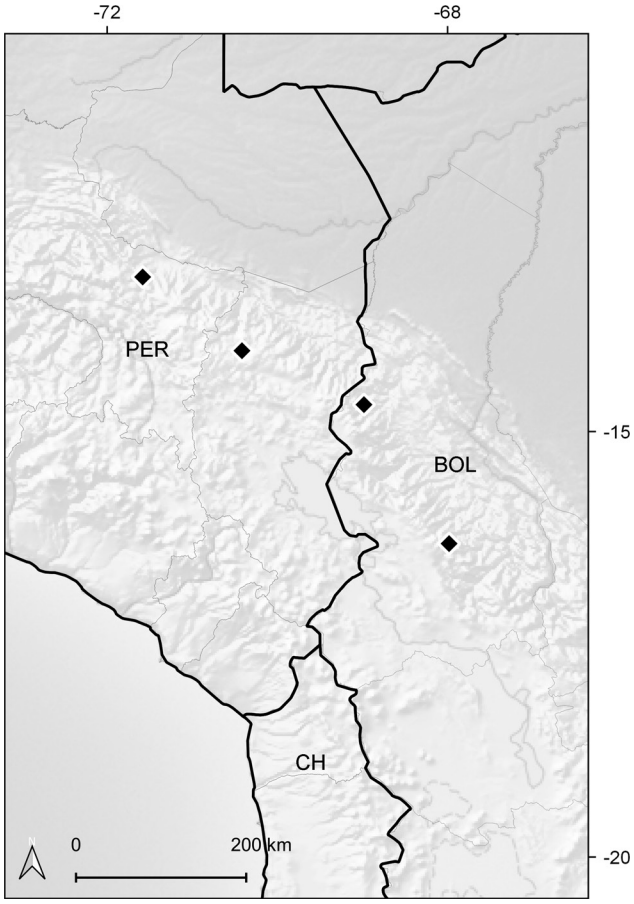

FIGURE 22. Distribution map of *Werneria glandulosa*.

pilose indumentum covering the leaves, peduncle, and involucre (see further comments under *W. plantaginifolia*). The trichomes are 1–4 mm long and multicellular, with lageniform, somewhat rigid, and persistent basal cells and flagelliform, quickly deciduous apical cells. On dried specimens the remaining basal cells may resemble glandular trichomes; this probably led Weddell to choose the epithet *glandulosa*. The indumentum is more copious on the peduncle and the leaf pseudopetioles. The peduncle has somewhat foliose bracts near the base that become linear upward. Another striking character is the dark-purple color of the abaxial leaf surface.

This species is known from only a few gatherings from southern Peru (Cusco and Puno) and northern Bolivia (La Paz). It was treated as a dubious species by Rockhausen (1939). Beltrán (2017), in his synopsis of the Peruvian species, did not mention it and included *Cano 5241* (USM) under *W. plantaginifolia*. Further collections would improve the knowledge of the extent of its morphological variability.

Since the lectotype consists of only one individual that is poorly developed and its diagnostic characters are barely recognizable, we consider it appropriate to designate an epitype from a region as close as possible to the type locality (Carabaya Province, Puno). This solution is aimed at minimizing any future uncertainty regarding the application of this name. The epitype selected is a Cano collection from Paucartambo (Cusco). See comments under *W. caespitosa* for further details about the criterion used for the lectotypification of the name *W. glandulosa*.

Additional Specimens Examined. **BOLIVIA. La Paz:** Franz Tamayo, P.N. Madidi, sector Calistía, por el camino de herradura Keara–Mojos, 14°41′S, 68°59′W, 28 Apr 2016, *A. Fuentes 20067* (LPB, MO n.v.); Franz Tamayo, área natural de manejo integrado Apolobamba, Queara Nuevo, Toilcacocha, 14°41′S, 69°5′W, 12 Apr 2008, *M. P. Paco et al. 94* (LPB, MO n.v.); Alaska Mine, 3 km [~ 4.8] north of Pongo, Unduavi Valley, 16°19′S, 67°59′W, 1/4 Mar 1926, *G. H. H. Tate 91* (NY).

11. ***Werneria graminifolia*** Kunth, Nov. Gen. Sp. (folio ed.) 4: 150. 1818. *Werneria nubigena* var. *graminifolia* (Kunth) Wedd., Chlor. Andina 1: 81. 1856. Type. Ecuador. Napo: Antisana, [without date], *F. W. H. A. Humboldt & A. J. A. Bonpland 2243* (lectotype: P-00320183 [digital image!], designated as "holotype" by Nordenstam [1999: 313]; isolectotype: B-W-16431-01-0 [digital image!]).

Oresigonia parviflora Willd. ex Rockh., Bot. Jahrb. Syst. 70: 312. 1939, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 2–3 cm tall. **Rhizome** 3–5.5 cm long, 0.4–0.9 cm in diameter, horizontal to oblique, covered with long, silky trichomes and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, silky trichomes, subdistichously arranged; leaf lamina linear, (9.5–)17–40 mm long, (1.1–)1.9–2.9 mm wide, entire, usually hyaline at the margin, obtuse at the apex, not narrowed at the base, flat in cross section, glabrous or with scattered long trichomes, inconspicuously nerved above, 1-nerved beneath (usually only conspicuous in the lower half), coriaceous, shiny. **Capitulum** radiate, solitary, terminal, sessile (rarely shortly pedunculate). **Involucre** cupuliform, with bracts fused at the base, 6–11 mm long, 5.8–7.9 mm wide, glabrous; involucral bracts ~13, 3.8–4.6 mm long, 1.1–1.5 mm wide at the base, acute to obtuse at the apex, greenish, usually purple edged, shiny; supplementary bracts absent. **Ray florets** (9–)13–18; corollas 9.3–12.5 mm long, 1.5–2 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, usually purplish beneath. **Disc florets** 35–90; corollas 4.6–5.1 mm long, 5-lobed, yellowish; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** 2.3–2.5 mm long, ~0.7 mm wide, cylindrical, ~7-ribbed, glabrous; pappus 5.8–6 mm long, barbellate, whitish. Chromosome number unknown (Figure 23).

Additional Iconography. Kunth (1818: plate 368-I).

Distribution and Habitat. Endemic to Ecuador (Azuay, Bolívar, Cañar, Chimborazo, Cotopaxi, Imbabura, Napo, Pichincha, Tungurahua). This species grows in open places and areas close to streams of the paramo ecoregion, between elevations of 3,050 and 4,650 m (Figure 24).

FIGURE 23. *Werneria graminifolia*. Ecuador, Azuay, Cajas (not collected); photographs by Joel Calvo.

PHENOLOGY. Flowering nearly all year round.

ETYMOLOGY. The epithet *graminifolia* refers to the grasslike leaves of this species.

NOTES. This species has perfectly linear leaves that are minutely hyaline at the margin (more conspicuous in the lower half), obtuse at the apex, shiny, and pale green in living plants; they tend to be distichously arranged. The young leaves usually bear scattered long trichomes and become glabrous when the plant ages. The rhizome is covered with long, silky trichomes, as well as the sheath-like bases of the leaves.

Werneria graminifolia has often been misidentified as *W. pygmaea*. They mainly differ in leaf morphology, specifically in the shape of the cross section (flat in *W. graminifolia* vs. elliptical to terete in *W. pygmaea*), leaf margin (usually minutely hyaline in *W. graminifolia* vs. not hyaline in *W. pygmaea*), apex (obtuse in *W. graminifolia* vs. acute to obtuse in *W. pygmaea*), and surface appearance (shiny in *W. graminifolia* vs. matte in *W. pygmaea*). Furthermore, the leaves of *W. graminifolia* are subdistichously arranged and coriaceous, not fleshy as in *W. pygmaea*. *Werneria graminifolia* is usually a more robust plant than *W. pygmaea*.

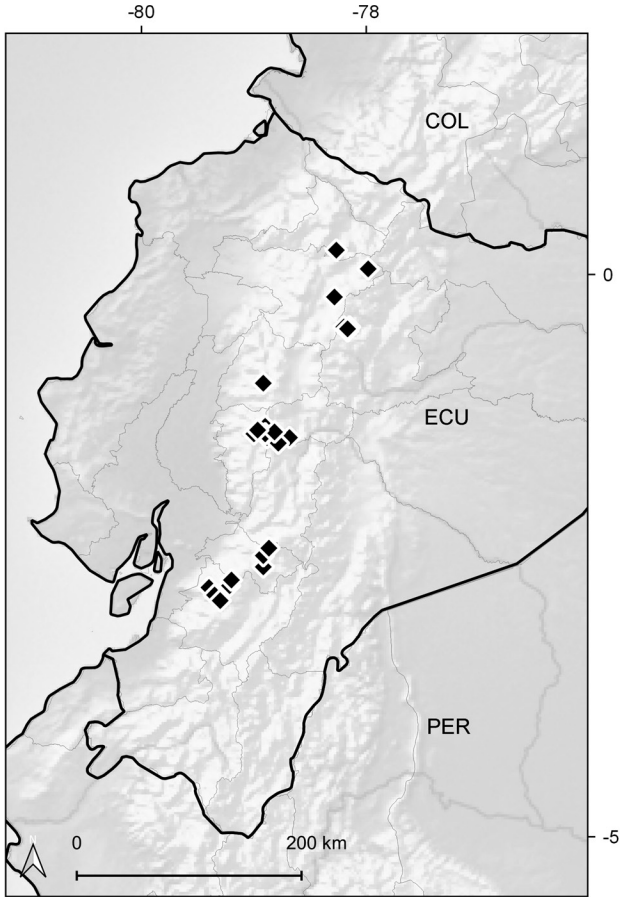

FIGURE 24. Distribution map of *Werneria graminifolia*.

Since both species sometimes co-occur in the same habitat, a detailed examination of the mentioned characters is required for proper identification. We found some specimens with mixed material, that is, *Fosberg 22629* (US).

Werneria graminifolia also has morphological affinities with *W. apiculata*. Both have coriaceous leaves that are flat in cross section and shiny, but they progressively become narrower upward in *W. apiculata,* and the apex is rather acute or apiculate (rarely somewhat obtuse). Their distribution areas do not overlap.

B-W-16431-01-0 is considered part of the original material and designated as the isolectotype. Willdenow received the plant from Humboldt as stated at the bottom right of the sheet. This specimen, although unnumbered, contains individuals identical to those from the lectotype.

Additional Specimens Examined. **ECUADOR. Azuay:** P.N. Cajas, cerca de la laguna de Soldados, 2°54′S, 79°18′W, 17 Nov 2000, *L. Endara & M. Nonhebel 553* (QCA); Las Cajas, laguna Toreadora, 2°43′S, 79°12′W, 9 Sep 1983, *B. B. Larsen & B. Eriksen 45010* (QCA, QCNE); Cajas, Cochapampa, 2°47′S, 79°24′W, 22 Jul 1999, *M. Smeets & M. Lind van Wijngaarden 520* (QCA); Cajas, río Blanco, 2°51′S, 79°21′W, 29 Aug 1999, *M. Smeets & M. Lind van Wijngaarden 813* (QCA); P.N. Cajas, Cuenca–Molleturo km 28, laguna Toreadora, sendero oeste, 2°46′S, 79°13′W, 28 Aug 2003, *C. Ulloa & D. Minga 1384* (HA). **Bolívar:** road to Salinas, 1.8 km W of Guaranda–Ambato hwy., 1°25′S, 79°0′W, 25 Jun 1989, *L. J. Dorr & I. Valdespino 6479* (QCA, QCNE, US); Los Arenales, cruce de la antigua y la nueva carretera Ambato–Guaranda, 1°27′S, 78°53′W, 1 Aug 1985, *B. B. Larsen 72* (QCA); carretera Ambato–Guaranda, cerca del paso bajo las antenas, 1°25′S, 78°54′W, 1 Aug 1985, *B. B. Larsen 77* (QCA); Guaranda, reserva de producción faunística Chimborazo, Guanujo–El Sinche, 1°23′S, 78°58′W, 26 Mar 1992, *H. Vargas & M. Villacís 44* (QCNE [mixed with *W. pygmaea*]). **Cañar:** near El Tambo (~69 km by RR south of Sibambe), 2°30′S, 78°55′W, 5 Jul 1945, *W. H. Camp E-3980* (P, US); cerro Buerán, páramo de Curiquinga, 5 km S of Cañar, 2°36′S, 78°55′W, 29 Jan 1945, *F. R. Fosberg & M. A. Giler 22629* (US [mixed with *W. pygmaea*]); camino de la laguna Culebrillas hasta Ingapirca, cerca de la comunidad de Cajontambo, 2°26′S, 78°52′W, 11 Mar 2009, *D. Minga & F. Nugra 1597* (HA); vicinity of Cañar, 16 Sep 1918, *J. N. Rose & G. Rose 22742* (US). **Chimborazo:** nevado Chimborazo, 1°30′S, 78°47′W, 12 Jul 2009, *D. Cárate et al. 913* (QCA). **Cotopaxi:** Cordillera Occidental, páramo de Apagua entre Zumbagua y Pilaló, alrededores de Indian village Apagua, 0°58′S, 78°55′W, 18 Jul 1959, *H. G. Barclay & P. Juajibioy 8096* (COL); Cordillera Occidental, páramo de Apagua entre Zumbagua y Pilaló, just below Indian village Apagua, 0°58′S, 78°55′W, 18/19 Jul 1959, *H. G. Barclay & P. Juajibioy 8124* (COL, US). **Imbabura:** laguna de Mojanda, 0°13′N, 78°16′W, 13 Aug 1976, *B. Øllgaard & H. Balslev 8744* (AAU, US). **Napo:** lado WNW del Antisana, 0°28′S, 78°9′W, 2 Feb 1980, *S. Halloy B-58* (LIL); volcán Antisana, W side of the mountain, 0°30′S, 78°10′W, 21 Jul 1997, *P. Sklenář & V. Sklenářová 2723* (QCA). **Pichincha:** falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 3944* (QCA); Antisana, falda OSO, 11 Sep 1986, *A. Ehrenburg 103* (QCA); Antisana, falda WSW, 14 Sep 1986, *A. Ehrenburg 161* (QCA); faldas occidentales del volcán Antisana, 0°28′S, 78°12′W, 29 Feb 1984, *L. Muñoz 310* (QCA); base del volcán Antisana, entrando por Pintag hacia la laguna Micacocha, campamento de EMAP, 0°30′S, 78°10′W, 8 Oct 1990, *K. Romoleroux 1106* (QCA); N side of nevado Cayambe, 0°3′N, 77°59′W, 6 Aug 2004, *P. Sklenář 8102* (QCA); in m. Coturco, 0°12′S, 78°17′W, *L. Sodiro s.n.* (QPLS). **Tungurahua:** Cordillera Occidental, vertientes del lado este del Chimborazo, S of Machopota [Mochapata], 1°27′S, 78°41′W, 12 Aug 1959, *H. G. Barclay & P. Juajibioy 8810* (COL); Ambato, parroquia Pilahuín, sector Llama Guayuna junto a la quebrada Cunuyacu al N del Chimborazo y SW del Caryguayrazo, 1°24′S, 78°49′W, 1 Jul 1992, *C. E. Cerón et al. 19172* (QCNE); Guaranda–Ambato road, on the summit of the road just below mt. Chimborazo, 1°25′S, 78°54′W, 6 Jul 1984, *J. Grimes & C. Todzia 2570* (QCA, QCNE); Ambato, comunidad Rumipata, 1°21′S, 78°54′W, 11 Jun 2015, *J. Irazabal & R. Jaramillo 1257* (QCA).

12. ***Werneria huascarana*** J. Calvo, H. Beltrán, & Trinidad, Willdenowia 50(1): 9. 2020. Type. Peru. Ancash: Carhuaz, Huascarán National Park, quebrada Ulta, near Ulta pass, 9°07′S, 77°30′W, 4,870 m, 28 Jul 1985, *D. N. Smith 11308* (holotype: USM-69998!; isotype: MO n.v.).

Rhizomatous herb, rosettiform, forming lax clumps, 2–3 cm tall. **Rhizome** 6–8 cm long, 0.2–0.3 cm in diameter, horizontal to oblique, covered with long, silky trichomes and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, silky trichomes; leaf lamina narrowly elliptic, 6.5–12 mm long, 1.5–2.5 mm wide, entire, acute, usually callous tipped at the apex, slightly narrowed at the base, flat in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 10–11 mm long, 7–8 mm wide, glabrous; involucral bracts ~13, 4–4.5 mm long, 1.5–2 mm wide at the base, acute at the apex, greenish; supplementary bracts absent. **Ray florets** ~10; corollas 10–11 mm long, 1.8–2.1 mm wide, 4–5-veined, 3-toothed at the apex, conspicuously surpassing the involucre, yellow. **Disc florets** ~61; corollas 6–6.5 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellow. **Achenes** cylindrical, glabrous (immature); pappus ~5 mm long, barbellate, whitish. Chromosome number unknown (Figure 25A,B).

Additional Iconography. Calvo et al. (2020: 10, fig. 5, as photo).

Distribution and Habitat. Endemic to Peru (Ancash). *Werneria huascarana* J. Calvo, H. Beltrán, & Trinidad is thus far known only from the surroundings of the Ulta pass, which is located between the cities of Carhuaz and Chacas in the central part of the Cordillera Blanca. This species grows on rock outcrops and scree slopes around the upper limit of vegetation of the puna ecoregion, between elevations of 4,700 and 4,900 m (Figure 26).

Phenology. Collected in bloom from April to July (also seen in flower in November).

Etymology. The epithet refers to the Huascarán National Park, from where this species is known.

Notes. *Werneria huascarana* belongs to the subgroup that displays yellow ray corollas. It is characterized by its narrowly elliptic, callous-tipped, glabrous, flat, and somewhat fleshy leaves. The rhizomes are covered with long, silky trichomes and leaf base remnants.

Among the species displaying yellow ray corollas, it may be confused with *W. pumila*. They differ in the leaf shape and length (narrowly elliptic, 6.5–12 mm long in *W. huascarana* vs. linear to narrowly oblanceolate, 18–85 mm long in *W. pumila*), number of involucral bracts (~13 in *W. huascarana* vs. 19–21 in *W. pumila*), and number of supplementary bracts (absent in *W. huascarana* vs. 12–16 in *W. pumila*). Their distribution areas do not overlap. See Calvo et al. (2019) for further details.

Additional Specimen Examined. **PERU. Ancash:** Asunción, Chacas, abra de Punta Olímpica, 9°7′S, 77°30′W, 24 Apr 2004, *A. Cano, M. I. La Torre, & W. Mendoza 14507* (USM).

13. ***Werneria lanatifolia*** J. Calvo & R. I. Meneses, Phytotaxa 422(2): 202. 2019. Type. Peru. Cusco: cordillera de Vilcanota, cuenca de la laguna Sibinacocha, cerro Pumachunta, 13°50′S, 71°4′W, 4,950 m, 4 Apr 2012, *A. Palabral et al. 774* (holotype: LPB s.n.!; isotype: US s.n.!).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 1–1.5 cm tall. **Rhizome** 1–3 cm long, 0.2–0.3 cm in diameter, horizontal to oblique, covered with long, silky trichomes. **Leaves** extending into a sheath-like base that bears long, silky trichomes; leaf lamina linear, 7–12 mm long, 1.2–2.1 mm wide, entire, sometimes thinly hyaline at the margin, acute to apiculate, rarely somewhat obtuse at the apex, not narrowed at the base, flat to slightly curved forward in cross section, lanate above (indumentum composed of trichomes 1–1.5 mm long), glabrous or with some scattered trichomes beneath, inconspicuously nerved above, 1-nerved beneath, coriaceous, rather matte, finely papillose. **Capitulum** radiate, solitary, terminal, sessile. **Involucre** cupuliform, with bracts fused at the base, 5–6 mm long, 6–8 mm wide, covered with trichomes 1–1.5 mm long; involucral bracts ~14, 2.3–4.9 mm long, 0.9–1.9 mm wide at the base, acute at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 13–14; corollas 6.3–8.7 mm long, 1.5–2.1 mm wide, 4–5-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 26–28; corollas 3.7–4.9 mm long, 5-lobed, whitish to creamy; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** ~1.4 mm long, ~0.6 mm wide, cylindrical, glabrous or with some scattered arachnoid trichomes near the base (immature); pappus 3.8–4.7 mm long, barbellate, whitish. Chromosome number unknown (Figure 27A,B).

Additional Iconography. Calvo and Meneses (2019: 202–203, figs. 1A,B, 2, as photos).

Distribution and Habitat. Bolivia (La Paz), Peru (Cusco). It is known only from the surroundings of Ulla Ulla (Franz Tamayo, La Paz) and the Cordillera Vilcanota in southeastern Cusco. This species grows on exposed slopes of the humid puna ecoregion, between elevations of 4,500 and 4,950 m (Figure 28).

Phenology. Collected in bloom in March and April.

Etymology. The epithet *lanatifolia* refers to the leaf indumentum that characterizes this species.

Notes. This is a minute species that is easily recognizable by the lanate indumentum that covers the adaxial surface of its leaves. These are linear, 7–12 mm long, and usually slightly apiculate at the apex. The capitulum is radiate and sessile and has 13–14 ray florets with white corollas.

The morphologically closest species is *W. apiculata*. They can be easily differentiated by the adaxial leaf indumentum

FIGURE 25. A, B. *Werneria huascarana*. Peru, Ancash, Olleros (*Sachahuaman s.n.*, USM [herbarium specimen not seen]); photographs by Inés Sachahuaman. **C, D.** *Werneria pumila*. C. Ecuador, Pichincha, volcán Guagua Pichincha (not collected); photograph by Joel Calvo. D. Ecuador, Zamora-Chinchipe, páramo de Yacuambi (*I. Arnelas et al. 1130*, HUTPL); photograph by Joel Calvo. **E, F.** *Werneria villosa*. E. Peru, Lima, Cajatambo (*H. Beltrán et al. 8288*, USM); photograph by Hamilton Beltrán. F. Bolivia, Cochabamba, cordillera del Tunari (not collected); photograph by Modesto Zárate.

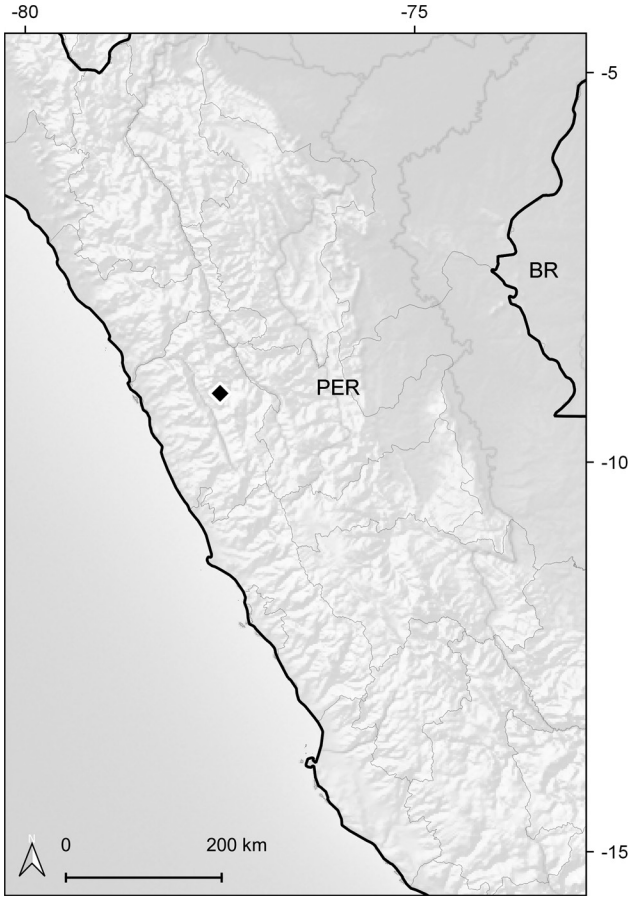

FIGURE 26. Distribution map of *Werneria huascarana*.

(lanate in *W. lanatifolia* vs. glabrous or rarely with a few scattered, long, deciduous trichomes in *W. apiculata*). The involucre is also covered with trichomes 1–1.5 mm long in *W. lanatifolia*, whereas it is glabrous in *W. apiculata*. The latter species is also a larger plant with longer leaves (20–42 mm vs. 7–12 mm in *W. lanatifolia*).

Additional Specimens Examined. **BOLIVIA. La Paz:** Franz Tamayo, Ulla Ulla, 15°2′S, 69°15′W, 15 Apr 1982, *X. Menhofer 1107* (LPB); Bautista Saavedra, ANMI Apolobamba, Canahuma, sector laguna Catantira, al límite con la comunidad de Medallani, 15°3′S, 69°6′W, 18 Apr 2019, *A. P. Sandoval, H. Alberto, & T. Heuts 249* (BOLV, LPB).

PERU. Cusco: cordillera de Vilcanota, cuenca de la laguna Sibinacocha, cerro Pumachunta, 13°50′S, 71°4′W, 3 Mar 2019, *R. I. Meneses et al. 6933* (LPB).

14. ***Werneria microphylla*** H. Beltrán & S. Leiva, Phytotaxa 372(4): 297. 2018. Type. Peru. Lima: Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 4,877 m, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7970* (holotype: USM-253391!; isotypes: HAO n.v., HUSA n.v., HUT n.v.).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 1–1.5 cm tall. **Rhizome** 2–4 cm long, 0.2–0.3 cm in diameter, horizontal to oblique, covered with scarious leaf base remnants, glabrous or with scattered arachnoid trichomes. **Leaves** extending into a sheath-like base that bears a few short arachnoid trichomes; leaf lamina linear, 2.5–5.7 mm long, 0.5–0.6 mm wide, entire, aristate at the apex (arista up to 0.8 mm long), barely or not narrowed at the base, elliptical to terete in cross section, glabrous, inconspicuously nerved above, 0–1-nerved beneath (barely visible), fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile (sometimes shortly pedunculate). **Involucre** narrowly cupuliform, with bracts fused at the base, 5–5.5 mm long, 3–5 mm wide, glabrous; involucral bracts 8–13, 2.3–2.5 mm long, 1.1–1.3 mm wide at the base, acute to obtuse at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 7–8; corollas 4.5–5.1 mm long, 1.1–1.2 mm wide, 3-veined, subentire to 2-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 11–23; corollas 3–4 mm long, 5-lobed, yellowish to creamy; style branches truncate with a crown of sweeping hairs, yellowish, purple tipped. **Achenes** 1.3–1.6 mm long, 0.5–0.6 mm wide, cylindrical, glabrous, ribs inconspicuous; pappus 3.7–3.8 mm long, barbellate, whitish. Chromosome number unknown (Figure 27C,D).

Additional Iconography. Beltrán and Leiva (2018: 298–299, fig. 1A–D, as photos, fig. 2).

Distribution and Habitat. Bolivia (Cochabamba, La Paz), Peru (Ancash, Cusco, Huancavelica, Huánuco [expected], Junín [expected], Lima, Puno). It grows in wet places and Andean marshes ("bofedales") of the puna ecoregion, between elevations of 3,150 and 5,600 m (Figure 29).

Phenology. Flowering nearly all year round.

Etymology. The epithet *microphylla* refers to the small leaves of this species.

Notes. This species is morphologically close to *W. pygmaea*, from which it can be differentiated by its aristate leaves. The leaf apex of *W. pygmaea* is acute to obtuse and lacks an arista. These two species also differ in leaf length (2.5–5.7 mm in *W. microphylla* vs. 7–80 mm in *W. pygmaea*) and rhizome indumentum (glabrous or with scattered arachnoid trichomes in *W. microphylla* vs. arachnoid-lanate in *W. pygmaea*).

The length of the arista is quite variable. Populations from central Peru have an up to 0.8 mm long aristate apex. However, individuals with a shorter arista or even rather apiculate leaves are common in the south of its distribution area.

Additional Specimens Examined. **BOLIVIA. Cochabamba:** cordillera del Tunari, por encima de la laguna de Huara-Huara, 17°17′S, 66°7′W, 17 Mar 1990, *G. Navarro 659* (BOLV [mixed with *W. pygmaea*]). **La Paz:** Murillo, valle de Zongo, ~15 km desde la cumbre, 7 Apr 1979, *S. G. Beck 1274* (LPB); Los Andes, del camino principal a Peñas, 43 km vía mina Fabulosa, laguna al pie del cerro Mullu Apacheta [Apachita], 16°4′S, 68°16′W, 18 Feb 1980, *S. G. Beck 2918* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas,

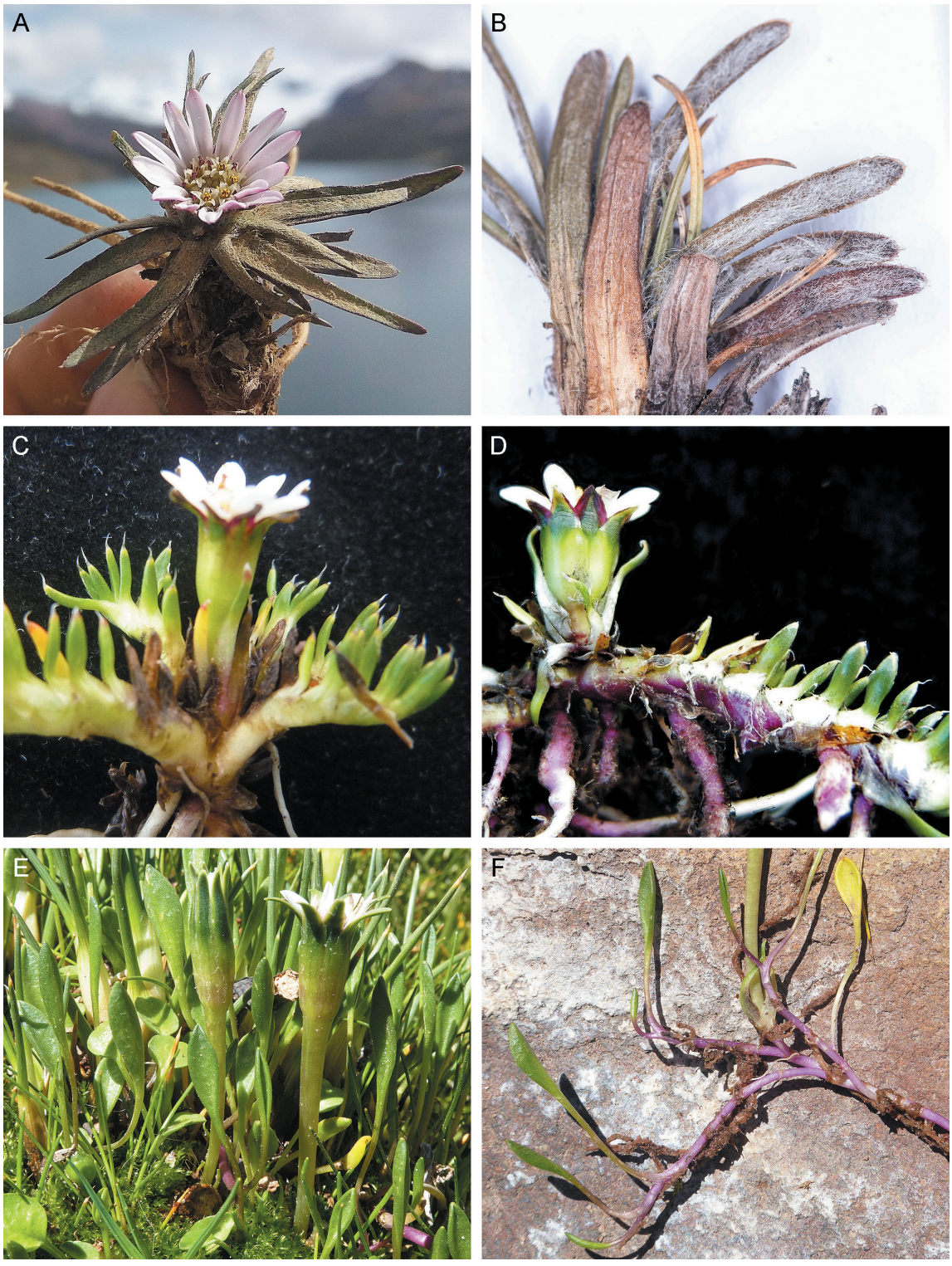

FIGURE 27. A, B. *Werneria lanatifolia*. A. Peru, Cusco, Sibinacocha (*R. I. Meneses et al. 6933*, LPB); photograph by Ariel Lliully. B. Bolivia, La Paz, Cañahuma (*A. P. Sandoval et al. 249*, LPB); photograph by Ana Sandoval. **C, D.** *Werneria microphylla*. Peru, Lima, Laraos (*H. Beltrán 2751*, USM); photographs by Hamilton Beltrán. **E, F.** *Werneria spathulata*. Chile, Antofagasta, Machuca (*J. Calvo 7920*, SGO); photographs by Joel Calvo.

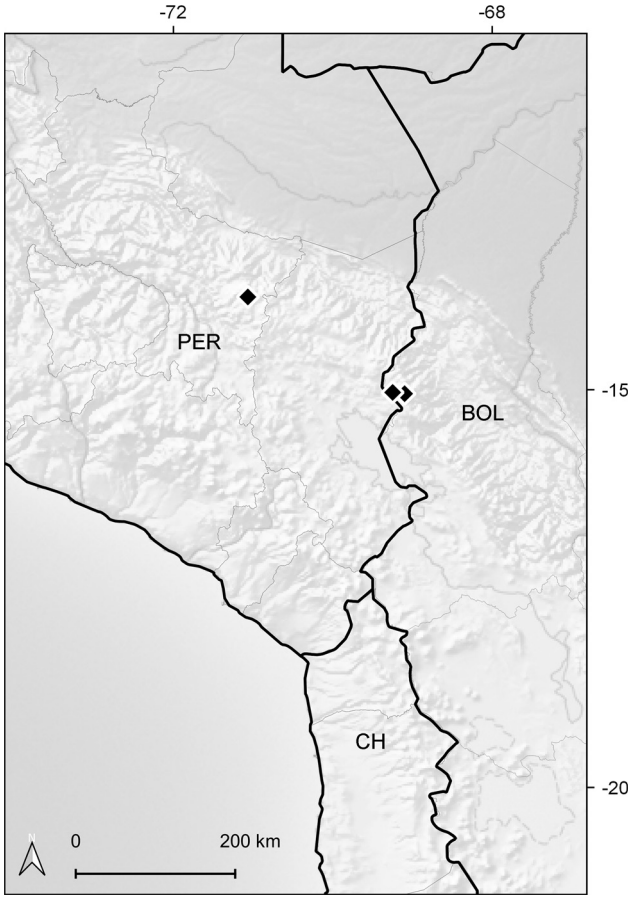

FIGURE 28. Distribution map of *Werneria lanatifolia*.

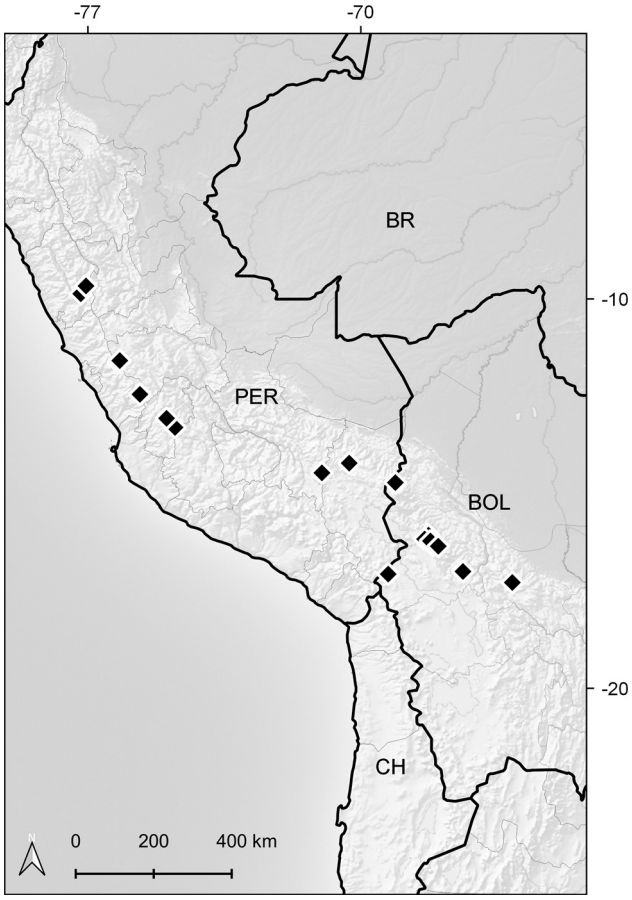

FIGURE 29. Distribution map of *Werneria microphylla*.

16°21′S, 68°1′W, Mar 1987, *S. Estenssoro 34* (LPB [mixed with *W. pygmaea*]); Murillo, al pie del Illimani, junto a la mina El Águila, 25 Feb 1979, *J. Fernández Casas 2736* (MA); Los Andes, an der Strabe zur Mine Fabulosa, westlich unterhalb der Pabhöhe, 10 Feb 1980, *T. Feuerer 8467b* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, entre paso Sánchez y Carcapampa, por el camino entre Pelechuco y Carcapampa (Queara Nuevo), 14°43′S, 69°7′W, 24 Feb 2008, *A. Fuentes, I. Jiménez, & J. Quisbert 11977* (LPB); Los Andes, Hichu-Kkota valley, 21 km from base of lgn. Khara Kkota along rd. to mina Fabulosa, near the pass, 16°10′S, 68°20′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11375* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lgn. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11409* (LPB [mixed with *W. pygmaea*]); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lgn. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11410* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lgn. Khara Kkota, crossroads of rd. to Tipuani and mina La Fabulosa, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11414* (LPB [mixed with *W. pygmaea*]); Murillo, de la cumbre hacia Kaluyo cerca del punto más alto, 16°19′S, 68°4′W, 10 Oct 1986, *E. García 881* (LPB); Loayza, río Thia Kkota ~4 km NW of Rodeo, ~15 km N of Caxata, 17°0′S, 67°23′W, 5 Dec 1987, *M. Lewis 871250* (LPB); Murillo, Milluni, a 18 km al NE de La Paz, 16°19′S, 68°9′W, 13 Jan 1996, *R. I. Meneses & J. Gonzáles 616* (LPB [mixed with *W. pygmaea*]); Omasuyos, Hichu Cota, después de la laguna Khara Khota, cerca al río Pauchintani, 16°10′S, 68°22′W, 14 Apr 1985, *M. Moraes 120* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1020* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1067* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1077* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1097* (LPB); Los Andes, por encima de la represa Condoriri, cerca

al glacial Condoriri, 27 Mar 2010, *T. Ortuño & A. P. Sandoval 994* (LPB); Los Andes, valle de Hichu Kkota, 17 Nov 1983, *C. Ostria 10* (LPB [mixed with *W. pygmaea*]); Inquisivi, cumbre en el camino entre Quime y la carretera La Paz–Oruro, pasando 1 km al N por el camino hacia una mina, 17°4′S, 69°18′W, 13 Mar 2003, *J. R. I. Wood & T. Ortuño 19329* (LPB).

PERU. Ancash: San Marcos, Ccolla Chica, 9°40′S, 77°3′W, 4 May 2008, *H. Beltrán 6475* (USM); Recuay, Huascarán N.P., pass between nevado Pasto Ruri and nevado Raria, río Pachacoto drainage, 9°52′S, 77°11′W, 31 Mar 1985, *D. N. Smith & F. Escalona 10179* (USM [mixed with *W. pygmaea*]). **Cusco:** La Raya, 14°28′S, 71°0′W, 22 Apr 1925, *F. W. Pennell 13495* (CONC). **Huancavelica:** Huachocolpa, alrededores de la unidad minera Caudalosa, 13°4′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3515* (USM); Huaytará, 7 km lineales al NE del abra Apacheta, en el límite entre Huancavelica y Ayacucho, 13°18′S, 74°46′W, 11 Apr 2005, *J. Roque 4806* (USM). **Lima:** Yauyos, Laraos, 12°27′S, 75°40′W, 8 Jul 1997, *H. Beltrán 2751* (USM); Yauyos, Laraos, Malpaso, 12°27′S, 75°40′W, 12 May 2001, *H. Beltrán 4202* (USM); Huarochirí, lago Aguascocha, near mina Caprichosa, above Casapalca, 11°38′S, 76°13′W, 1 Mar 1964, *P. C. Hutchison & O. Tovar 4263* (CONC, LE, USM). **Puno:** Melgar, quebrada Chuquisani, abajo de la laguna Estancococha, 14°13′S, 70°18′W, 16 Feb 2006, *J. Roque 4897* (USM).

15. ***Werneria nubigena*** Kunth, Nov. Gen. Sp. (folio ed.) 4: 151. 1818. *Werneria nubigena* var. *vulgaris* Wedd., Chlor. Andina 1: 80. 1856, *nom. inval.* (Turland et al., 2018, ICN Art. 26.2). Type. Ecuador. Chimborazo: Chimborazo [Volcano], [without date], *F. W. H. A. Humboldt & A. J. A. Bonpland 3191* (lectotype: P-00320184 [digital image!], **designated here**; isolectotypes: B-W-16428-01-0 [digital image!], F-972159 [fragment!], P-04319323 [digital image!]).

Werneria disticha Kunth, Nov. Gen. Sp. (folio ed.) 4: 151. 1818. *Werneria nubigena* var. *latifolia* Wedd., Chlor. Andina 1: 81. 1856. Type. Ecuador. Napo: Antisana, [without date], *F. W. H. A. Humboldt & A. J. A. Bonpland 2272* (lectotype: P-00320185 [digital image!], **designated here**; isolectotypes: B-W-16429-01-0 [digital image!], F-972227!, HAL-0113454 [digital image!], P-02088530 [digital image!], P-02088542 [digital image!]).

Oresigonia latifolia Willd. ex Less., Syn. Gen. Compos.: 393. 1832, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria mocinniana DC., Prodr. 6: 324. 1838 [“Mocinniana”]. Type. Art Accession Number 6331.0746, Catalogue of the Botanical Art Collection at the Hunt Institute (holotype).

Oribasia acaulis Moc., Sessé, & Cerv. ex DC., Prodr. 6: 324. 1838, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria stuebelii Hieron., Bot. Jahrb. Syst. 21(3): 362. 1895 [“Stuebelii”]. Type. Peru. Amazonas/San Martín: de Pacasmayo a Moyobamba, Challuayacu, 3,400 m, Apr/June 1875, *A. Stübel 55c* (B, destroyed; photo F0BN015823!). Neotype, **designated here**: Peru. Amazonas: Chachapoyas, North side of Diosan–Molinopampa pass, 3,300–3,350 m, 2 Aug 1962, *J. J. Wurdack 1551* (US-00622561!; isoneotype: USM-34133!).

Oresigonia grandiflora Willd. ex Rockh., Bot. Jahrb. Syst. 70: 301. 1939, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Rhizomatous herb, rosettiform to scapiform, forming lax clumps or solitary plants, 2.5–40 cm tall. **Rhizome** 5–9 cm long, 0.9–5 cm in diameter, oblique to vertical, covered with arachnoid-lanate indumentum. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes, sometimes subdistichously arranged; leaf lamina linear, 20–360 mm long, 2–22 mm wide, entire, obtuse at the apex, not narrowed at the base, flat in cross section (rarely slightly curved forwards), glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile to pedunculate; peduncle up to 290 mm long, glabrescent to densely arachnoid, bearing linear bracts (rather foliose bracts in large plants). **Involucre** broadly cupuliform, with bracts fused at the base (sometimes strongly partite), 10–35 mm long, 6.4–29 mm wide, glabrous; involucral bracts 12–27, 6.7–30 mm long, 1.7–5.5 mm wide at the base, acute, rarely obtuse at the apex, greenish; supplementary bracts absent. **Ray florets** (12–)16–21(–27); corollas (13.7–)27–34(–55) mm long, (1.9–)3.5–4.8(–6.6) mm wide, 4–10-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, usually purplish beneath. **Disc florets** (49–)76–226(–~400); corollas 5.6–13.1 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellow. **Achenes** 3.3–4.6 mm long, ~1 mm wide, cylindrical, ~10-ribbed, glabrous, with scattered trichomes, or with dense, white villous trichomes 0.5–1.5 mm long; pappus 5.1–14.7 mm long, barbellate, whitish. Chromosome number $2n = 212(\pm 8)$ (Diers, 1961); $n = 50$ (Beaman and Turner, 1962; Turner et al., 1967) (Figures 30, 31, 32, 33).

Additional Iconography. Kunth (1818: plate 369, sub *W. disticha*); Weddell (1856: pl. 16C); Funk (1997c: 30, fig. 2A,B); Freire and Ariza-Espinar (2014: 223, *W. pumila* A–H); Beltrán (2017: 61, fig. 3F, as photo).

Distribution and Habitat. Argentina (Jujuy, Salta), Bolivia (Chuquisaca, Cochabamba, La Paz, Potosí [expected], Tarija), Costa Rica [n.v.], Ecuador (Azuay, Bolívar, Cañar, Carchi [n.v.], Chimborazo, Cotopaxi, El Oro, Imbabura, Loja, Napo, Pichincha, Tungurahua, Zamora-Chinchipe), Guatemala (Huehuetenango, Quetzaltenango, San Marcos), Mexico (Chiapas), Panama (Bocas del Toro), Peru (Amazonas, Ancash, Apurímac, Arequipa, Ayacucho, Cajamarca, Cusco, Huancavelica, Huánuco, Junín, La Libertad, Lambayeque, Lima, Moquegua, Pasco, Piura, Puno, San Martín). It grows in meadows, grasslands, boggy areas, rocky slopes, and exposed places of the paramo and puna ecoregions, as well as in the highlands of the Central American montane forests, between elevations of 2,400 and 5,025 m (Figure 34).

Phenology. Flowering all year round.

Etymology. The adjective *nubigenus, -a, -um* means cloud born, probably referring to the fact that it was collected on the Chimborazo Volcano, which was considered to be the world’s highest mountain in Humboldt’s time.

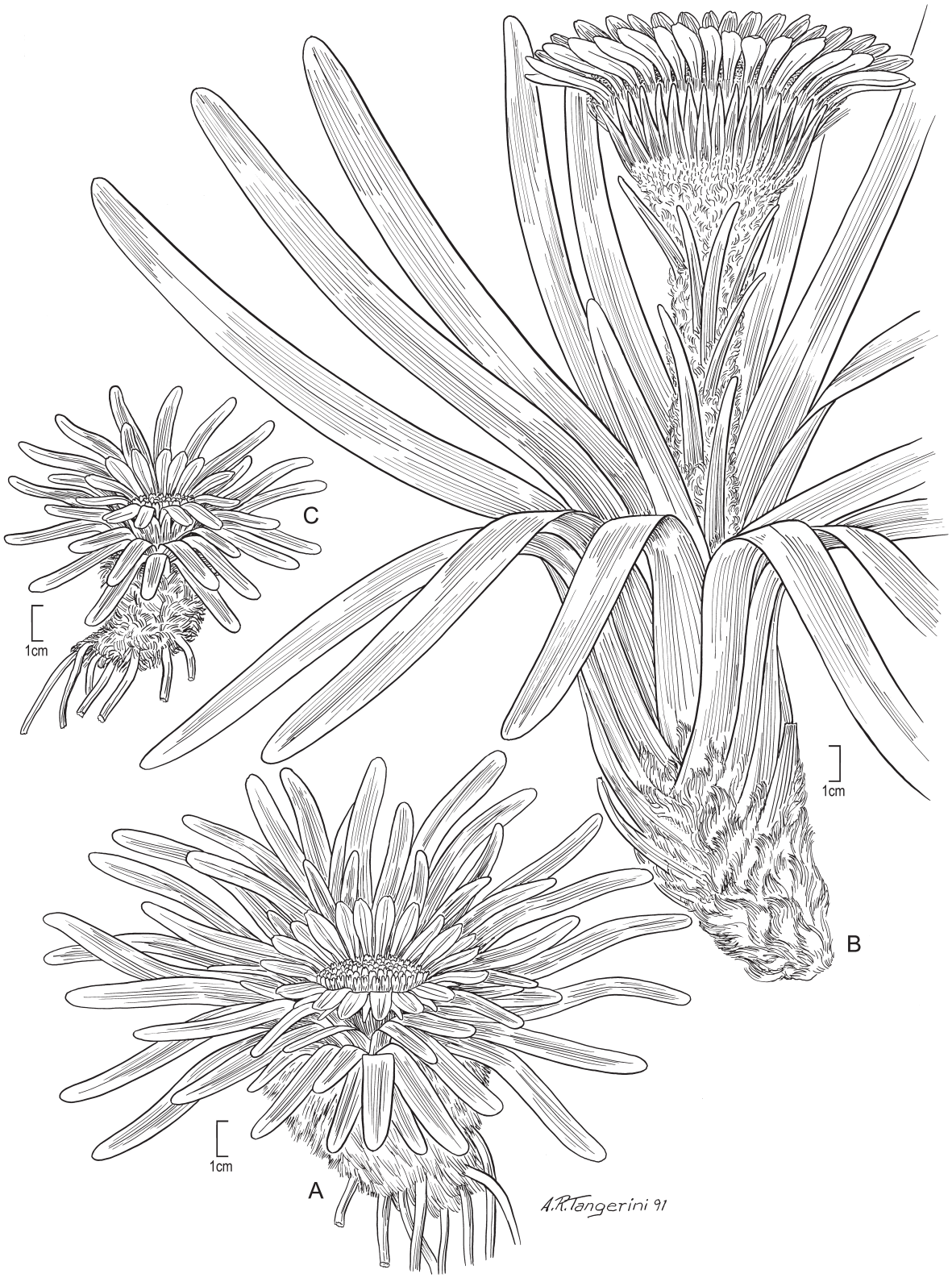

FIGURE 30. *Werneria nubigena*. **A–C.** Habit. A is drawn from *E. K. Balls 5854* (US), B is drawn from *J. J. Wurdack 1551* (US), and C is drawn from *J. D. Boeke 1951* (US). Illustration by Alice Tangerini.

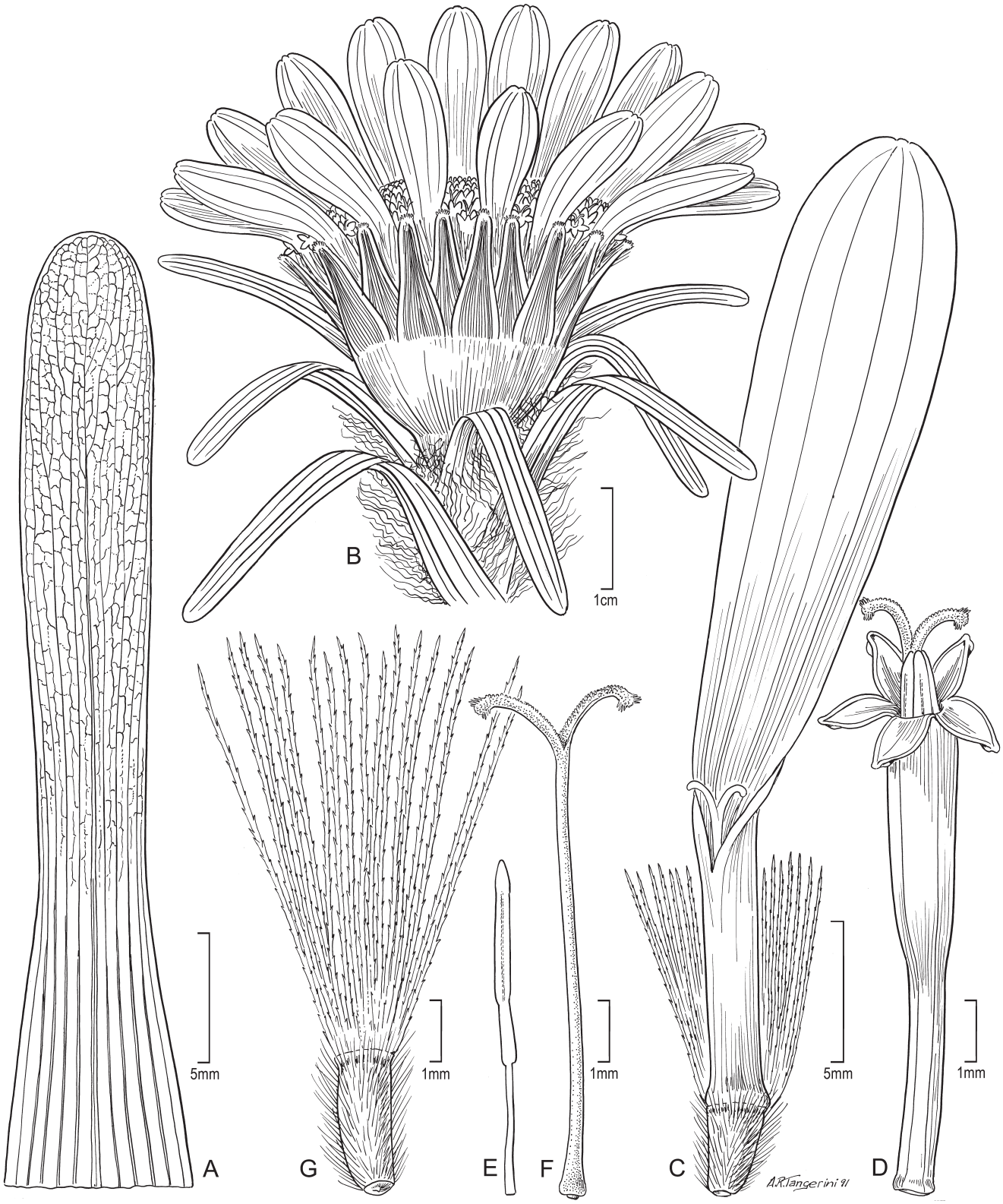

FIGURE 31. *Werneria nubigena*. **A.** Leaf. **B.** Capitulum. **C.** Ray floret (frontward bristles removed). **D.** Disc floret (ovary and pappus removed). **E.** Stamen. **F.** Style. **G.** Achene with pappus. All details are drawn from *E. K. Balls 5854* (US). Illustration by Alice Tangerini.

FIGURE 32. *Werneria nubigena*. **A.** Ecuador, Napo, Oyacachi (not collected). **B.** Ecuador, Pichincha, volcán Guagua Pichincha (not collected). **C.** Peru, Moquegua, Querala (*D. Montesinos & J. Calvo 5929*, HSP). **D.** Bolivia, La Paz, between Escoma and Charazani (*J. Calvo & K. Escobar 7850*, LPB). **E.** Bolivia, Chuquisaca, Chataquila (*J. Calvo 7889*, HSB). **F.** Ecuador, Azuay, Cajas (not collected). Photographs by Joel Calvo.

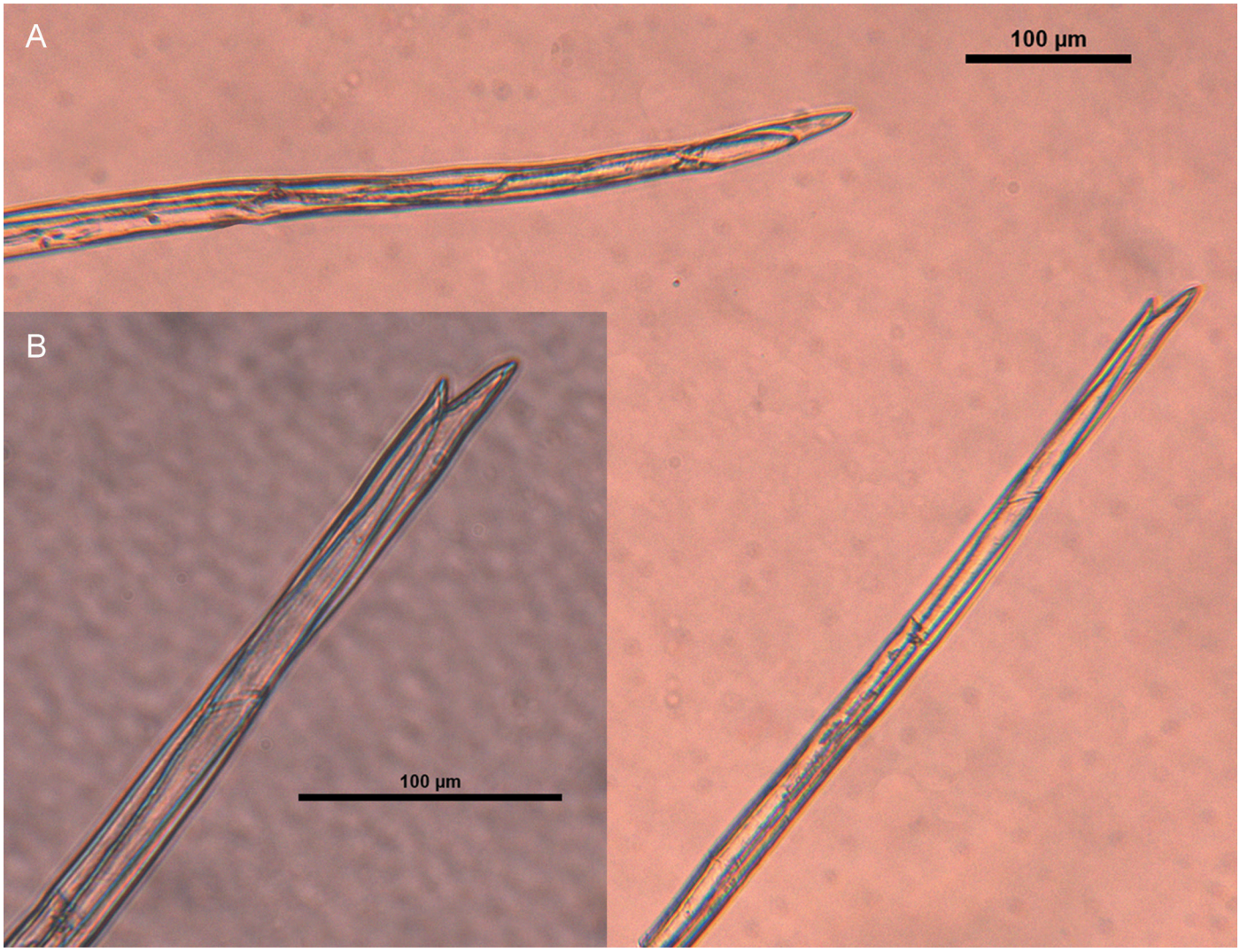

FIGURE 33. *Werneria nubigena*. **A.** Achene trichomes (10× Standard 16WL). **B.** Apex of achene trichome (20× Standard 16WL). Material taken from *F. W. Pennell 14106* (US).

NOTES. *Werneria nubigena* is a greatly variable species distributed from the Tacaná Volcano in southern Chiapas (Mexico) to northwestern Argentina, although strikingly absent in the paramos of Colombia. In Central America it is known only from the paramos at the border between Panama and Costa Rica and from the mountainous complex of northwestern Guatemala and its proximity (Sierra de los Cuchumatanes, Tajumulco, Tacaná).

This species was described from specimens collected on the Chimborazo Volcano in Ecuador. The original material shows acaulescent plants with a tough rhizome covered with an arachnoid-lanate indumentum, linear, flat leaves that are 40–60 mm long and 3–4 mm wide and clearly obtuse at the apex, 18–21 involucral bracts that are fused at the base, white ray corollas that greatly surpass the involucre, and dense white villous achenes (composed of twin filiform trichomes with an acute to subacute, asymmetrical, usually forked apex; Figure 33). These typical forms mainly occur in the northern part of its distribution area.

Some Peruvian populations from Ancash, Cajamarca, Huánuco, and San Martín are characterized by very large, scapiform plants with leaves up to 360 mm long and 22 mm wide, an involucre with ~27 involucral bracts that are barely fused at the base, and glabrous achenes. They were described as *W. stuebelii* Hieron. with material that was likely collected in the paramos of the southern Amazonas Department, on the way to Moyobamba according to the *indicatio locotipica*. From this region (surroundings of Chachapoyas), we also studied smaller

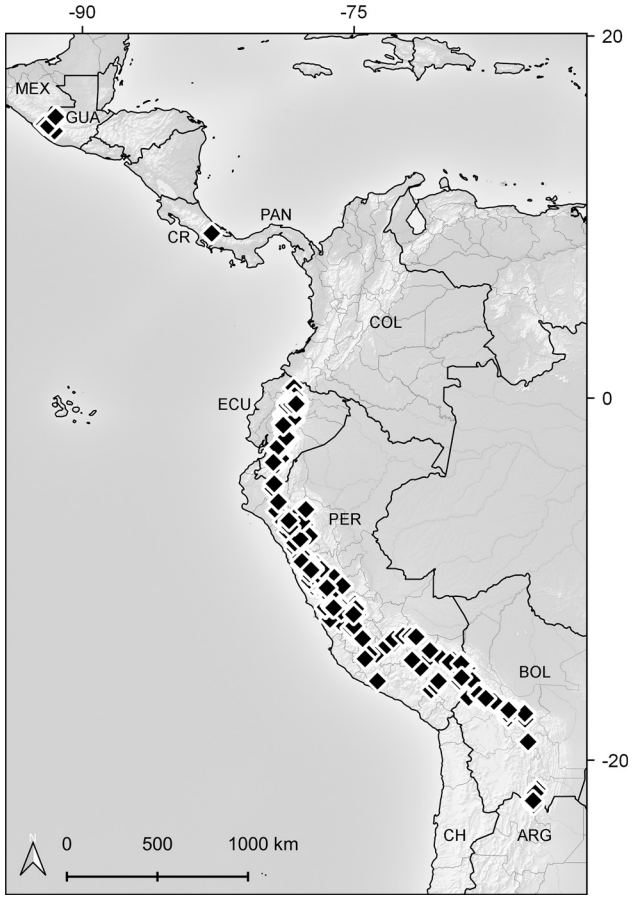

FIGURE 34. Distribution map of *Werneria nubigena*.

plants displaying a pedunculate capitulum (e.g., *Wurdack 1149*, US, USM) and acaulescent plants very similar to the typical forms (e.g., *Fernández et al. 53*, USM; *Pennell 15665*, USM). The large forms also co-occur with the typical ones in Pachitea (southern Huánuco), Ancash, and Cajamarca. A clear example can be found in *Fosberg 28115* (collected in Celendín, Cajamarca), which consists of two duplicates containing both morphologies. Cuatrecasas (*in sched.*) identified the duplicate at US as *W. nubigena* (renumbered "28115a") and the duplicate at COL as *W. stuebelii*. Whereas most specimens of *W. stuebelii* from southern Amazonas have glabrous achenes, the mentioned large forms from Pachitea have pilose achenes similar to the typical forms. From Ancash, we also studied large specimens displaying pilose achenes (e.g., *Pérez 17*, USM) or having achenes covered with scattered trichomes (*Ferreyra 14528*, USM). The recognition of *W. stuebelii* is not, therefore, recommended because of the existence of a continuum of intermediate morphologies and because the different forms lack a defined distribution pattern. In this line, Rockhausen (1939) stated that *W. stuebelii* should be considered a particular variation of *W. nubigena*.

On the other hand, plants remarkably smaller than the typical forms, scapiform or acaulescent, are frequent from Ancash in Peru to northern Argentina. In Huancavelica and Puno, some of these small plants have pilose achenes (e.g., *Gonzáles 3481*, USM; *Roque 4856*, USM), but individuals with glabrous achenes are also found in Lima (*Cerrate et al. 4803*, USM) and Puno (e.g., *Mondragón & Postigo 60*, USM; *Funk et al. 13190*, US, USM). These examples demonstrate that the different morphologies of *W. nubigena* have a puzzling distribution.

Plants from southern Bolivia and northwestern Argentina (e.g., *Bastián 338*, LPB, US; *Calvo 7889*, HSB; *Meyer 4663* and *4665*, LIL) are characterized by leaves that are curved forward and barely obtuse at the apex and by a pedunculate capitulum. In Argentina, they have been misidentified as *W. pumila* (Freire and Ariza- Espinar, 2014) and may also be confused with *W. villosa* (see comments under that species). *Werneria nubigena* differs from *W. pumila* in having white ray corollas, leaves that are not papillose, and the absence of supplementary bracts. Moreover, their distribution areas overlap only in Ecuador and northern Peru (see further comments under the latter species).

Our morphological study of 475 collections of *W. nubigena* did not reveal any character that supports the recognition of infraspecific entities. There are, indeed, regions where certain character states are common; however, the intermediate forms that occur throughout its distribution area make their delimitation unworkable. On this basis, we consider *W. nubigena* a highly variable species.

The only original material cited in the protologue of *W. mocinniana* is an illustration made during the Royal Botanical Expedition to New Spain (1787–1803) headed by Martín Sessé y Lacasta and José Mariano Mociño. It was obtained by Candolle (along with other illustrations) and served to describe the species as indicated in the protologue "v. ic. pict." (pictorial icon seen). There is no reason to think that it was not the single element upon which the description was based, and therefore, it is considered the holotype. The illustration is kept at the Hunt Institute for Botanical Documentation.

Since the original material of *W. stuebelii* at B was destroyed in 1943, a neotype from a nearby area has been designated (US-00622561). A duplicate is kept at USM.

Additional Specimens Examined. **ARGENTINA. Jujuy:** Lizoite a Cajas, 22°13′S, 65°14′W, 4 Feb 1943, *T. Meyer 4663* (LIL). **Salta:** Santa Victoria, de Nazareno a abra de Fundición, ruta prov. 145, 22°28′S, 65°6′W, 17 Feb 2009, *F. Zuloaga et al. 10879* (SI); Lizoite a Rodeopampa, 22°14′S, 65°7′W, 4 Feb 1943, *T. Meyer 4665* (LIL); Sta. Victoria, "Mal Paso" hasta Rodeopampa, 22°16′S, 65°5′W, 3 Feb 1953, *H. Sleumer 3728* (LIL).

BOLIVIA. Chuquisaca: Sucre, Punilla, Chataquila, proximidades de la ermita, 18°59′S, 65°24′W, 26 Feb 2019, *J. Calvo 7889* (HSB); cerro Chataquila (Punilla-Chanauca), 18°59′S, 65°24′W, 27 Feb 1994, *J. R. I. Wood 8046* (LPB). **Cochabamba:** Cercado, cuenca Taquiña, Linkupata, 17°18′S, 66°11′W, 31 Jan 1995, *M. Atahuachi 499* (BOLV); Ayopaya, cuenca río Tambillo,

estancia Pajchanti, 17°3′S, 66°50′W, 8 May 1989, *R. Baar 388* (LPB); Ayopaya, Piusilla, cerca del lago Jusaq, 17°13′S, 66°26′W, 7 Mar 2012, *I. Bustamante & E. Melgarejo 176* (BOLV); Ayopaya, Piusilla, cercano al camino Quillacollo–Morochata, 17°14′S, 66°23′W, 5 Mar 2012, *I. Bustamante & E. Melgarejo 93* (BOLV); Quillacollo, 41 km camino a San Miguel, 15 Mar 1984, *J. M. Canne & G. S. Varadarajav 2742* (LPB); Chapare, Incachaca, 17°14′S, 66°28′W, 25 Jan 1958, *J. Cañigueral 1032* (LPB); Mizque, Sacha Loma, al NW de Mizque, subiendo por el camino bordeando la planicie, 17°44′S, 65°34′W, 7 Feb 2003, *E. Gutiérrez, N. Dakduki, & J. Terán 139* (BOLV); Mizque, localidad de Sacha Loma, 17°44′S, 65°34′W, 17 Mar 2000, *M. Mercado 2309* (BOLV); cordillera del Tunari, zona de Tahua Cruz, en el camino a Morochata, 18 Feb 1990, *G. Navarro 580* (BOLV); cordillera del Tunari, laderas sobre laguna de Huara-Huara, 17°17′S, 66°7′W, 16 Feb 1990, *G. Navarro 590* (BOLV); cordillera del Tunari, proximidades de las orillas de la laguna de Huara-Huara, 17°17′S, 66°7′W, 15 Feb 1990, *G. Navarro 609* (BOLV); Quillacollo, area just below laguna Irilla Torrini and above the road between Morochata and estancia Caliente, 17°12′S, 66°22′W, 27 Jan 1996, *N. Ritter & J. R. I. Wood 2838* (BOLV, LPB); Arque, camino a Oruro, entrando por el km 86, camino a Huancani, canteras de Sayari, 17°41′S, 66°30′W, 10 Mar 1992, *P. Rojas 1178* (BOLV); Quillacollo, camino que vincula Quillacollo–San Miguel–Jankho K'ala a 29.7 km, 17°26′S, 66°35′W, 29 Jan 2007, *B. Soto, B. Soto, & A. Dávalos 87* (BOLV); Tiraque, Toralapa, a 50 km aproximadamente sobre la carretera antigua Cbba–Santa Cruz, 17°25′S, 65°35′W, 19 Feb 2008, *N. Vargas et al. 604* (BOLV, LPB); Tiraque, ~40 km along old Chapare road (1–2 km NE of summit) from main Cochabamba to Chapare highway, 18 Apr 1998, *J. R. I. Wood 13550* (BOLV, HSB, LPB); Tiraque, P.N. Carrasco, cordillera El Ronco, 17°19′S, 65°41′W, 16 Mar 2001, *M. Zárate & D. Méndez 1018* (BOLV, LPB); Quillacollo, cuenca Taquiña, 17°18′S, 66°10′W, 21 Jan 2006, *M. Zárate & M. Morales 2117* (BOLV, LPB); Quillacollo, cordillera alta del Tunari, subiendo por el sendero al Jalsuri, al norte de la represa, 17°15′S, 66°23′W, 10 Mar 2011, *M. Zárate & N. Vargas 3774* (BOLV). **La Paz:** Franz Tamayo, Ulla Ulla, 15°2′S, 69°15′W, 3 May 1980, *C. Barcena 1007* (LPB); Murillo, de la casa 16 km hacia Palca, desvío a Tacapaya, 3 Jan 1990, *S. G. Beck 17417* (LPB); Murillo, al NW de La Paz unos 6 km arriba del lago Challapata, 28 Dec 1990, *S. G. Beck 17898* (LPB); Murillo, subiendo el valle de Irpavi, entrando al valle lateral del río Palcoma, hacia las serranías Nurillo, cerca la laguna Jachcha Khasiri, 16°27′S, 67°58′W, 15 Feb 1999, *S. G. Beck 22935* (LPB); Murillo, La Paz–Alto 5 km hacia Chacaltaya, 16°27′S, 68°9′W, 7 Mar 1980, *S. G. Beck 2937* (LPB); Franz Tamayo, cerro Socondori (Bajo), 15°0′S, 69°13′W, 5 Dec 2007, *S. G. Beck 32559* (LPB); Los Andes, 42 km NNW línea recta de La Paz, alrededor de la abandonada Agencia Palcoco, 25 Jan 1981, *S. G. Beck 4314* (LPB); Murillo, 40 km NNE línea recta de La Paz, valle de Zongo, 15 Feb 1981, *S. G. Beck 6142* (LPB); Murillo, La Paz–Calacoto 64 km hacia el nevado Illimani, sobre el pueblo de Pinaya, pie del Illimani, 16°41′S, 67°48′W, 19 Jan 1983, *S. G. Beck 9090* (LPB); Camacho, entre Escoma y Charazani, pasado el cruce de Humanata, 15°26′S, 69°4′W, 9 Feb 2019, *J. Calvo & K. Escobar 7850* (LPB); Chacaltaya, 16°21′S, 68°6′W, 11 Jan 1958, *J. Cañigueral 991* (LPB); Larecaja, Mapiri trail (trek from Ingenio to Mapiri), 15°36′S, 68°29′W, 20 Jul 2002, *J. L. Clark & D. Barrientos 6628* (LPB); José M. Camacho, G. V. Puni, Waraq'uy Pata, 15°38′S, 69°10′W, 4 Mar 2006, *S. Cocarico 579* (LPB); Ingavi, Achaca, Kimsachata, 16°32′S, 68°41′W, 6 Mar 2004, *S. Cocarico 82* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 2 Feb 1983, *D. K. de Ávila 29* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 22 Oct 1982, *D. K. de Ávila 31* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 2 Feb 1983, *D. K. de Ávila 43b* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 333* (LPB); Omasuyos, collado entre Achacachi y Sorata, 15°52′S, 68°38′W, 6 Mar 1982, *J. Fernández Casas & J. Molero 6490* (MA); Bautista Saavedra, Charazani-Tal, am Weg von Chununa nach Chari, seitlich oberhalb Chari, 30 Mar 1982, *T. Feuerer 11003b* (LPB); Bautista Saavedra, am Horizontalweg von Chullina nach Wayrapata, 9 May 1982, *T. Feuerer 11501* (LPB); Murillo, Zongo-Tal, an der Strabe oberhalb des Viscachani-Sees, 1 Jun 1980, *T. Feuerer 4319* (LPB); Bautista Saavedra, Umgebung von Curva, am Weg von Canizaya zum Chochojasee, 13 Jun 1980, *T. Feuerer 4435* (LPB); vallée de Zongo, après la cumbre (7 km), 16°11′S, 68°8′W, 8 Apr 1987, *A. Fournet 756* (BOLV, LPB); Franz Tamayo, P.N. Madidi, Queara, Lampayani Alto, 14°40′S, 69°6′W, 14 Apr 2008, *A. Fuentes, M. P. Paco, & R. Canaza 12526* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, cerro antes de llegar a laguna Waca Cocha, al SE de Keara Bajo, 14°43′S, 69°4′W, 18 Jun 2005, *A. Fuentes et al. 8356* (LPB); Franz Tamayo, P.N. Madidi, entre Keara y Mojos, 14°40′S, 68°59′W, 24 Jun 2005, *A. Fuentes et al. 8668A* (LPB); Murillo, Zongo valley, 15 km N of cumbre, around lgn. Viscachani, 16°11′S, 68°7′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11313* (LPB); Murillo, 7.3 km NE of la cumbre (pass) on rd. to Unduavi, and 8 km W of Pongo, on N side of rd., 16°19′S, 68°1′W, 15 Apr 1995, *V. A. Funk 11338* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11387* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11390* (LPB); Murillo, camino la cumbre-Chacaltaya, camino a antigua estación desvío del asfalto, 16°24′S, 68°10′W, 22 Feb 1986, *E. García et al. 702* (LPB); Murillo, valle de Zongo, laguna Viscachani, 16°11′S, 68°7′W, 7 Jun 1993, *T. Killeen 5472* (LPB); Murillo, Zongo, represa, 16°16′S, 68°7′W, 28 Mar 1975, *R. Lara 1443* (LPB); Inquisivi, on the slope above the Pavionani Fork of the río Chumi below the headwaters divide with the río Janko Kalani, 7 km N of Choquetanga, 16°48′S, 67°18′W, 8 Apr 1991, *M. Lewis 38506* (LPB); Inquisivi, upper part of the río Jancha Kaihua, opposite side of headwaters of the río Chekha, 1 km NW of laguna Huara Huarani, 11 km NNW of Choquetanga, 16°45′S, 67°17′W, 8 Sep 1991, *M. Lewis 39979* (LPB);

Murillo, valle de La Paz, Putupampa, 16°31′S, 68°0′W, 19 Jan 1995, *R. López & A. López 127* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, Juchuy Queñua a medio día de Laji Sorapata, 14°55′S, 68°47′W, 16 Apr 2009, *I. Loza et al. 810* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, Juchuy Queñua a medio día de Laji Sorapata, 14°55′S, 68°47′W, 16 Apr 2009, *I. Loza et al. 880* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, frente a Pallalani, 14°53′S, 68°57′W, 4 Apr 2009, *I. Loza et al. 953* (LPB); Larecaja, ~23 km above (N of) Sorata, along rd. toward Consata, 15°45′S, 68°39′W, 24 May 1990, *J. L. Luteyn & L. J. Dorr 13779* (LPB); Franz Tamayo, senda Pelechuco–Mojos, a 10 min. antes de Tambo Quemado, sobre senda Pelechuco–Mojos, 14°41′S, 68°58′W, 6 May 2003, *C. Maldonado, M. Calzadilla, & L. Cama 3330* (LPB); Franz Tamayo, senda Pelechuco–Mojos, a 45 min. antes de Tambo Quemado, hacia derecha de senda Pelechuco–Mojos, 14°41′S, 68°59′W, 9 May 2003, *C. Maldonado, M. Calzadilla, & L. Cama 3345* (LPB); Larecaja, viciniis Sorata, montem Illampu, pampa de Chiliata, 15°42′S, 68°35′W, 1858, *G. Mandon 85* (RB); Murillo, Milluni, bajando de la laguna Ventanani, 16°19′S, 68°9′W, 24 Apr 1995, *R. I. Meneses 102* (LPB); Murillo, Milluni, a 18 km NE de La Paz, a un costado de la laguna Ventanani, 16°19′S, 68°9′W, 20 Apr 1995, *R. I. Meneses 34* (LPB); Murillo, Milluni, a 18 km al NE de La Paz, 16°19′S, 68°9′W, 6 Jan 1996, *R. I. Meneses & J. Gonzáles 542* (LPB); Murillo, Milluni, a 18 km al NE de La Paz, 16°19′S, 68°9′W, 9 Feb 1996, *R. I. Meneses 579* (LPB); Bautista Saavedra, cerca de la carretera nueva de Cotapampa a Ulla Ulla, cerro Piñita, 9 Jan 1983, *X. Menhofer 1783* (LPB, US); Camacho Pacobamba, 29 Mar 1983, *X. Menhofer 2125* (LPB); Bautista Saavedra, punto más elevado en el camino de Jatichulaya a Huayrapata, 15°14′S, 69°2′W, 28 Apr 1983, *X. Menhofer 2172* (LPB); Murillo, Alto Kaluyo, 16°19′S, 68°4′W, 13 Jan 1986, *M. Moraes 716* (LPB); Murillo, pasando estancia Kaluyo, 16°19′S, 68°4′W, 19 Jan 1986, *M. Moraes 745* (LPB); Sud Yungas, Lambate, 5 km al E de la comunidad Chuñavi, 16°33′S, 67°39′W, 17 Jun 1997, *A. Núñez 4* (LPB); Los Andes, valle de Hichu Kkota, 3 Mar 1985, *C. Ostria 318* (LPB); Franz Tamayo, bosque de Chuñuni, cerca de la comunidad de Queara, 14°41′S, 69°5′W, 21 Jul 2006, *A. Palabral et al. 416* (LPB); Sud Yungas, Lambate, Chillkani, 16°35′S, 67°44′W, 1 May 1994, *L. Pizarro 104* (LPB); Franz Tamayo, Apolobamba, entre la comunidad de Puina y cerro K'akepununa, 14°36′S, 69°5′W, 11 Apr 2008, *J. Quisbert et al. 823* (LPB, MA); Franz Tamayo, al W de Pelechuco, en la región de Huatha Chica, 14°47′S, 69°0′W, 8 Jul 2002, *N. R. Quispe & N. Sanjines 20B* (LPB); Franz Tamayo, al W de Pelechuco, en la región de Huatha Chica, 14°47′S, 69°0′W, 8 Jul 2002, *N. R. Quispe & N. Sanjines 28* (LPB); Murillo, 2.7 km SW of pass at head of valle del Zongo, 16°18′S, 68°9′W, 15 Mar 1984, *J. C. Solomon, B. Stein, & M. Uehling 11798* (LPB); Murillo, 3.4 km N of Milluni on road to Zongo, 16°18′S, 68°7′W, 25 Apr 1985, *J. C. Solomon & M. Moraes 13451* (LPB); Murillo, valle del río Zongo, 11 km al N de la cumbre, 16°13′S, 68°7′W, 8 Mar 1987, *J. C. Solomon 16303* (BOLV, LPB); Murillo, valle del río Zongo, 14.8 km al N de la cumbre, arriba de laguna Viscachani, 16°12′S, 68°7′W, 11 Apr 1987, *J. C. Solomon et al. 16508* (LPB); Murillo, mina Lourdes, 2.7 km al N del camino entre La Paz y Unduavi, a lo largo del río Kkota khuchu (~14 km al E de la cumbre), 16°18′S, 67°58′W, 25 Apr 1987, *J. C. Solomon & R. Chevalier 16579* (LPB); Sud Yungas, oberhalb Ventilla, jenseits des Abra am Camino del Inca, 6 Apr 1987, *S. Stab B63* (LPB); Murillo, camino a la cumbre, lado derecho, laguna Ajlan Khota, 4 Feb 1988, *E. Valenzuela 1040* (LPB); Murillo, camino a Alto Chacaltaya, 200 m entrando hacia el camino de la comp. minera Kellguani, 21 Dec 1986, *E. Valenzuela 915* (LPB); Murillo, La Cumbre, a 700 m del camino asfaltado, 25 Feb 1987, *E. Valenzuela 990* (LPB); Franz Tamayo, Pelechuco, Puina, al SE en línea recta 3.3 km de la laguna Celeste, 14°35′S, 69°42′W, 5 Sep 2015, *F. Zenteno, B. Miranda, & F. Flores 15095* (LPB); Franz Tamayo, Pelechuco-población Puina, al ESE en línea recta a 8.5 km del poblado de Puina en el sector de Wayna, 14°37′S, 69°2′W, 17 Oct 2016, *F. Zenteno et al. 19166A* (LPB); Franz Tamayo, Supay kocha, al NE en línea recta a 1.7 km del poblado de Keara, 14°41′S, 69°5′W, 3 Jan 2017, *F. Zenteno et al. 19664* (LPB); Franz Tamayo, Pelechuco, al NE en línea recta a 1.2 km del campamento Chocollo, 14°44′S, 69°13′W, 23 Nov 2017, *F. Zenteno, D. Villalba, & L. Mamani 21240* (LPB). **Tarija:** Cercado, cerca Tucumillas, cuesta de Sama, 21°36′S, 64°54′W, 4 Jan 1986, *E. Bastián 338* (LPB, US); José María Avilés, abra de Turcamarca, 21°49′S, 65°0′W, 22 Apr 2000, *S. G. Beck & N. Paniagua 27345* (LPB).

ECUADOR. Azuay: Cuenca, área nacional de recreación Cajas, laguna Toreadora, 2°48′S, 79°8′W, 10 Oct 1995, *M. Alexander 12* (QCNE); Cuenca–Molleturo, camino a la Luspa, 2°47′S, 79°15′W, 23 Apr 2014, *R. Ansaloni 209* (HA); Río Blanco, quebrada de Yantahuaico, 2°49′S, 79°21′W, 9 May 2001, *T. Calle & D. Minga 55* (HA); Cajas, la Toreadora, 2°49′S, 79°11′W, 28 Jun 1993, *J. Carrasco 4* (HA); Cuenca, área nacional de recreación Cajas, along río Patul from the comunidad Baute/laguna Patul (watershed of río Patul), 2°42′S, 79°13′W, 5 Feb 2001, *J. L. Clark, J. García, & W. García 6222* (QCNE); Ayaloma, páramos de Nabón, cerca de las antenas militares, 3°20′S, 79°3′W, 16 Nov 2000, *L. Endara & M. Nonhebel 529* (QCA); 8 km W of Soldados, near laguna Estrellas Cocha, 2°54′S, 79°15′W, 24 Oct 1995, *V. Funk & X. Montezuma 11439* (HA, QCA); P.N. Cajas, road Cuenca–Sayausí–Molleturo, km 38.4, from the pass to the top of ridge north of pass, 2°46′S, 79°14′W, 4 Jan 2000, *P. Jørgensen, C. Ulloa, & E. Narváez 2110* (HA); Cajas, laguna Toreadora, 2°43′S, 79°12′W, 9 Sep 1983, *B. B. Larsen & B. Eriksen 45060* (QCA, QCNE); Cuenca, Sayausí, Tres Cruces, 2°46′S, 79°14′W, 13 Oct 2017, *D. Minga, M. Jiménez, & N. Guzmán 3241* (HA); P.N. Cajas, junto a laguna Caballo Shayana, 2°47′S, 79°12′W, 27 Aug 2016, *A. M. Ormaza et al. 21* (HA); área nacional de recreación Cajas, laguna Toreadora, 2°50′S, 79°15′W, 5 Aug 1985, *P. M. Ramsay et al. 19* (QCNE); Nabón, Gañadel, 3°13′S, 79°2′W, 27 Sep 2007, *K. Rivas 11PC* (HA); Cajas, 2°46′S, 79°14′W, 24 Jun 1999,

M. Smeets & M. Lind van Wijngaarden 395 (QCA); P.N. Cajas, km 28 redondel Cuenca–Molleturo, sendero laguna Patoquinoas, 2°47′S, 79°12′W, 10 Jan 2003, *C. Ulloa, P. Jørgensen, & X. Clavijo 1106* (HA); Octavio Cordero, sector Parcarco, 2°45′S, 78°59′W, 25 May 2006, *A. Verdugo & D. Minga 1356* (HA). **Bolívar:** Guaranda, volcán Chimborazo, 1°30′S, 78°55′W, 22 Oct 2000, *S. Ickert-Bond & R. Bond 1106* (QCNE); Guaranda, subcuenca del río Chimbo, cerro Tililag, 1°36′S, 78°52′W, 23 Jan 1982, *V. Pasaca 1399* (LOJA); volcán Chimborazo, W side of the mountain, ~4 km from the road Ambato–Guaranda, 1°28′S, 78°48′W, 13 Sep 1995, *P. Sklenář & V. Sklenářová 127-3* (QCA); Guaranda, reserva de producción faunística Chimborazo, Guanujo–El Sinche, 1°23′S, 78°58′W, 26 Mar 1992, *H. Vargas & M. Villacís 2* (QCNE). **Cañar:** nudo entre Cordillera Occidental y Cordillera Oriental, entre Cañar y Biblián, 2°37′S, 78°54′W, 8 Aug 1959, *H. G. Barclay & P. Juajibioy 8708* (COL); S of Cañar, dirt road on E slope of cerro Buerán (branching W from panamericana hwy. near microwave tower), 2°36′S, 78°55′W, 13 May 1971, *B. MacBryde 250* (QCA); 14.2 km N of Biblián on panamericana hwy., 2°37′S, 78°54′W, 17 May 1971, *B. MacBryde 279* (QCA). **Chimborazo:** Chimborazo, Urbina, 1°29′S, 78°44′W, 1 Apr 1939, *E. K. Balls 5854* (US); Guamote, lagunas Ozogoche, 2°10′S, 78°45′W, 17 Nov 2003, *M. Buenaño, L. Mejía, & C. Prado 6222* (QCNE); Alausí, laguna de Ozogoche, 2°13′S, 78°37′W, 10 Jul 2013, *J. Caranqui 2462* (QCA); Alausí, laguna de Ozogoche, alrededores y tramo hasta Totorillas, 2°8′S, 78°42′W, 25 Feb 2002, *J. Caranqui, M. Melampy, & J. Lara 486* (QCNE); frente al volcán Chimborazo hacia los arenales de la parte occidental, 1°32′S, 78°53′W, 14 Jan 2010, *D. Cárate, S. Duchicela, & M. Subía 1252* (QCA); comunidad de Ambrosio Lazo, sector Patococha–Loma Caparina, 1°44′S, 78°53′W, 5 Jun 2009, *D. Cárate et al. 619* (QCA); nevado Chimborazo, 1°30′S, 78°47′W, 12 Jul 2009, *D. Cárate et al. 903* (QCA); arenales del Chimborazo, 19 Oct 2000, *L. Endara, J. Wolf, & M. Nonhebel 354* (QCA); at the pass on the road Riobamba–Guaranda, 1°39′S, 78°50′W, 27 Nov 1981, *P. Filskov, M. Søndergaard, & I. Gregersen 37494* (QCA); Chimborazo, Dec 1864, *J. Isern 345* (MA); carretera panamericana sur, carretero entre las localidades de Alausí–Chunchi, 2°15′S, 78°51′W, 30 Aug 1984, *J. Jaramillo 7110* (QCA); SW slope of volcano Chimborazo, 1°1′S, 78°46′W, 26 Jun 2012, *N. Morueta-Holme, K. Engemann, & P. Sandoval 86* (QCA); paramo de Chanlor, ~16 km to the W of Guamote, 1°56′S, 78°50′W, 24 Nov 2010, *P. Sklenář & V. Zeisek 13094* (QCA). **Cotopaxi:** P.N. Cotopaxi, carretera a el refugio en falda N del Cotopaxi, 0°40′S, 78°30′W, 2 Oct 1982, *H. Balslev 3328* (QCA); P.N. Cotopaxi, faldas N del volcán Cotopaxi, 0°37′S, 78°26′W, 14 Jan 1983, *H. Balslev & T. Vries 3764* (QCA); cordillera de Angamarca y Zumbagua, páramo de Milín, crest above Pujilí, W of Latacunga, 0°54′S, 78°44′W, 15 Jul 1959, *H. G. Barclay & P. Juajibioy 7992* (COL); P.N. Cotopaxi, 0°40′S, 78°30′W, 5 Jun 1982, *R. Briones 40* (QCA); P.N. Cotopaxi, río Pita, desde el Mudadero hasta el glaciar sur del Cotopaxi, 0°38′S, 78°23′W, 14 Dec 1990, *C. E. Cerón 12602* (QCNE); P.N. Cotopaxi, pampa de Limpios, 0°40′S, 78°30′W, 21 Nov 1982, *M. Dávila & H. Balslev 57* (QCA); W of Zumbahua, head of road striking NW from the Zumbahua–Corazón road, 0°55′S, 78°55′W, 4 Dec 1988, *L. J. Dorr & L. C. Barnett 6259* (QCA, QCNE); hacienda Sumbagua [Zumbagua], 0°58′S, 78°53′W, 16 Nov 1939, *O. Haught 2946* (COL); entre Aucacocha y Tambo, 31 Dec 1983, *J. Jaramillo 6281* (QCA); Salcedo–Napo rd., ~29–35 km E of Salcedo, 0°55′S, 78°28′W, 5 Dec 1989, *J. L. Luteyn 13453* (QCA, QCNE); P.N. Cotopaxi, al borde de la carretera, 0°40′S, 78°30′W, 5 Jun 1982, *L. Muñoz 210* (QCA); Quevedo, páramo de Milín, vía Pujilí, 0°54′S, 78°44′W, 26 Sep 1975, *R. A. A. Oldeman 3374* (QCA); paramo de Quispicacha, E slope of loma Pucyucuchu, 1°5′S, 78°50′W, 24 Oct 2006, *P. Sklenář 9068* (QCA, QCNE). **El Oro:** NE Zaruma, Tioloma, hacienda Ambocas, 30 Aug 1947, *R. Espinosa 2041* (LOJA); Salvias, La Victoria-cerro de Arcos, 3°33′S, 79°28′W, 9 May 2015, *E. Freire, D. Rodríguez, & J. Donoso 11407* (QCNE). **Imbabura:** carretera Riobamba-Ambato, volcán Chimborazo, alrededores del refugio, 1°28′N, 78°50′W, 17 Jun 2001, *S. Díaz 4440* (COL); faldas cerro Fuya-Fuya, al S de Otavalo, 0°8′N, 78°17′W, 27 Jan 1980, *J. Jaramillo & F. Coello 2083* (QCA, QCNE); Cotacachi, slopes of volcán Cotacachi, 0°35′N, 78°20′W, 11 Oct 1987, *P. M. Ramsay & P. J. Merrow-Smith 780* (QCA, QCNE). **Loja:** Saraguro, cerro de Arcos, 3°33′S, 79°27′W, 3 Apr 2003, *Z. Aguirre et al. 276* (LOJA); Jimbura, 4°44′S, 79°25′W, 11 Jul 2006, *Z. Aguirre et al. 461* (LOJA); cordillera de Amaluza, lagunas de Jimbura, al lado de la carretera a 10 min. de la entrada de la laguna Negra, 4°42′S, 79°25′W, 20 Jul 1999, *O. Cabrera 437* (LOJA); Jimbura–Zumba road, km 17, at small lake, 4°44′S, 79°25′W, 27 Jul 1990, *P. M. Jørgensen, C. Ulloa, & M. Gavilanes 92215* (QCA, QCNE); road Loja–Cuenca, km 50, track to Fierro Urco, km 12–14, 3°41′S, 79°17′W, 25 Oct 1996, *G. P. Lewis & P. Lozano 2740* (LOJA, QCNE); Saraguro, sector Zuruwuiña, 12 Feb 2008, *F. Tinitana, S. Letòn, & W. Agreda s.n.* (HUTPL); Saraguro, Manú, cerro de Arcos, 3°33′S, 79°27′W, 25 Jun 1994, *F. Vivar, Z. Aguirre, & B. Merino 4265* (LOJA). **Napo:** alrededores de la cordillera de los Llanganati, Chihuila Sacha o Ainchilibí, Ainchilibí, 25 Aug 1959, *H. G. Barclay & P. Juajibioy 9064* (COL); hcda. Yanahurco, 0°41′S, 78°17′W, 16 Oct 2000, *L. Endara et al. 339* (QCA); páramo de Papallacta, sector El Paso, 0°19′S, 78°12′W, 28 Oct 1984, *A. Freire 26* (QCA); rd. from Quito to Baeza, just at the pass, 0°20′S, 78°11′W, 22 Feb 1992, *V. A. Funk et al. 11025* (QCA, QCNE); Papallacta, 6 Nov 1981, *M. García s.n.* (QCA); páramo de Loma Gorda, along río Antisana, below Micacocha, 0°37′S, 78°10′W, 3 Nov 1979, *L. Holm-Nielsen 20793* (QCA); Antisana, Jan 1865, *J. Isern 45* (MA); carretera Pifo–Papallacta, páramo de Guamaní, 0°19′S, 78°12′W, 15 Jan 1981, *J. Jaramillo 4134* (QCA); páramo de Quilindaña, near laguna Yurac Cocha, 0°47′S, 78°21′W, 4 Jan 1979, *E. G. B. Kieft et al. 215* (QCA); SW slopes of volcán Antisana, 2–3 km N of hacienda El Hato and 5–6 km NNE of laguna Micacocha, 0°29′S, 78°9′W, 30 Jun 1979, *B. Løjtnant & U. Molau 15315* (QCA); Pisayambo, laguna Cochas Negras, 1°6′S, 78°19′W, 14 Jan 1999, *B. Merino & Á. Sánchez 5125*

(LOJA); páramo de la Virgen, 0°19′S, 78°12′W, 12 Jan 2007, *R. Mogollón 19* (QCA); ~2 km N of pass on Quito–Papallacta road, on road to lagos, 0°21′S, 78°11′W, 16 Jul 1990, *R. W. Scott & T. J. Ayers 763* (QCA, QCNE); reserva Antisana, 0°29′S, 78°12′W, 2 Jun 2011, *C. Ulloa et al. 2010* (QCA); Quijos, reserva ecológica Antisana, páramo de Guamaní, carretera Pifo–Papallacta, La Virgen, 0°20′S, 78°12′W, 24 Jul 1998, *H. Vargas, E. Narváez, & W. Quizhpe 1934* (QCNE); Tena, P.N. Llanganates, vía Salcedo–Tena, de laguna Chaloa Cocha desvío a Rayo Filo, 0°57′S, 78°23′W, 20 Sep 1998, *H. Vargas, E. Narváez, & S. Orellana 2647* (QCNE). **Pichincha:** carretera Quito–Papallacta–Baeza, páramo de la Virgen, 0°19′S, 78°12′W, 21 Jun 1986, *F. Albán 5* (QCA); near Quito, 0°9′S, 78°33′W, 8 Aug 1976, *G. C. G. Argent & R. B. Burbidge 463* (QCA); páramo de Antisana, La Virgen, 0°18′S, 78°8′W, 4 Sep 1982, *A. Argüello 287* (QCA); falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 3940* (QCA); falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 4006* (QCA); falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 4083* (QCA); falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 4151* (QCA); falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 4213* (QCA); faldas SE volcán Guagua Pichincha, proximidades del refugio, 0°10′S, 78°35′W, 25 May 1985, *J. Bosco & M. Marcillo 61B* (QCA); Quito, parroquia Amaguaña, bosque protector Pasochoa, sendero hacia la cumbre del Pasochoa, 0°21′S, 78°27′W, 13 Jun 1992, *C. E. Cerón 19106* (QCNE); páramo de la Virgen, carretera entre Quito y Papallacta, en la cumbre del camino, 0°21′S, 78°12′W, 22 Dec 1988, *C. E. Cerón et al. 5720* (QCNE); Ruminahui, Antisana Ecological Reserve, between base of glacier and main access road from Pintag, 0°30′S, 78°15′W, 24 Jul 1995, *J. L. Clark et al. 1447* (QCNE); Mejía, E border of Cotopaxi N.P., Tambo river, between la hacienda El Tambo and Quilindaña mountain, 0°43′S, 78°23′W, 3 Feb 1996, *J. L. Clark & M. Thurber 1928* (QCNE); Mejía, ~3 km NE of the volcano Illiniza Sur, 0°24′S, 78°42′W, 19 Mar 1995, *J. L. Clark 472* (QCNE); Oyacachi, reserva ecológica Cayambe Coca, cerca de la casa de guardaparques del INEFAN [Instituto Ecuatoriano Forestal y de Áreas Naturales y Vida Silvestre], 0°11′S, 78°6′W, 11 Oct 2000, *L. Endara, J. Wolf, & M. Nonhebel 319* (QCA); Quito, volcán Atacazo, sector E del volcán, 0°22′S, 78°35′W, 28 Jun 2000, *D. Fernández, M. Cerna, & P. Villacrés 315* (QCNE); Quito, embalse Salve Faccha, 0°20′S, 78°15′W, 31 Aug 2001, *D. Fernández, G. Pérez, & L. Calvopiña 421* (QCNE); Antisana, cerca del sector Quinoal, 0°22′S, 78°15′W, 12 Apr 1992, *A. Freire, J. L. Luteyn, & S. Laegaard 2123* (QCA); volcán Antisana, sector de Huasipata, loma al SW de la laguna de La Mica, 0°32′S, 78°13′W, 2 Oct 1999, *M. Gavilanes & M. Velásquez 2172* (QCA); páramo de Guamaní, sitio denominado "La Virgen," 0°19′S, 78°12′W, 12 Nov 1989, *M. Gavilanes, P. Coral, & V. Cachago 247* (QCNE); upper edge of reserva ecológica Cayambe-Coca, Quito–lago Agrio road, 0°15′S, 78°10′W, 22 Dec 1988, *A. Gentry et al. 63988* (QCNE); laguna Micacocha, ~5 km SW of the volcano Antisana, 0°20′S, 78°15′W, 14 Nov 1987, *F. Hekker & W. H. A. Hekking 10175* (QCA); volcán Iliniza, NE slope below the refugio, 0°38′S, 78°42′W, 13 Aug 1980, *L. Holm-Nielsen, B. Øllgaard, & C. Sperling 24940* (QCA); vía Toctiuco-Chorrera-Pirámide (antena de televisión), faldas del Rucu Pichincha, 0°9′S, 78°31′W, 11 Aug 1979, *J. Jaramillo & M. Lascano 1319* (QCA, QCNE); vía Tabacundo–Tocachi–Malchingui, 0°03′N, 78°14′W, 24 Apr 1999, *J. Jaramillo, I. Tapia, & A. Pérez 21059* (QCA); vía Chillogallo–San Juan, partidero desde la población de San Juan hacia faldas del Atacazo "antenas militares," 0°20′S, 78°36′W, 13 Jul 1980, *J. Jaramillo & M. Lascano 3131* (QCA); páramo de la Virgen (Guamaní), 0°19′S, 78°12′W, 14 Mar 1991, *C. Körner 9* (QCA, QCNE); páramo de Guamaní, paso de la carretera Quito–Baeza, 0°19′S, 78°12′W, 25 Aug 1985, *B. B. Larsen & B. Dall 189* (QCA); páramo de Guamaní, carretera Pifo–Papallacta, km 23, 0°18′S, 78°14′W, 4 Nov 1990, *S. León 1037* (QCA); páramo de Guamaní, carretera Pifo–Papallacta, km 27, 0°19′S, 78°12′W, 13 Jan 1991, *S. León 1151* (QCA); páramo de Guamaní, carretera Quito–Papallacta–Baeza, 0°19′S, 78°12′W, 21 Jun 1986, *S. León 3* (QCA); track from Lloa to Guagua Pichincha, km 10, W of Quito, 0°12′S, 78°40′W, 9 Oct 1997, *G. P. Lewis, B. B. Klitgaard, & A. Bruneau 3631* (LOJA, QCA, QCNE); páramo de Guamaní, carretera Quito–Baeza, 0°19′S, 78°12′W, 7 Oct 1981, *B. Merizalde 6* (QCA); faldas occidentales del volcán Antisana, 0°28′S, 78°12′W, 29 Feb 1984, *L. Muñoz 312* (QCA); páramo de Guamaní, carretera Quito–Baeza, 0°19′S, 78°12′W, 7 Nov 1981, *L. Olmedo 3* (QCA); Mejía, sendero ladera SE del cerro Rumiñahui, 0°35′S, 78°29′W, 23 Sep 2012, *G. Peyre & P. Lozano 499* (QCA); páramo de Guamaní, laguna de Hoyas, 0°15′S, 78°12′W, 8 Aug 1987, *P. M. Ramsay & P. J. Merrow-Smith 177* (QCA); base del volcán Antisana, entrando por Pintag hacia la laguna Micacocha, campamento de EMAP, 0°30′S, 78°10′W, 7 Oct 1990, *K. Romoleroux 1088* (QCA); NE slopes of Rucu Pichincha, 0°10′S, 78°34′W, 12 May 1995, *P. Sklenář & V. Kostečková 1-11* (QCA); NE slopes of Rucu Pichincha, 0°10′S, 78°34′W, 13 May 1995, *P. Sklenář & V. Kostečková 3-4* (QCNE); cerro Atacazo, planicie sur del cerro Carcacha, 0°20′S, 78°36′W, 11 Jun 1983, *B. Treiber de Espinosa 98* (QCA); base del volcán Antisana, entrando por Pintag hacia la laguna de Micacocha, campamento del agua potable, N de la laguna de Sta. Lucía, 0°30′S, 78°10′W, 7 Oct 1990, *C. Ulloa et al. 713* (QCA); reserva ecológica Cayambe-Coca, 0°20′S, 78°12′W, 3 Jul 2003, *M. Venegas 20* (QCA). **Tungurahua:** Santiago de Píllaro, páramos de Pisayambo, alrededor de la laguna de Pisayambo, 1°5′S, 78°23′W, 10 Oct 1998, *E. Cueva 218* (QCNE); cordillera de los Llanganates, páramo de Jaramillo, 12 km NW of cerro Hermoso, 1°9′S, 78°21′W, 14 Nov 1980, *L. Holm-Nielsen & J. Jaramillo 28792* (QCA); Llanganates, entre laguna de Los Leones y Fisayambo, 1°11′S, 78°19′W, 17 Feb 2010, *J. Jaramillo 30196* (QCA); Santiago de Píllaro, P.N. Llanganates, desde el río Millín hasta la colina Ashpachaca,

1°8′S, 78°22′W, 12 Oct 1998, *E. Narváez & W. Quizhpe 284* (QCNE). **Zamora-Chinchipe:** rd. Amaluza–Zumba (in construction), km 37, 4°44′S, 79°25′W, 30 Jul 2001, *J. E. Madsen 8230B* (AAU).

GUATEMALA. Huehuetenango: Sierra de los Cuchumatanes, between Tojiah and Chemal at km 319.5 on ruta nacional 9N, 15°32′N, 91°29′W, 29 Jul 1960, *J. H. Beaman 3741* (US); summit of road between Huehuetenango and Todos Santos, Oct/Nov 1928, *R. Hernández s.n.* (US); Sierra Cuchumatanes between Paquix and San Miguel, 15°27′N, 91°29′W, 12/23 Jan 1966, *A. Molina, W. C. Burger, & B. Wallenta 16491* (US); Sierra Cuchumatanes, Llanos de San Miguel, 15°30′N, 91°29′W, 12/23 Jan 1966, *A. Molina, W. C. Burger, & B. Wallenta 16501* (US); Sierra Cuchumatanes between Paquix and Llanos San Miguel, road to San Juan Ixcoy, 15°27′N, 91°29′W, 17 Nov 1967, *A. Molina 21243* (US); hacienda Chancol, 15°30′N, 91°20′W, 2 Jan 1896, *E. W. Nelson s.n.* (US); Sierra de los Cuchumatanes, along highway 9N ~12 km SW of San Juan Ixcoy, 15°29′N, 91°33′W, 1 Mar 2007, *J. Pruski & R. Ortiz 4283* (MO, US); Los Cuchumatanes, Jan 1915, *R. Tejada 318* (US). **Quetzaltenango:** Volcano of Santa María, 14°45′N, 91°33′W, 24 Jan 1896, *E. W. Nelson 3712* (US). **San Marcos:** volcán Tajumulco, 15°2′N, 91°53′W, Jan 1892, *W. C. Shannon 607* (US).

MEXICO. Chiapas: Unión Juárez, SE side of the summit of volcán Tacaná, 15°8′N, 92°6′W, 3 Mar 1972, *D. E. Breedlove 24279* (MO); mt. Tacaná, pico, 15°7′N, 92°6′W, Aug 1938, *E. Matuda 2321* (US); volcán Tacaná, pico, 15°7′N, 92°6′W, 28 Mar 1939, *E. Matuda 2880* (US).

PANAMA. Bocas del Toro: between Itamut and Bine peaks, Fábrega massif, 9°5′N, 82°53′W, 5/9 Mar 1984, *L. D. Gómez et al. 22448* (MO); cerro Fábrega and vicinity near the Costa Rican frontier, 9°6′N, 82°52′W, 7/8 Apr 1976, *A. S. Weston 10164* (MO).

PERU. Amazonas: Chachapoyas, Balsas–Leimebamba road km 404, 5 Jun 1977, *J. D. Boeke 1951* (US); Chachapoyas, Leimebamba, arriba de Lluy, 6°45′S, 77°49′W, 15 Jun 1982, *R. Fernández, S. E. Clemente, & J. Zumaeta 53* (USM); top of divide between río Marañón and río Utcubamba, 28–31 km SW of Leimebamba, on road to Balsas, 17 Jun 1978, *A. Gentry et al. 23163* (USM); Colcamar, 6°18′S, 78°0′W, 24 Jun 1948, *F. W. Pennell 15665* (USM); Bongará, Jumbilla, along road Jumbilla–Rodríguez de Mendoza, 6°7′S, 77°38′W, 10 Nov 2012, *H. van der Werff et al. 25431* (USM); Bongará, Jumbilla, along road Jumbilla–Rodríguez de Mendoza, 6°7′S, 77°38′W, 10 Nov 2012, *H. van der Werff et al. 25435* (USM); Chachapoyas, summit of Puma-urcu [Pumaurco] SE of Chachapoyas, 6°16′S, 77°50′W, 3 Jul 1962, *J. J. Wurdack 1149* (US, USM); Chachapoyas, on summit of cerros de Calla-Calla, between Leimebamba–Balsas road pass and the "camino de herradura" (2 hours walk S), 6°48′S, 77°53′W, 8 Jul 1962, *J. J. Wurdack 1187* (USM). **Ancash:** pr. Olleros, 9°39′S, 77°24′W, 20 May 2013, *C. Aedo & J. Molina 20307* (MA); San Marcos, mina Antamina, 9°30′S, 77°3′W, 23 May 2013, *C. Aedo & J. Molina 20379* (MA); Bolognesi, Pacllón, laguna Jahuacocha, alrededor de la laguna, 10°14′S, 76°57′W, 15 May 2004, *S. M. Baldeón, H. Montoya, & M. Benavente 5953* (USM); San Marcos, Huari, compañía minera Antamina, botadero este, 9°36′S, 77°1′W, 13 Aug 2011, *H. Beltrán et al. 7326* (USM); Huaylas, Pueblo Libre, altura de Huasta Cruz y Punta Chancay?, 16 May 2000, *A. Cano et al. 10155* (USM); Huaylas, 19 May 2000, *A. Cano et al. 10385* (USM); Santa, Macate, cerro al N de la laguna Capalo 3, 21 May 2000, *A. Cano et al. 10542* (USM); Huaylas, abajo del abra Tres Cruces, 21 May 2000, *A. Cano et al. 10594* (USM); Huaylas, Huata, arriba de Racracallán, en la carretera a Pamparomás, 9°2′S, 77°53′W, 13 Apr 2001, *A. Cano et al. 11099* (USM); Huaylas, Pueblo Libre, cumbre de Huashta Cruz, 26 May 2001, *A. Cano et al. 11258* (USM); Recuay, carretera a Pachacoto, 9°51′S, 77°25′W, 28 May 2001, *A. Cano et al. 11440* (USM); Recuay, carretera a Aija, 9°43′S, 77°29′W, 29 May 2001, *A. Cano et al. 11512* (USM); Recuay, Huancapeti, en la carretera Recuay–Aija, 9°44′S, 77°1′W, 25 Mar 2002, *A. Cano, I. Salinas, & F. Mellado 12122* (USM); Antonio Raimondi, Chingas, laguna Yanacancha y alrededores, 9°10′S, 77°4′W, 22 Aug 2003, *A. Cano et al. 13729* (USM); Huaylas, Riurín, en las alturas de Pueblo Libre, 9°12′S, 77°47′W, 17 May 1999, *A. Cano et al. 9046* (USM); Huaylas, Riurín y zonas aledañas, Taqtza Pampa, Huachoq, Hirca, 9°12′S, 77°47′W, 18 May 1999, *A. Cano et al. 9155* (USM); Huaylas, Pamparomás, quebrada Cachicorral, 9°10′S, 77°51′W, 12 Oct 1999, *A. Cano et al. 9801* (USM); Huaylas, alturas del distrito de Huaylas, 28 May 1984, *E. Carrillo, W. Medina, & P. Huaman 1284* (USM); Huaylas, Pamparomás, Pisha, 9°13′S, 77°55′W, 30 Apr 2011, *R. Castañeda 762* (USM); Bolognesi, Pariarracra, pampa de Lampas, 10°11′S, 77°12′W, 2 May 1952, *E. Cerrate 1457* (USM); Bolognesi, Huasta, Condorcocha, 10°4′S, 76°59′W, 22 Apr 1956, *E. Cerrate 2537* (USM); Bolognesi, Ticllos, cerca a Chonta, 10°16′S, 77°15′W, 29 Apr 1956, *E. Cerrate 2641* (USM); Bolognesi, subida a Condorcocha, 10°24′S, 77°17′W, 20 Aug 1981, *E. Cerrate 8168* (USM); Bolognesi, Pucarrajo, 8 Jul 2008, *M. Chocce et al. 4242* (USM); cordillera Blanca, quebrada de Llaca below mt. Oczapalca, 9°26′S, 77°27′W, 9 Aug 1977, *T. Duncan et al. 2719* (USM); Huaraz, encima de Huaraz, entre punta Caillán y Cajamarquilla, 1 May 1961, *R. Ferreyra 14315* (USM); Yungay, Llanganuco, 9°4′S, 77°38′W, 2 May 1961, *R. Ferreyra 14363* (USM); Recuay, entre Recuay y Chavín, 31 May 1962, *R. Ferreyra 14528* (USM); Yungay, Llanganuco, 9°4′S, 77°38′W, 22 Oct 1965, *R. Ferreyra 16514* (USM); Huari, Chavin, 9°25′S, 77°30′W, 9 Aug 2010, *X.-J. Ge et al. 110* (USM); Yungay, P.N. Huascarán, Llanganuco, 9°5′S, 77°40′W, 7 Aug 2010, *X.-J. Ge et al. 21* (USM); near top of divide over cordillera Blanca, upper slopes of Huascarán, above lagunas Llanganuco, 9°1′S, 77°35′W, 10 Jul 1982, *A. Gentry et al. 37421* (USM); Recuay, Marca, Paracmarca, 10°4′S, 77°28′W, 18 Aug 1963, *J. Gómez 148* (USM); about 15 km from Huaraz–Cajacay highway turnoff in Pachacoto on the road to Huascarán National Park, 9°51′S, 77°22′W, 17 May 2001, *L. Hufford, M. McMahon, & Á. Ramírez 3531* (USM); Carhuas, cordillera Blanca, above Vicos at Queque pampa, 14 Mar 1964,

P. C. Hutchison & J. K. Wright 4402 (USM); Recuay, Cátac, P.N. Huascarán, Pumapampa, 20 Nov 2008, *E. Jara 102* (USM); Yungay, Llanganuco, 9°4′S, 77°38′W, 20 Jul 1977, *A. Luna 64* (USM); Yungay, quebrada Demanda, 31 Aug 1981, *E. Pérez 17* (USM); Huari, camino Olleros a Chavín, entre Pucahueco y el abra, 9°37′S, 77°18′W, 21 Oct 1999, *J. Roque & K. Young 1198* (USM); Huari, camino Olleros a Chavín, entre Pucahueco y el abra, 9°37′S, 77°18′W, 21 Oct 1999, *J. Roque & K. Young 1201* (USM); Huaylas, Macoto, trayecto entre las lagunas Capalo, 20 May 2000, *J. Roque et al. 1535* (USM); Yungay, Huascarán N.P., quebrada Ranincuray, 8°59′S, 77°34′W, 17 Apr 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10324* (USM); Carhuaz, Huascarán N.P., quebrada Honda, between Vinoyapampa and Portachuelo Honda, 9°18′S, 77°24′W, 3 Oct 1985, *D. N. Smith, M. Buddensiek, & R. Valencia 11675* (USM); Recuay, Huascarán N.P., río Pachacoto drainage, 9°53′S, 77°17′W, 16 Mar 1986, *D. N. Smith & M. Torres 11783* (MO, US, USM); Recuay, Huascarán N.P., quebrada Queshque, lateral valley toward río Pachacoto, 9°50′S, 77°18′W, 18 Mar 1986, *D. N. Smith, R. Valencia, & M. Torres 11844* (USM); Recuay, Huascarán N.P., lateral valley of quebrada Queshque, toward río Pachacoto drainage, 9°50′S, 77°18′W, 19 Mar 1986, *D. N. Smith, R. Valencia, & A. Gonzales 11879* (US, USM); Huaylas, Huascarán N.P., environs of Auquispuquio, 8°49′S, 77°57′W, 9 Apr 1986, *D. N. Smith, R. Valencia, & M. Buddensiek 12091* (USM); Huaraz, Huascarán N.P., quebrada Rajucolta, 9°32′S, 77°23′W, 17 Apr 1986, *D. N. Smith, R. Valencia, & M. Buddensiek 12150* (USM); Huari, Huascarán N.P., S side of quebrada Carhuazcancha, 9°28′S, 77°15′W, 6 May 1986, *D. N. Smith et al. 12286* (USM); Huari, Huascarán N.P., quebrada Pachachaca, a lateral valley of quebrada Rurichinchay, 9°23′S, 77°16′W, 12 Jun 1986, *D. N. Smith, A. Gonzales, & D. Maldonado 12551* (USM); Huari, Huascarán N.P., quebrada Pachachaca, a lateral valley of quebrada Rurichinchay, 9°23′S, 77°16′W, 13 Jun 1986, *D. N. Smith, A. Gonzales, & D. Maldonado 12651* (USM); Yungay, Huascarán N.P., Llanganuco sector, quebrada Ancosh at portachuelo, 9°3′S, 77°35′W, 31 Dec 1984, *D. N. Smith & K. Goodwin 8882* (USM); Yungay, Huascarán N.P., quebrada Ranincuray, 8°59′S, 77°34′W, 12 Jan 1985, *D. N. Smith, L. Sánchez, & H. Vidaurre 9085* (USM); Yungay, Huascarán N.P., Morococha, 8°55′S, 77°35′W, 14 Jan 1985, *D. N. Smith, L. Sánchez, & H. Vidaurre 9208* (USM); Huaraz, Huascarán N.P., quebrada Shallap, 9°30′S, 77°23′W, 20 Feb 1985, *D. N. Smith, R. Valencia, & A. Gonzales 9683* (USM); Huaylas, Huascarán N.P., quebrada Alpamayo at foot of snow-free peak above lago Jancarurish, 8°53′S, 77°41′W, 9 Mar 1985, *D. N. Smith, R. Valencia, & A. Gonzales 9791* (QCA, USM); laguna Conococha, 10°7′S, 77°16′W, 15 Mar 1983, *O. Tovar et al. 9461* (USM); Bolognesi, entre Tallenga y Piscapaccha, *A. Weberbauer 2873* (USM); Huaylas, Pamparomás, alrededores de la laguna Negrahuacanan, 9°0′S, 77°55′W, 8 May 1994, *G. Yarupaitán & J. Albán 1394* (USM); Huari, comunidad de Mallas, camino que sigue de la mina hacia áreas del P.N. Huascarán, 9°24′S, 77°11′W, 24 Oct 1994, *G. Yarupaitán & E. Salas 1495* (USM). **Apurímac:** Quishuela [Kishuara] to Andahuaylas, 13°40′S, 73°12′W, 19 May 1939, *E. K. Balls 7028* (US); Abancay, road from Abancay to Cuzco, 38 km NE of Abancay, 13°32′S, 72°48′W, 22 Apr 1982, *V. A. Funk, H. Bedell, & J. L. Cracraft 3592* (US); Andahuaylas, Pomacocha, Feb 2004, *L. Vargas & G. Mora 261* (USM). **Arequipa:** Caraveli, Quicacha, 15°38′S, 73°43′W, 5 May 1955, *A. Guevara s.n.* (USM). **Ayacucho:** carretera a Minas Canarias, 14°24′S, 74°24′W, 24 Feb 2002, *A. Cano et al. 11910* (USM); Lucanas, carretera a Puta Jasa, 14°8′S, 74°11′W, 24 Feb 2002, *A. Cano et al. 11942* (USM); Huamanga, Vinchos, arriba de Occollo, 13°17′S, 74°32′W, 17 Oct 2014, *P. Gonzáles, E. Huamán, & W. Aparco 3402* (USM); Sucre, Morcolla, a 100 m del río Jajincura y Cuyto, 14°9′S, 73°46′W, 5 May 2014, *C. Tejada 366* (HSP). **Cajamarca:** cerro Huañuñán, 5 km NW de Cajamarca, 7°7′S, 78°33′W, 23 Aug 1985, *B. Becker 32* (LPB); surroundings of Cajamarca, 29 Jan 1986, *B. Becker & F. M. Terrones 330* (LPB); surroundings of Cajamarca, 11 Mar 1986, *B. Becker & F. M. Terrones 613* (LPB); La Encañada, San Pedro de Lipiac, 6°57′S, 78°19′W, 7 Sep 2010, *H. Beltrán 6908* (USM); Cajabamba, alrededores de la laguna Yahuarcocha, 7°34′S, 77°58′W, 4 Nov 2014, *H. Castillo, E. Cochachin, & S. Castillo 4* (USM); Cajabamba, alrededores de la laguna Yahuarcocha, 7°34′S, 77°58′W, 21 Apr 2015, *H. Castillo, E. Cochachin, & S. Castillo A27* (USM); Cajabamba, 7°37′S, 78°0′W, 18 Apr 2012, *E. Cochachin, H. Castillo, & S. Castillo 41* (USM); Jaén, cerro arriba de Aguas Verdes, 5°44′S, 79°11′W, 10 Nov 1999, *C. Díaz & L. Campos 10954* (USM); carretera entre Hualgayoc y Cajamarca, 15 Oct 1986, *C. Díaz 2136* (MO n.v., USM); Celendín, about 40 km NNE of Cajamarca on road to Celendín, 28 May 1966, *G. Edwin & J. Schunke 3574* (USM); cumbre Comulca, entre Cajamarca y Celendín, 6 Aug 1958, *R. Ferreyra 13246* (USM); cumbre Comulca, entre Cajamarca y Celendín, 6 Aug 1958, *R. Ferreyra 13253* (USM); Celendín, entre Celendín y jalca Cumullca, 6°53′S, 78°7′W, 24 Jun 1963, *R. Ferreyra 15145* (USM); cumbre El Gavilán, carretera Cajamarca–Chilete, 31 Mar 1948, *R. Ferreyra 3306* (USM); Hualgayoc, El Empalme, lugar donde se unen las carreteras de Hualgayoc y San Miguel, 6°50′S, 78°40′W, 16 Aug 1952, *R. Ferreyra 8572* (USM); Hualgayoc, abajo de Goymolache, camino a Cajamarca, 16 Aug 1952, *R. Ferreyra 8575* (USM); Celendín, 35 km NNW of Celendín, Las Lajas, NW slopes of cerro Alto, SE of Cortagana (Chimuch), 6°34′S, 78°16′W, 3 Jul 1947, *F. R. Fosberg 28115* (COL, US); cerro Cochorco, 7°0′S, 78°18′W, 22 Sep 2008, *M. Machahua & J. Arnaiz 63* (USM); on the Cajamarca–Celendín road, 45.8 km NE of Cajamarca, 49.9 km SW of Celendín, at km marker 53.5, 7°2′S, 78°16′W, 19 Sep 2001, *M. McMahon, L. Hufford, & J. Opisso 620* (USM); Celendín, jalca cerca a Celendín, 7 Jul 1976, *W. Rauh 40258* (USM); Contumazá, Carcabamba–Pampa de la Sal, 7°23′S, 78°41′W, 31 May 1990, *A. Sagástegui et al. 14329* (USM); Santa Cruz, Pulán, La Zanja, 6°50′S, 78°55′W, 31 Jul 2007, *L. Santa Cruz 2006* (USM); Santa Cruz, Pulán, El Progreso, 12 Feb 2007, *L. Santa Cruz 989* (USM); Cajamarca–Bambamarca road, 50 km from Cajamarca, 6°55′S, 78°37′W,

17 Feb 1983, *D. N. Smith & R. Vásquez 3488* (USM); Cajamarca–Bambamarca road, 55 km N of Cajamarca, 6°55′S, 78°35′W, 2 Jun 1984, *D. N. Smith & I. Sánchez-Vega 7440* (USM); 41 km N of Cajamarca on gravel road to Hualgayoc, jalca de Coimolache, 6°46′S, 78°36′W, 15 Jul 1992, *T. F. Stuessy, D. J. Crawford, & A. Sagástegui 12623* (CONC). **Cusco:** Espinar, c. Alto Huarca (Huinipampa), 14°54′S, 71°21′W, 4 Mar 2012, *A. Cano, N. Valencia, & P. Gonzáles 20591* (USM); Paucartambo, P.N. Manu, Acjanaco, 13°11′S, 71°35′W, 28 Apr 1990, *A. Cano 3100* (USM); Paucartambo, Acjanaco, 13°11′S, 71°35′W, 28 Apr 1990, *A. Cano 3152* (USM); Paucartambo, P.N. Manu, Jesús María, 14 Jul 1990, *A. Cano 3720* (USM); Paucartambo, P.N. Manu, altura de Teleban, 16 Jul 1990, *A. Cano 3759* (USM); Paucartambo, P.N. Manu, alturas de Teleban, 16 Jul 1990, *A. Cano 3831* (USM); Paucartambo, P.N. Manu, Qollatambo, 13°12′S, 71°37′W, 9 Sep 1990, *A. Cano 4222* (USM); Paucartambo, P.N. Manu, Huáscar, 13°12′S, 71°37′W, 9 Sep 1990, *A. Cano 4235* (USM); Paucartambo, P.N. Manu, Qollatambo, 13°12′S, 71°37′W, 10 Sep 1990, *A. Cano 4274* (USM); Paucartambo, P.N. Manu, Tres Cruces, 13°7′S, 71°36′W, 5 Mar 1991, *A. Cano 4572* (USM); Paucartambo, P.N. Manu, Acjanaco, 13°11′S, 71°35′W, 19 Mar 1992, *A. Cano & D. Aguilar 5120* (USM); Paucartambo, Parque Nacional del Manu, Acjanaco, 13°11′S, 71°35′W, 19 Mar 1992, *A. Cano & D. Aguilar 5121* (USM); Urubamba, Ollantaytambo, valle de Patacancha, 13°11′S, 72°13′W, 1987, *S. Carter & J. Tait 42* (USM); Manu National Forest, road from Paucartambo to Tres Cruces, at junction of road into Manu N.P., 10 Apr 1982, *V. A. Funk, J. Cracraft, & H. Bedell 3441* (QCA); Velille, Uchucarco, alrededores de la mina Constancia, 14°28′S, 71°48′W, 23 Apr 2015, *P. Gonzáles 3587* (USM); Espinar, terrenos del proyecto Minero "Quechua," 24 km al SO del pueblo de Espinar, 14°58′S, 71°18′W, 23 Jan 2008, *E. M. Ortiz & Y. Cano 1799* (HUSA); "Pillahuata," cerro de Cusilluyoc, 3/6 May 1925, *F. W. Pennell 14106* (US); Espinar, inmediaciones de la presa de relaves de Huinipampa, 14°54′S, 71°21′W, 12 Apr 2014, *D. Ramos et al. 1608* (HSP); abra Málaga, 13°8′S, 72°18′W, Apr 1981, *O. Tovar 8088* (USM); Amparaes, 13°9′S, 71°54′W, Mar 1981, *O. Tovar, S. Rivas, & Crespo 8944* (USM); Paucartambo, Acanacu [Acjanaco], 13°11′S, 71°35′W, Jun 1937, *C. Vargas 323* (USM); Urubamba, Yanahuanca, 10°29′S, 76°30′W, 16 Mar 1950, *C. Vargas 9316* (LPB); Paucartambo, Corohuayrachina, 13°19′S, 72°50′W, 15 Mar 1953, *F. Woytkowski 476* (USM); Paucartambo, Aconaco [Acjanaco], 13°11′S, 71°35′W, 13 Dec 1952, *F. Woytkowski 53* (USM). **Huancavelica:** Angaraes, Ccochaccasa, 12°57′S, 74°47′W, 4 Apr 2014, *A. Cano, B. Britto, & N. Valencia 21911* (USM); Huachocolpa, alrededores de la unidad minera Caudalosa, 13°3′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3481* (USM); Huaytamayocc, Tansiri, cerca a Manta, 12°42′S, 75°10′W, Mar 1953, *O. Tovar 1143* (USM); Occoro, entre Conaica y Tansiri, 12°35′S, 75°1′W, 3 Apr 1953, *O. Tovar 1210* (USM); Occoro, entre Conaica y Tansiri, 12°35′S, 75°1′W, 3 Apr 1953, *O. Tovar 1213* (USM); Tayacaja, hacienda Alalay entre Mariscal Cáceres y Pampas, 13 Apr 1953, *O. Tovar 1336* (USM); Huaytamayoc-Tansiri, 12°42′S, 75°10′W, May 1956, *O. Tovar 2551* (USM); arriba de Machaichuay, entre Conaica y Tinyacalle, Mar 1952, *O. Tovar 869* (USM). **Huánuco:** Pachitea, Umari, comunidad campesina de San Marcos, 9°54′S, 76°6′W, 4 Mar 2010, *H. Beltrán 6699* (USM); Pachitea, Umari, comunidad campesina de San Marcos, 9°54′S, 76°6′W, 4 Mar 2010, *H. Beltrán 6701* (USM); Dos de Mayo, Lauricocha, 10°18′S, 76°39′W, Jun 1956, *A. Cardich 223* (USM); Zapatococha, above Acomayo, 17 Jun 1973, *J. P. O'Neill s.n.* (USM); Huamalíes, Punchao, 9°27′S, 76°49′W, 14 Aug 1999, *C. Ortiz 33* (USM); Lauricocha, San Miguel de Cauri, laguna Taulicocha, lado este, 10°18′S, 76°39′W, 8 Sep 2002, *F. Salvador, M. A. Alonso, & M. Rodríguez 431* (USM); Dos de Mayo, valle de Huallanca, 23 Mar 1983, *O. Tovar et al. 9889* (USM); Sariapampa, 8 May 1946, *F. Woytkowski s.n.* (USM). **Junín:** Sais Túpac Amaru, 11°47′S, 75°43′W, *O. Acuña s.n.* (USM); pampas de Junín, 5 May 1948, *P. Aguilar s.n.* (USM); Patarcocha, 11°38′S, 74°55′W, 7 May 1948, *P. Aguilar s.n.* (USM); Huancayo, Huaytapallana, 11°57′S, 75°2′W, 6 Nov 1977, *D. Barrón 136* (USM); Huancayo, Huaytapallana, 11°57′S, 75°2′W, 30 Sep 1993, *D. Barrón 43* (USM); Huancayo, Huaytapallana, 11°57′S, 75°2′W, 15 Jul 1978, *D. Barrón A3* (USM); Tarma, Huaricolca, carretera Huancayo Jauja, 11°32′S, 75°37′W, 27 May 2017, *H. Beltrán & S. Castillo 8033* (USM); Huancayo, Pucara, comunidad de Patala, laguna Yauricocha, 12°10′S, 75°3′W, 30 May 2017, *H. Beltrán & S. Castillo 8076* (USM); Huancayo, Pucara, comunidad de Patala, laguna Yauricocha, 12°10′S, 75°3′W, 30 May 2017, *H. Beltrán & S. Castillo 8078* (USM); entre Palcamayo y Junín, 8 Mar 1979, *A. Ceballos et al. 90* (MA); Yauli, Anticona, 11°35′S, 76°10′W, 25 Apr 1972, *E. Cerrate et al. 5051* (USM); Anticona, cumbre entre Lima y Oroya, 11°35′S, 76°11′W, 22 May 1955, *R. Ferreyra 10967* (USM); bajando la cumbre de Garrachacan, 10 Aug 1948, *R. Ferreyra 3928* (USM); 10 km S of Junín, pampas de Junín, 11°12′S, 75°58′W, 9 Mar 1982, *A. Gentry, D. Smith, & B. León 36128* (USM); near Morococha, 11°35′S, 76°8′W, 24 May 1942, *V. Grant 7575* (CONC); Tarma, km 42 de Huancayo hacia Tarma, 11 Apr 1953, *J. P. Hjerting & E. Petersen 1358* (USM); road from Tarma to Jauja, 31 km NW of Jauja, 11°35′S, 75°38′W, 13 May 2001, *L. Hufford, M. McMahon, & Á. Ramírez 3506* (USM); cercanías de Morococha, 11°35′S, 76°8′W, 13 Nov 1863, *J. Isern 418* (MA); camino de Tarma a La Oroya, 12 Nov 1863, *J. Isern 426* (MA); Huancayo–hacienda Huari, 9 Jul 1976, *A. Lourteig 3127* (USM); Morococha, 11°35′S, 76°8′W, 23 May 1922, *J. F. Macbride & F. Featherstone 892* (CONC); pampa de Junín near km 231 on road between La Oroya and Junín, 23 Apr 1960, *H. E. Moore, A. Salazar, & E. E. Smith 8312* (USM); Concepción, laguna de Pomacocha, 11°47′S, 75°15′W, 15 Apr 1948, *C. Ochoa 484* (MOL); Concepción, Carmencerro, cerca de Chicche, 11°48′S, 75°18′W, 19 May 1948, *C. Ochoa 504* (MOL); Ondonores, 11°4′S, 76°9′W, 13 Sep 1976, *U. Pettersson 100* (USM); Runatullo, 11°38′S, 74°57′W, Jul 1940, *C. A. Ridoutt s.n.* (USM); Ticlio, 11°35′S, 76°11′W, Jul 1940, *C. A. Ridoutt s.n.*

(USM); Jauja, Ricrán, 10°45′S, 76°13′W, 9 Apr 1967, *A. Rojas 38* (USM); Huancayo, Mar 1947, *J. Soukup 3150* (USM); Anahua–Atocsaico, 10 Feb 1982, *K. Tiller & B. Maass 52* (USM); cerro al E de Huancayo, 2 May 1954, *O. Tovar 2191* (USM); paso de Anticona, entre Casapalca y Oroya, 11°35′S, 76°11′W, 26 Jun 1955, *O. Tovar 2205* (USM); Yauli, alred. Corpacancha, 11°21′S, 76°13′W, 2 Mar 1970, *O. Tovar 6492* (USM); Huancayo, Huaytapallana, al E de Huancayo, 11°57′S, 75°2′W, Apr 1973, *O. Tovar 7045* (USM); Huancayo, Pariahuanca, Illaycocha, 11°58′S, 74°49′W, 10 May 1979, *O.Tovar 8048* (USM); Satipo, Pampa Hermoza, comunidad campesina Santa Rosa de Toldopampa, caserío Jatun Talhuis, bosque de protección Pui Pui, 11°23′S, 74°58′W, 15 Oct 2014, *L. Valenzuela et al. 28636* (USM); Yauli, Tucto, cerca Morococha, 11°28′S, 76°16′W, 20 Nov 1975, *F. Weberling 5906* (USM). **La Libertad:** Bolívar, Uchumarca, paramo in surroundings of Vira Vira–lagunas La Quinua, 7°0′S, 77°45′W, 17 May 2011, *R. Bussmann et al. 16928* (RB); Santiago de Chuco, laguna El Toro y alrededores, 7°59′S, 78°14′W, 31 Oct 2002, *A. Cano et al. 12768* (USM); Otuzco, ~28 km E of Agallpampa on road to Huamachuco, 6 Jan 1983, *M. Dillon, U. Molau, & P. Matekaitis 2798* (USM); Sánchez Carrión, laguna Sausacocha, ~10 km NE of Huamachuco, 7°47′S, 77°59′W, 10 Jan 1983, *M. Dillon, U. Molau, & P. Matekaitis 2838* (USM); cerro al frente de la laguna de Sausacocha, 10 km al N de Huamachuco, 16 Mar 1948, *R. Ferreyra 3029* (USM); cerro Quiruvilca, entre Huamachuco y Trujillo, 8°0′S, 78°17′W, 17 Mar 1948, *R. Ferreyra 3074* (USM); Santiago de Chuco, Quiruvilca, alrededores de la minera Lagunas Norte, 7°54′S, 78°16′W, 6 May 2014, *P. Gonzáles 3279* (USM); Coipín, Santiago de Chuco, 18 Apr 1950, *A. López 456* (USM); Santiago de Chuco, Santuario Nacional Calipuy, 8°19′S, 78°16′W, 13 Apr 2012, *M. Morales et al. 3734* (USM); Huamachuco, jalcas de Huaguil, entre Pallar y Molino Viejo, 7°51′S, 77°46′W, 17 Jun 1971, *C. Ochoa 3017* (MOL); Sánchez Carrión, Santo Domingo y alrededores, 15 km lineales al SO de Huamachuco, 7°54′S, 78°7′W, 23 Mar 2006, *J. Roque 5102* (USM); Bolívar, cabecera de la quebrada Quishuar, laguna Rinconada al sur del distrito de Condormarca, 7°35′S, 77°29′W, 29 Mar 2011, *I. Silva 17* (USM); Sánchez Carrión, laguna Sansagocha, between Huamachuco and Cajabamba, 7°48′S, 77°59′W, 18 Aug 1982, *D. N. Smith & A. Cáceres 2226* (USM); Sánchez Carrión, señal Huayllides, 7°53′S, 78°2′W, 21 Aug 1982, *D. N. Smith 2271* (USM); Santiago de Chuco, laguna de Santa Cruz Chiquita near Shoreyo on Huamachuco–Shoreyo road, 7°59′S, 78°17′W, 25 Aug 1982, *D. N. Smith 2307* (USM); jalca about 5 km E of Quiruvilca toward Huamachuco, 7°59′S, 78°15′W, 19 Jun 1964, *R. M. Straw 2485* (USM); laguna Sausacocha, about 10 km SE of Huamachuco, 7°47′S, 77°59′W, 20 Jun 1964, *R. M. Straw 2496* (USM); Bolívar, cercano al poblado de Condormarca, 7°34′S, 77°33′W, 25 Jul 2011, *D. Wong 3* (USM). **Lambayeque:** Ferreñafe, arriba de Incahuasi, 6°14′S, 79°17′W, 8 Jul 1987, *R. Ferreyra 20921* (USM). **Lima:** cordillera Raura, base del pico Torre de Cristal, 10°29′S, 76°45′W, 30 May 2013, *C. Aedo & J. Molina 20548* (MA); Yauyos, Laraos, Huachaca, 12°22′S, 75°47′W, 1 Mar 1991, *H. Beltrán 302* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7976* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7990* (USM); límite con dpto. Junín, entre Casapalca y Ticlio, 11°35′S, 76°11′W, 1 Dec 1977, *S. Castroviejo, M. Costa, & E. Valdés-Bermejo 1124* (MA); Huarochirí, Ticlio, 11°35′S, 76°11′W, 5 Mar 1966, *E. Cerrate, C. Acleto, & J. Gómez 4291* (USM); Huarochirí, Mariatana, cueva Mortero, 12°13′S, 76°20′W, 14 Apr 1968, *E. Cerrate, J. Gómez, & B. Ojeda 4803* (USM); Anticona abajo, 11°35′S, 76°11′W, 8 Aug 1987, *M. Chanco, O. Tovar, & A. Galán 1222* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 24 May 2010, *P. Gonzáles & E. Navarro 1270* (USM); Canta, Lachaqui, Quinán, muy cerca a la laguna, 11°35′S, 76°34′W, 20 May 1995, *A. Granda 1455* (MOL); Canta, Carhuapampa (Canta y Lachaqui), 11°33′S, 76°36′W, 12 May 1963, *I. Meza 154* (USM); Canta, Carhuapampa (carretera Canta–Lachaqui), 11°33′S, 76°36′W, 9 Jun 1963, *I. Meza 190* (USM); Cajatambo, Rancas, 10°26′S, 77°0′W, 28 Mar 2004, *Y. Quinteros & E. Tito 238* (USM); Canta, 18 Oct 1974, *P. Waechter s.n.* (USM). **Moquegua:** General Sánchez Cerro, Ubinas, Querala, 16°7′S, 70°45′W, 2 Mar 2018, *D. Montesinos & J. Calvo 5929* (HSP). **Pasco:** Oxapampa, distr. Huancabamba, Sta. Bárbara, above Lanturachi, 10°20′S, 75°40′W, 2 Jul 1985, *R. B. Foster, B. d'Achille, & A. Brack 10372* (USM); Pasco, Paragsha, 10°39′S, 76°16′W, 10 Mar 2012, *W. Mendoza, D. Trujillo, & N. Fernández-Baca 6540* (USM); Oxapampa, Santa Bárbara, 10°22′S, 75°39′W, 2 Aug 1984, *D. N. Smith 8099* (USM); Cerro de Pasco, Huayllay, bosque de piedra, 10°59′S, 76°19′W, 14 May 1976, *N. Urquizo 2* (USM). **Piura:** Huancabamba, El Carmen de la Frontera, caserío Chulucanas Alto, cerro Las Mangas, 1 Jun 1996, *E. Meza & C. Meléndrez 1474* (USM); Huancabamba, Huaringas, 5°0′S, 79°29′W, Jul 1987, *H. Ochoa 36* (USM). **Puno:** abra de la Raya, 14°28′S, 70°59′W, 6 Apr 2005, *C. Aedo & A. Galán 11189* (MA, USM); Sandia, cerca Cuyo-Cuyo, encima de Sandia, 14°28′S, 69°32′W, 28 Mar 1978, *A. Camino s.n.* (USM); abra on unpaved track, ~17 km from Puno–Ananea rd., 14°41′S, 69°41′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13182* (US, USM); Puno to Arequipa via old Panamerican Hwy, road from Mañazo to abra Toroya and on to Arequipa city, near abra Toroya, 15°54′S, 70°28′W, 17 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13190* (US, USM); San Román, Cabanillas, 15°38′S, 70°21′W, 15 Jan 2001, *A. Galván et al. 3* (LPB); Carabaya, Quelcaya, 13°57′S, 70°49′W, 14 Feb 2009, *E. Mondragón & J. Postigo 60* (USM); Antauta, cabecera de la quebrada Larancota, al N de Cumani, 14°14′S, 70°19′W, 15 Feb 2006, *J. Roque 4856* (USM). **San Martín:** Mariscal Cáceres, P.N. del río Abiseo, 7°37′S, 77°28′W, 23 Jun 1996, *A. Cano et al. 7242* (USM); Mariscal Cáceres, campamento Chochos y laguna de Chochos y alrededores en el P.N. del río Abiseo, 7°37′S, 77°28′W, 27 Jun 1996,

A. Cano et al. 7355 (USM); Mariscal Cáceres, P.N. río Abiseo, Callejón Rojas, cerca a cabecera de valle, 6 Jul 2010, *S. Castillo & C. Alfaro 973* (USM); Mariscal Cáceres, Huicungo, Callejón de Corneadas, 11 Jun 2001, *B. León & K. Young 5167* (USM).

16. ***Werneria orbignyana*** Wedd., Chlor. Andina 1: 85. 1856 ["Orbignyana"]. Type. Bolivia. La Paz: sommet de la cordillère de la Paz, [without date], *A. D. d'Orbigny 328* [as "338" in the protologue, see comments below] (lectotype: P s.n.!, **designated here**).

Werneria orbignyana var. *breviradiata* A. Gray, Proc. Amer. Acad. Arts 5: 139. 1861. Type. Peru. Junín: Andes Peru, Casa Cancha to Culnai, [without date], *Capt. Wilkes Expedition s.n.* (lectotype: US-00037328!, **designated here**; isolectotype: K-000527755 [digital image!]).

Werneria nuda A. Gray, Proc. Amer. Acad. Arts 5: 139. 1861, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria mandoniana Wedd. ex Sch. Bip., Bull. Soc. Bot. France 12: 80. 1865 ["Mandoniana"], *nom. nud.* (Turland et al., 2018, ICN Art. 38.1).

Werneria pygmaea var. *rhodopappa* Phil., Anales Mus. Nac. Santiago de Chile 8: 41. 1891. Type. Chile. Antofagasta: Machuca, 17 Feb 1885, *F. Philippi s.n.* (lectotype: SGO-000006435!, designated by Calvo and Moreira-Muñoz [2019: 174]; isolectotype: SGO-000006442! [individual at the bottom]), **syn. nov.**

Werneria mandoniana Wedd. ex Klatt, Ann. K. K. Naturhist. Hofmus. 9: 367. 1894 ["Mandoniana"]. Type. Bolivia. La Paz: Larecaja, viciniis Sorata, valle inter las Trincheras de Chillata et montem Illampu, 3,800 m, Sep 1858, *G. Mandon 102* (lectotype: P-00711470 [digital image!], **designated here**; isolectotypes: BR-5531547 [digital image!], F-974608!, G-00305793 [digital image!], G-00305794 [digital image!], GH s.n.!, GOET s.n.!, K-000527754 [digital image!], LE s.n., NY s.n.!, S-R-6524 [digital image!], US-00037324!, US-00037325 [fragment!], W-120473!, W s.n.!).

Werneria orbignyana var. *longifolia* Rockh., Bot. Jahrb. Syst. 70: 331. 1939. Type. Peru. Lima: near Antaicocha, cerro Colorado, east of Canta, 4,000–4,100 m, 20 Jun 1925, *F. W. Pennell 14690* (lectotype: PH-00348278 [digital image!], **designated here**; isolectotype: F-558651, GH s.n.!, NY s.n.!, US-00622823!).

Rhizomatous herb, rosettiform, forming clumps, rarely solitary, 2–10 cm tall. **Rhizome** 5–20 cm long, 0.3–0.5 cm in diameter, horizontal to oblique, glabrous. **Leaves** extending into a glabrous sheath-like base; leaf lamina linear to narrowly oblanceolate, 17–92 mm long, 1.2–12 mm wide, denticulate, minutely tridentate to 3–7-dentate at the apex (rarely subentire), barely narrowed at the base, flat to slightly curved forward in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath (barely visible), somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile to pedunculate; peduncle up to 67 mm long, glabrous, with or without a few bracts. **Involucre** cupuliform, with bracts fused at the base, 9.3–30 mm long, 7.4–13 mm wide, glabrous; involucral bracts 11–13, 6.4–18.2 mm long, 2–4.1 mm wide at the base, acute at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** (8–)11–13; corollas 9.2–23.1 mm long, 2.3–4.2 mm wide, 4–5-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, usually bluish or purplish beneath. **Disc florets** 32–61; corollas 5.7–9.4 mm long, 5-lobed, yellowish to creamy; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** ~3.1 mm long, ~1 mm wide, cylindrical, ~9-ribbed, glabrous; pappus (3–)7.5–15.5 mm long, barbellate, whitish to partially rose colored. Chromosome number $2n = 100(\pm 4)$ (Diers, 1961) (Figure 19C–F).

Additional Iconography. Beltrán (2017: 61–62, fig. 3D, sub *W. glaberrima*, as photo, fig. 4A, as photo).

Distribution and Habitat. Bolivia (Cochabamba, La Paz, Oruro), Chile (Antofagasta, Arica y Parinacota, Tarapacá), Peru (Ancash, Apurímac [expected], Arequipa, Ayacucho, Cajamarca, Cusco, Huancavelica, Junín, La Libertad [expected], Lima, Moquegua, Puno, Tacna). It grows in grasslands, rocky slopes, exposed places of the puna ecoregion, between elevations of 3,500 and 5,000 m (Figure 35).

Phenology. Flowering nearly all year round.

Etymology. The epithet honors the French naturalist A. D. d'Orbigny (1802–1857), who traveled in South America from 1826 to 1834 (Stafleu and Cowan, 1981).

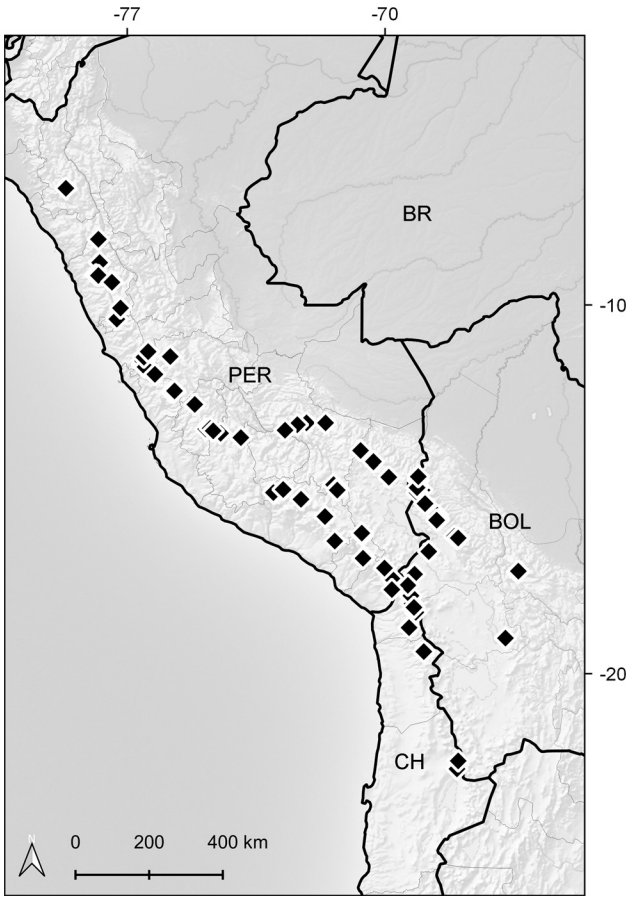

FIGURE 35. Distribution map of *Werneria orbignyana*.

Notes. *Werneria orbignyana* is widely distributed through the central Andes and belongs to the *Werneria* group with white ray corollas and denticulate leaves. It usually has an up to 67 mm long peduncle without bracts or with only a few; specimens with a sessile capitulum are also found. The ray corollas are white, usually bluish or purplish beneath. This species is very variable in leaf morphology. Typical forms have narrowly oblanceolate leaves that are 30–50 mm long and shallowly tridentate at the apex (e.g., *Mandon 102*, BR, G, K, P, S, US). Some populations from Ancash and Lima (Peru) display longer leaves with 5–7 teeth up to 4 mm long (e.g., *Granda 1460*, MOL; *Pennell 14690*, PH; *Vilcapoma 2499*, USM). In contrast, plants tend to have narrowly oblanceolate leaves (almost linear) with a subentire apex in northern Chile and northern Bolivia (e.g., *Aedo 6961*, MA; *Massy 23* and *1206*, LPB; *Villavicencio & Valenzuela 371*, LPB). As commented under *W. cochlearis*, these individuals can be confused with forms of *W. cochlearis* with narrowly oblanceolate leaves.

The small forms of *W. orbignyana* from northern Chile may also be confused with *W. glaberrima*, another species with white ray corollas and denticulate leaves that also thrives in northern Chile. They differ in the shape of the leaf apex (obtuse to rounded in *W. orbignyana* vs. acute in *W. glaberrima*) and their habit (rather decumbent in *W. orbignyana* vs. erect in *W. glaberrima*). Moreover, the leaf apex of *W. glaberrima* is usually slightly bent backward (i.e., somewhat reflexed).

D'Orbigny's collection number indicated in the protologue of *W. orbignyana* is "338." We found a d'Orbigny collection at P perfectly matching the *indicatio locotipica* but numbered "328." We consider this a typographical error, and the mentioned specimen is here designated as the lectotype of the name *W. orbignyana*.

Additional Specimens Examined. **BOLIVIA. Cochabamba:** Quillacollo, cumbre cordillera del Tunari, 17°13′S, 66°23′W, 28 Apr 2006, *M. Zárate & M. Velarde 2395* (BOLV); Quillacollo, cordillera alta del Tunari, cima de Jalsuri, 17°15′S, 66°24′W, 2 Apr 2011, *M. Zárate et al. 3884* (BOLV). **La Paz:** Murillo, bajando de la cumbre 7 km hacia Unduavi, 28 Jul 1991, *S. G. Beck et al. 18773* (LPB); Murillo, bajando de la cumbre unos 4 km hacia La Rinconada, arriba de la laguna, 16°19′S, 68°1′W, 1 Nov 2015, *S. G. Beck 35001* (LPB); Franz Tamayo, P.N. Madidi, Keara Nuevo, camino a Puina, 14°39′S, 69°6′W, 19 Jun 2005, *A. Fuentes et al. 8414* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, entre Pelechuco y Keara, poco antes de llegar a paso Sánchez, 14°45′S, 69°6′W, 16 Apr 2006, *A. Fuentes, M. Mendoza, & M. C. López 9974* (LPB); Murillo, 7.3 km NE of the cumbre (pass) on rd. to Unduavi, and 8 km W of Pongo, on N side of rd., 16°19′S, 68°1′W, 15 Apr 1995, *V. A. Funk 11339* (LPB, US); Bautista Saavedra, Ulla Ulla, cerca del camino hacia mina Sunchuli, 15°1′S, 69°0′W, 3 Aug 1993, *P. Holt 5* (LPB); Pacajes, a 24.4 km al O de río Blanco, 17°53′S, 69°18′W, 15 Jul 1995, *N. Massy 1206* (LPB); Gral. José Manuel Pando, a 2.4 km al S de Berenguela, 17°18′S, 69°12′W, 2 Aug 1995, *N. Massy 23* (LPB); Franz Tamayo, Ulla Ulla, más arriba de la laguna Puyo Puyo, 14°57′S, 69°8′W, 6 Jun 1982, *X. Menhofer 1339a* (LPB); Franz Tamayo, Ulla Ulla, nevado Manuel Llipani, 20 Jul 1982, *X. Menhofer 1339b* (LPB); Franz Tamayo, isla en la laguna Catantira (=Okaria), 15°5′S, 69°8′W, 12 Mar 1983, *X. Menhofer 2143* (LPB); Murillo, near cumbre ne La Paz, 16°20′S, 68°3′W, 28 Aug 1999, *J. Müller 7571* (LPB); Pacajes, Japuma, a 5 km E Charaña, sobre riel, 17°36′S, 69°23′W, 21 Sep 2000, *G. Prieto 36* (LPB); Inquisivi, cordillera Tres Cruces, 13 Sep 2001, *B. J. Ruthsatz 10534* (LPB); Murillo, 3.3 km N of (below) the pass at the head of the Zongo valley, 16°16′S, 68°7′W, 15 Sep 1984, *J. C. Solomon 12283* (LPB, MO n.v.); Murillo, 7.5 km NE of la cumbre (railroad station), 16°19′S, 68°0′W, 15 May 1985, *J. C. Solomon 13655* (LPB, MO n.v.); Murillo, La Cumbre, ~16 km N of the puesto de tránsito Chuquiaguillo, vicinity of laguna Estrellani, 16°20′S, 68°3′W, 24 Aug 1986, *J. C. Solomon 15526* (BOLV, LPB, MO n.v., US); Muñecas, oberhalb Sarani (oberhalb Pocohuaya, Chuma), 15°23′S, 68°55′W, 7 Oct 1992, *A. Stampfli 1* (LPB); Ingavi, cantón Jesús de Machaca, comunidad Titicani-Tacaca, a 20 km de Guaqui, 16°41′S, 68°49′W, 22 Mar 1989, *X. Villavicencio & E. Valenzuela 371* (LPB); Larecaja, Sorata, nevado Illampu, laguna glacial, 15°49′S, 68°33′W, 20 Jul 1996, *J. R. I. Wood 11259* (LPB); Larecaja, Sorata, on trail from la abra de Illampu to la laguna glacial, 15°50′S, 68°36′W, 7 Apr 2004, *J. R. I. Wood 20657* (LPB); Franz Tamayo, Pelechuco, Puina, al ESE en línea recta 3.3 km de la laguna Celeste, 14°40′S, 69°54′W, 7 Sep 2015, *F. Zenteno, B. Miranda, & F. Flores 15140* (LPB). **Oruro:** altiplano central, commune de Condo, 19°2′S, 66°44′W, 7 Apr 1989, *L. Naessany 18* (LPB).

CHILE. Antofagasta: Loa, San Pedro de Atacama, Machuca–El Tatio, ~4.2 km al S de El Tatio, 22°22′S, 68°1′W, 5 Mar 2019, *J. Calvo 7922* (SGO). **Arica y Parinacota:** pr. Caquena, 18°6′S, 69°16′W, 25 Nov 2001, *C. Aedo 6961* (MA); Aguas Calientes, Tacora, 17°43′S, 69°49′W, 17 Sep 1955, *M. Ricardi 3371* (CONC); camino Bocatoma a Chungará, km 2, 18 May 1991, *C. Fernández & H. Niemeyer 91-102* (SGO); lagunas de Cotacotani, 18°12′S, 69°13′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 240* (CONC); termas Churiguaya, 18°20′S, 69°10′W, 18 Jun 2015, *A. Moreira-Muñoz 2496* (SGO); camino Umirpa a Tignamar, ~km 28, 18°45′S, 69°21′W, 26 May 2016, *A. Moreira-Muñoz & M. Diazgranados 2626* (SGO). **Tarapacá:** Colchane, vega camino a géiser Puchuldiza, 19°24′S, 68°57′W, 16 Jun 2018, *A. Moreira-Muñoz 2877* (SGO).

PERU. Ancash: Huaylas, alrededores del abra de Tres Cruces, 18 May 2000, *A. Cano et al. 10437* (USM); Huaylas, Riurín, alturas de Pueblo Libre y alrededores, cerro Huachoq Qocha y cerro Gallu Huaqanan, 9°12′S, 77°47′W, 19 May 1999, *A. Cano et al. 9267* (USM); Huaylas, Ocshapampa (Oxapampa), 9°11′S, 77°51′W, 11 Oct 1999, *A. Cano et al. 9735* (USM); Bolognesi, Mojón cumbre entre Chiquián y Conoccocha, 10°5′S, 77°11′W, 26 May 1960, *E. Cerrate 3334* (USM); Bolognesi, Acas, cerca a la laguna de Condorcocha, 10°23′S, 77°17′W, 20 Aug 1981, *E. Cerrate 8166* (US, USM); alrededores de la Laguna, 25 Nov 1981, *E. Cerrate & B. León 8402* (USM); Pallasca, Conchucos,

parte alta de quebrada Toldobamba, 8°13′S, 77°47′W, 15 Sep 2015, *P. Gonzáles & N. Tenorio 3840* (USM); Carhuaz, Huascarán N.P., quebrada Ishinca, side valley to laguna Ishinca, 9°23′S, 77°25′W, 16 Jul 1985, *D. N. Smith & M. Buddensiek 11211* (USM); Huaylas, Huascarán N.P., pass between quebrada Los Cedros and Hatuncocha, 8°51′S, 77°45′W, 12 Mar 1985, *D. N. Smith & R. Valencia 9954* (USM); Huaraz, quebrada de Ishiuca, Cordillera Blanca cerca de Huaraz (Paltay), 9°22′S, 77°25′W, Aug 1974, *M. Weibel s.n.* (USM); Huaylas, bajando de Huinco hacia la laguna de Huamanripa, 6 Sep 1994, *G. Yarupaitán & E. Salas 1481* (USM). **Arequipa:** dist. Chiguata, 16°24′S, 71°22′W, 29 Jun 2006, *F. Cáceres 5715* (HUSA); Ramón Castilla, Orcopampa, alrededores de Cia. Minera Ares, 15°16′S, 72°17′W, 31 Mar 2000, *A. Cano & N. Valencia 10099* (USM); Caylloma, Patapampa, 15°44′S, 71°38′W, 10 May 1988, *E. Linares 262* (USM); La Unión, Huaynacotas, entre la laguna y el rodal de Puya raimondii, 15°0′S, 72°46′W, 6 Aug 2017, *V. Quipuscoa et al. 6113* (HSP). **Ayacucho:** Vilcashuamán, cerca a la cumbre del cerro Atinccocha, 13°36′S, 73°55′W, 30 Sep 2004, *S. M. Baldeón 6178* (USM); Ayacucho, abra Apacheta, camino a Pars, 13°25′S, 74°40′W, 4 Aug 2010, *A. Cano, W. Mendoza, & A. Delgado 19760* (USM [mixed with *Xenophyllum marcidum*]); Huamanga, Ocollo, hacia abra Apacheta, 13°29′S, 74°28′W, 26 Jun 2010, *A. Cano et al. 19868* (USM); Páucar del Sara Sara, Oyolo, a 15 km al NO de Pampamarca, camino a Sayla, 15°5′S, 73°2′W, 14 Sep 2013, *C. Tejada 237* (HSP). **Cajamarca:** Hualgayoc, El Empalme, lugar donde se unen las carreteras de Hualgayoc y San Miguel, 6°50′S, 78°40′W, 16 Aug 1952, *R. Ferreyra 8572a* (USM). **Cusco:** valle de Urubamba, alrededores laguna Yanacocha, 13°15′S, 72°23′W, 5 Jun 1995, *S. Agüero s.n.* (USM); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7669* (USM); Paucartambo, Parque Nacional del Manu, Huáscar, Challabamba, 13°12′S, 71°37′W, 9 Sep 1990, *A. Cano 4241* (CUZ, USM); Comandante Espinar, mina Quechua cerca de Yauri, 14°59′S, 71°17′W, 19 Nov 1984, *I. Carlier 211* (USM); Comandante Espinar, Espinar, río Chocó, 15°1′S, 71°18′W, 5 Oct 2015, *P. Gonzáles & M. Monzón 3857* (USM); Espinar, río Cañipía aguas abajo, en inmediaciones de la comunidad Huisa Ccollana, 14°52′S, 71°24′W, 29 Sep 2013, *D. Ramos et al. 1512* (HSP); Urubamba, ACP Mantanay, 10 km up the valley from Yanahuara, by the side of laguna Manalloqsa, in the small valley 3 km E of laguna Ipsaycocha, 13°12′S, 72°8′W, 25 Jun 2012, *S. P. Sylvester 1740* (USM). **Huancavelica:** alrededores del puente Licapa, San Antonio, 13°22′S, 74°52′W, 19 Jun 2007, *H. Beltrán 6390* (USM); Huaytará, Pilpichaca (abra Apacheta), 13°21′S, 74°45′W, 4 Jul 2010, *A. Cano, W. Mendoza, & A. Delgado 19710* (USM); Huaytamayocc, 12°42′S, 75°10′W, Apr 1961, *O. Tovar 3211* (USM [mixed with *W. nubigena* and *W. pectinata*]). **Junín:** Tarma, punta carretera Oroya–Tarma, 11°24′S, 75°50′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 8000* (USM). **Lima:** Yauyos, Laraos, camino Jalcacha a Palca, 12°20′S, 75°43′W, 25 May 1995, *H. Beltrán 1708* (USM); Yauyos, Laraos, entre Soca y Achiquina, 12°20′S, 75°43′W, 27 May 1995, *H. Beltrán 1771* (USM); Yauyos, Laraos, alrededores de la laguna de Huachaca, 12°22′S, 75°47′W, 1 Mar 1991, *H. Beltrán 307* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 24 May 2010, *P. Gonzáles & E. Navarro 1275* (USM); Huarochirí, San Damián, Chanape, 11°53′S, 76°15′W, 5 Jul 2013, *P. Gonzáles & B. Brito 2636* (USM); Canta, Lachaqui, camino a la laguna Llarcán, 11°31′S, 76°35′W, 17 Apr 2015, *P. Gonzáles & E. Castañeda 3570* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 28 Oct 2009, *P. Gonzáles & R. Jurado 792* (USM); Canta, Lachaqui, Quinán, muy cerca a la laguna, 11°35′S, 76°34′W, 20 May 1995, *A. Granda 1460* (MOL); Canta, Lachaqui, más arriba de la laguna de Quinán, camino hacia Carampoma (Huarochirí), 11°35′S, 76°34′W, 20 May 1995, *A. Granda 1493* (MOL); Canta-Mishquipuquio, 11°34′S, 76°33′W, 10 Aug 1949, *S. Sánchez 29* (USM); Canta, Lachaqui, laderas de laguna Quinan, 11°35′S, 76°34′W, 5 Jun 1993, *G. Vilcapoma 2499* (USM); Huarochirí, San Juan de Iris, 11°41′S, 76°31′W, 18 Aug 1993, *G. Yarupaitán & J. Albán 1066* (USM). **Moquegua:** Mariscal Nieto, Carumas, cerca a un acueducto, 16°50′S, 70°34′W, 15 Jun 2013, *H. Beltrán 7733* (USM); rd. from Moquegua to Puno, near abra Huaytire (abra Viscachas), 91.6 km from Moquegua, 16°52′S, 70°36′W, 12 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13144* (USM); General Sánchez Cerro, Yunga, Perusa, 16°11′S, 70°38′W, 13 Apr 2012, *D. Montesinos 3810* (USM); General Sánchez Cerro, Yunga, Choco-Choco, 16°14′S, 70°37′W, 11 Sep 2012, *D. Montesinos 3940* (HSP, USM). **Puno:** Melgar, Antauta, San Rafael, quebrada Rosario y Larancota, 14°15′S, 70°19′W, 21 Sep 2011, *P. Gonzáles & W. Ramírez 1609* (USM); Carabaya, Corani, Jarapampa, 13°57′S, 70°40′W, 15 Oct 2015, *P. Gonzáles 3820* (USM). **Tacna:** Tarata, laguna Vilacota, 17°8′S, 70°1′W, 6 Dec 1997, *M. Arakaki 801* (USM); Tarata, laguna Casire [Casiri], 17°25′S, 69°49′W, 18 Jun 1998, *A. Cano 8446* (USM); Tarata, laguna Casire [Casiri], 17°25′S, 69°49′W, 3 Apr 1998, *M. I. La Torre 2435* (USM); Tarata, cerca Tarata, 3 Sep 1976, *W. Rauh 40763* (USM).

17. ***Werneria pectinata*** Lingelsh., Repert. Spec. Nov. Regni Veg. 8: 6. 1910. Type. Bolivia. La Paz: am Chacaltaya (30 km von La Paz), 4,800 m, Feb 1908, *O. Buchtien 1596* (lectotype: US-00037343!, **designated here**).

Werneria knocheae Perkins, Bot. Jahrb. Syst. 49(2): 230. 1913 ["Knocheae"]. Syntypes. Bolivia. La Paz: ["Aguila, 17° südl. Breite, 67° westl. Länge, an der Cordillera Real, 5200 m, Apr 1909, E. Knoche 2, 14, 21" according to the *ind. loc.*] (none found). Neotype, **designated here**: Bolivia. La Paz: Loayza, Caxata 7 km hacia Quime, 4,540 m, 19 Feb 1981, *S. G. Beck 4355* (LPB s.n.!).

Rhizomatous herb, rosettiform, forming clumps, 1–2 cm tall. **Rhizome** 3–9 cm long, 0.2–0.4 cm in diameter, horizontal to oblique, glabrous. **Leaves** extending into a glabrous sheath-like base; leaf lamina narrowly spatulate to spatulate, 5.2–23.9 mm long, 1.3–2.5 mm wide, entire and ciliate (cilia ~0.8 mm long), obtuse at the apex, narrowed at the base, curved forward in

cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath, somewhat fleshy, matte, papillose. **Capitulum** radiate, solitary, terminal, sessile (rarely shortly pedunculate). **Involucre** cupuliform, with bracts fused at the base, 5.9–10.2 mm long, 4.5–5 mm wide, glabrous; involucral bracts 10–13, 3.2–5 mm long, 0.9–1.4 mm wide at the base, acute to obtuse at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 12–13; corollas 5.8–7.1 mm long, 0.7–1 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 12–20; corollas 4.5–5.1 mm long, 5-lobed, whitish, usually purple tipped; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** 1.9–2 mm long, 0.6–0.7 mm wide, cylindrical, ~10-ribbed, glabrous; pappus 3.9–8.9 mm long, barbellate, whitish to partially purplish. Chromosome number unknown (Figures 12E,F, 36, 37).

Additional Iconography. Beltrán (2017: 62, fig. 4B, as photo); Calvo and Beltrán (2019: 140, fig. 4D, as photo).

Distribution and Habitat. Bolivia (Cochabamba, La Paz, Oruro, Potosí [expected]), Peru (Ancash, Apurímac, Arequipa, Ayacucho, Cusco, Huancavelica, Huánuco [expected], Junín, Lima, Moquegua, Puno). It grows on grassy hillsides, exposed slopes, and rocky places of the subhumid puna ecoregion, between elevations of 3,900 and 5,200 m (Figure 38).

Phenology. Flowering from December to July.

Etymology. The adjective *pectinatus, -a, -um* means comblike, that is, with narrow, close-set divisions. It refers to the ciliate leaf margin that characterizes this species.

Notes. *Werneria pectinata* is readily distinguishable by its marginal ~0.8 mm long cilia on the leaves and its white ray corollas. The leaf shape varies from narrowly spatulate to spatulate. Any confusion with other species of the genus is unlikely.

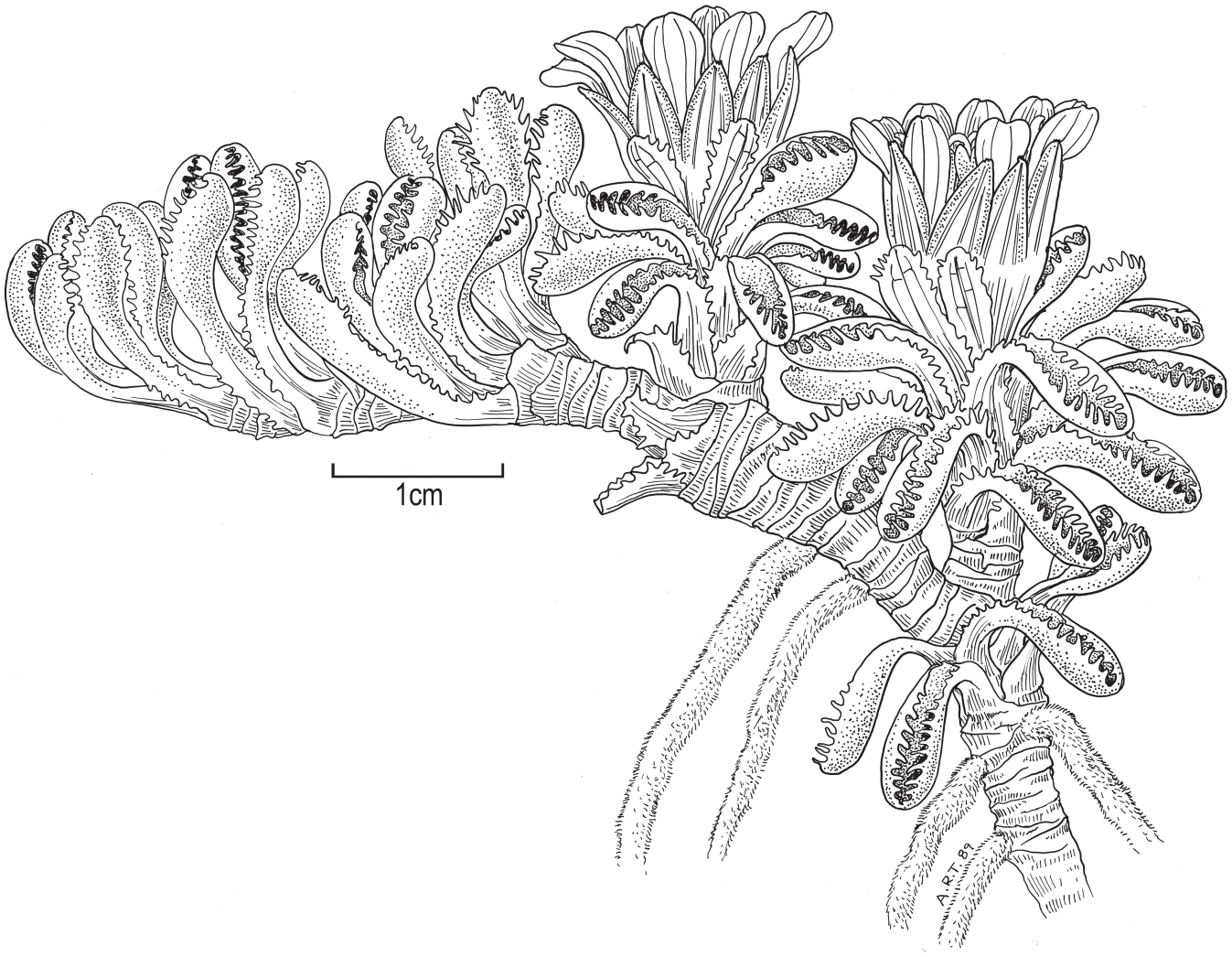

FIGURE 36. *Werneria pectinata*. Habit (drawn from *E. Asplund 4929*, US). Illustration by Alice Tangerini.

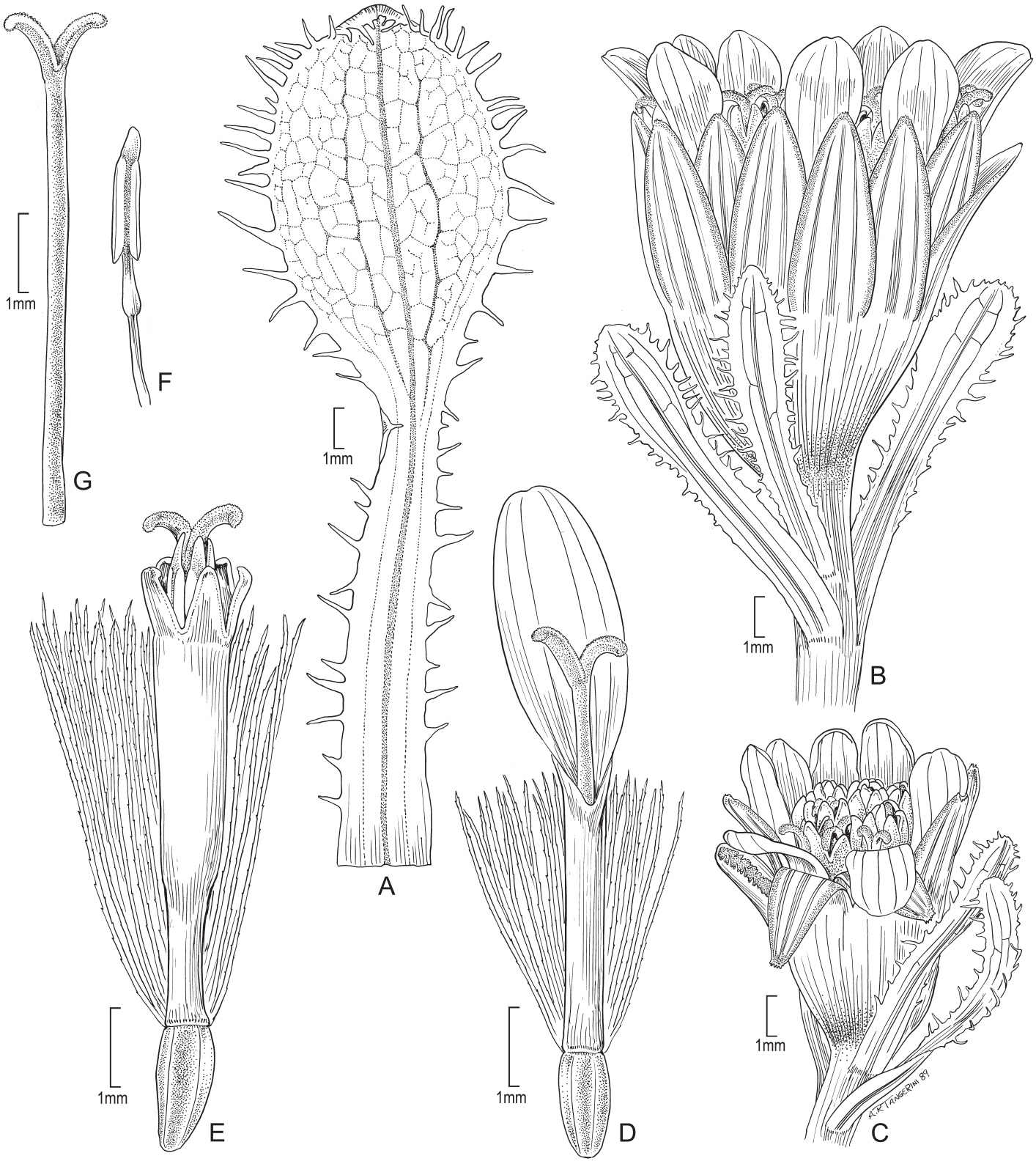

FIGURE 37. *Werneria pectinata*. **A.** Leaf. **B, C.** Capitula at different stages of development. **D.** Ray floret (frontward bristles removed). **E.** Disc floret (frontward bristles removed). **F.** Stamen. **G.** Style. All details are drawn from *E. Asplund 4929* (US).

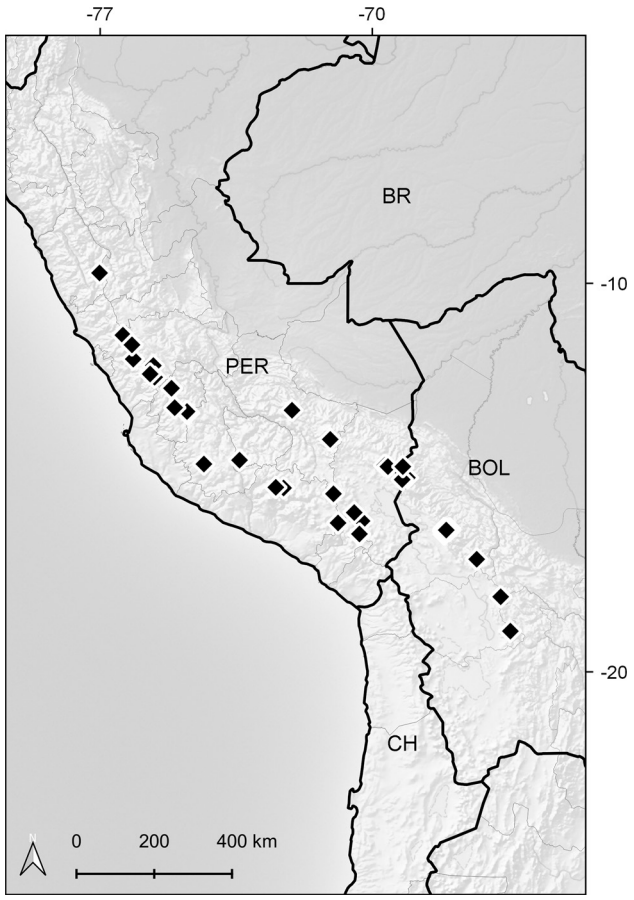

FIGURE 38. Distribution map of *Werneria pectinata*.

It shares only some morphological affinities with *W. castroviejoi* (see comments under the latter species).

In agreement with Rockhausen (1939), *W. knocheae* Perkins perfectly matches *W. pectinata*. We saw only a picture of the specimen *Knoche 21* that was kept at B and destroyed in 1943 (F0BN015813). There are no duplicates at DS (Debra Trock, California Academy of Sciences, personal communication, 22 May 2019), which harbors most of Knoche's herbarium (Stafleu and Cowan, 1979). On this basis, a neotype that perfectly matches the protologue information has been selected.

See comments under *W. caespitosa* for further details regarding the criterion adopted for the lectotypification of the name *W. pectinata*.

Additional Specimens Examined. **BOLIVIA. Cochabamba:** Bolívar, Tanqa Tanqa, 18°4′S, 66°42′W, 26 Apr 2009, *M. Zárate 3350* (BOLV [mixed with *W. apiculata*], LPB). **La Paz:** La Cumbre am Wege nach Yungas, 16°20′S, 68°4′W, 28 Apr 1921, *E. Asplund 4929* (US); Murillo, cordillera Real, de la laguna Larankhota hacia el cerro Wila Manquilizani, 9 Apr 1989, *S. G. Beck 14885* (LPB); Murillo, La Paz–Alto 5 km hacia Chacaltaya, 16°27′S, 68°9′W, 7 Mar 1980, *S. G. Beck 2926* (LPB); Murillo, de la cumbre de Yungas 11 km hacia Unduavi, 6 Feb 1983, *S. G. Beck 7858* (LPB); Murillo, ~15 km al NNE de La Paz, pie del nevado Chacaltaya, 16°22′S, 68°7′W, 27 Mar 1983, *S. G. Beck 9136* (LPB); Nor Yungas, Unduavi, 25 May 1958, *J. Cañigueral 1207* (LPB); Franz Tamayo, estación experimental de Ulla Ulla, 15°3′S, 69°14′W, 29 Jun 1982, *A. Dennis 859* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, 18 Mar 1987, *S. Estenssoro 137* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 18 Mar 1987, *S. Estenssoro 158* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 335* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 350a* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 2 May 1987, *S. Estenssoro 441* (LPB); Murillo, la cumbre (pass) on rd. to Unduavi, near Inca trail, 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11325* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and above lake on abandoned rd., 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11328* (LPB); Murillo, near la cumbre (pass) on rd. to Unduavi, across rd. and high above marker cross, along rd. into mountains, 16°20′S, 68°4′W, 14 Apr 1995, *V. A. Funk 11336* (LPB); Murillo, 7.3 km NE of la cumbre (pass) on rd. to Unduavi, and 8 km W of Pongo, on N side of rd., 16°19′S, 68°1′W, 15 Apr 1995, *V. A. Funk 11340* (LPB); Murillo, nev. Chacaltaya, road to Cabaña del Club Andina, 4.7 km from turn off on road to Zonga, 16°22′S, 68°9′W, 30 Apr 1995, *V. A. Funk 11417* (LPB); Murillo, cima del cerro Estuquería, cerca de la torre de alta tensión, 16°23′S, 68°7′W, 21 Dec 1986, *E. García et al. 925* (LPB); Murillo, subida desde la cumbre ~1 km al E, 25 Jan 1987, *E. García et al. 953* (LPB); Franz Tamayo, Ulla Ulla, ~1 km al N de la cabaña, 15°3′S, 69°14′W, 30 May 1980, *R. Lara 1675* (LPB); Murillo, camino a los Yungas km 16 de La Paz, 6 Apr 1985, *M. Liberman 860* (LPB); Murillo, Milluni, a 18 km NE de La Paz, a un costado de la laguna Ventanani, 16°19′S, 68°9′W, 20 Apr 1995, *R. I. Meneses 12* (LPB); Murillo, Milluni, planicie frente al centro Milluni, 16°19′S, 68°9′W, 6 May 1995, *R. I. Meneses 223* (LPB); Murillo, Milluni, planicie frente al centro Milluni, 16°19′S, 68°9′W, 8 May 1995, *R. I. Meneses 255* (LPB); Murillo, Milluni, frente al centro Milluni, 16°19′S, 68°9′W, 19 May 1995, *R. I. Meneses 357* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 20 Apr 1995, *R. I. Meneses 57* (LPB); Franz Tamayo, Ulla Ulla, estancia Canhuma, subiendo al cerro Laramani, 15°0′S, 69°6′W, 22 Jan 1983, *X. Menhofer 1907* (LPB); Murillo, La Cumbre, ~16 km NE of La Paz (from puesto de tránsito Chuquiaguillo), 16°20′S, 68°3′W, 8 Mar 1984, *J. C. Solomon & B. A. Stein 11644* (LPB); Murillo, 14.5 km N of the La Paz–Tiquina road on the road to Milluni, 16°22′S, 68°10′W, 25 Apr 1985, *J. C. Solomon & M. Moraes 13435* (LPB); Murillo, La Cumbre, laguna Estrellani, margen derecho del camino, 16°20′S, 68°2′W, 2 Feb 1988, *E. Valenzuela 1078* (LPB); Murillo, camino a Alto Chacaltaya, 200 m entrando hacia el camino de la comp. minera Kellguani,

21 Dec 1986, *E. Valenzuela 904* (LPB); Murillo, Patapampa, 2.5 km del desvío, 21 Dec 1986, *E. Valenzuela 936* (LPB); Murillo, 1–2 km along road leading off from near la cumbre on Yungas road toward S side of reservoir in valley above La Paz, 16°22′S, 68°2′W, 16 Mar 2007, *J. R. I. Wood, D. J. N. Hind, & M. Mendoza 23166* (LPB); cumbre vers Yungas, 9 Apr 1981, *J. P. Ybert 832* (LPB); Franz Tamayo, Pelechuco, al NE en línea recta a 1.1 km del campamento Chocollo, 14°43′S, 69°13′W, 22 Nov 2017, *F. Zenteno, D. Villalba, & L. Mamani 21225* (LPB). **Oruro:** Eduardo Abaroa, carretera a Potosí, cerro Toro, ingresando por Ichurata, 18°57′S, 66°27′W, 27 Feb 2016, *I. Jiménez 7842* (LPB).

PERU. Ancash: Recuay, Huancapeti, en carretera Recuay–Aija, 9°44′S, 77°1′W, 25 Mar 2002, *A. Cano, I. Salinas, & F. Mellado 12149* (USM). **Apurímac:** Aimaraes, road from Puquio to Chalhuanca 109 km E-NE of Puquio, 14°33′S, 73°25′W, 21 Apr 1982, *V. A. Funk, H. Bedell, & J. L. Cracraft 3569* (US). **Arequipa:** Castilla, Orcopampa, minas de Poracota, Providencia, 15°15′S, 72°29′W, 20 Apr 2011, *H. Beltrán 7103* (USM); Ramón Castilla, Orcopampa, alrededores de Cia. Minera Ares, 15°16′S, 72°17′W, 31 Mar 2000, *A. Cano & N. Valencia 10110* (USM); San Juan de Tarucani, a 3.9 km al SO de Carmen de Chaclaya, 16°10′S, 70°53′W, 24 Mar 2013, *C. Tejada, D. Montesinos, & D. Figueroa 81* (HSP). **Ayacucho:** Lucanas, Reserva Nacional Pampas Galeras, 14°39′S, 74°20′W, 21 Apr 2012, *M. Morales et al. 4067* (USM). **Cusco:** Quispicanchis, 20.5 km past Santa Bárbara and 62.5 km from Sicuana on dirt road to cordillera Auzangate (in the Cordillera de Chimboya), near abra Puncuni, 14°1′S, 71°5′W, 12 Apr 1982, *V. A. Funk, J. L. Cracraft, & H. Bedell 3462* (US); Urubamba, Huayllabamba, lagunas Yanachocha y Quellococha hacia San Juan, NE de Cusco, 13°16′S, 72°4′W, 19 Aug 1989, *A. Tupayachi & W. Galiano 1207* (US). **Huancavelica:** Huaytará, Pilpichaca (abra Apacheta), 13°18′S, 74°47′W, 4 Jul 2010, *A. Cano, W. Mendoza, & A. Delgado 19644* (USM); Huaytará, Pilpichaca (abra Apacheta), 13°20′S, 74°44′W, 4 Jul 2010, *A. Cano, W. Mendoza, & A. Delgado 19667* (USM); Huaytará, Pilpichaca (abra Apacheta), 13°20′S, 74°44′W, 4 Jul 2010, *A. Cano, W. Mendoza, & A. Delgado 19681* (USM); Huaytará, Pilpichaca (abra Apacheta), 13°21′S, 74°45′W, 4 Jul 2010, *A. Cano, W. Mendoza, & A. Delgado 19709* (USM); Huaytará, 7 km lineales al NE del abra Apacheta, en el límite entre Huancavelica y Ayacucho, 13°18′S, 74°46′W, 11 Apr 2005, *J. Roque 4805* (USM); Huaytamayocc, Tansiri, cerca a Manta, 12°42′S, 75°10′W, Mar 1953, *O. Tovar 1117* (USM); Tansiri, cerca a Manta, 12°42′S, 75°10′W, Mar 1953, *O. Tovar 1169* (USM); Huaytamayocc, Tansiri, 12°42′S, 75°10′W, May 1956, *O. Tovar 2510* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, 3 May 1958, *O. Tovar 2867b* (USM). **Junín:** abra de la Viuda, 11°20′S, 76°25′W, 26 Mar 2005, *C. Aedo & A. Galán 10874* (MA); Chupaca, San José de Quero, límite con la provincia de Yauyos en el distrito de Tomas, 12°7′S, 75°38′W, 21 Jun 2011, *P. Gonzáles 1530* (USM). **Lima:** Yauyos, Laraos, camino Jalcacha a Palca, 12°20′S, 75°43′W, 23 May 1995, *H. Beltrán 1685* (USM); Yauyos, Laraos, Viscollo, 12°25′S, 75°36′W, 12 May 2001, *H. Beltrán 4182* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7994* (USM); Huarochirí, alrededores de la laguna de Chumpicocha, 11°57′S, 76°9′W, 28 May 1953, *E. Cerrate 1999* (USM). **Moquegua:** pr. Tiriti, 16°27′S, 70°20′W, 10 Apr 2005, *C. Aedo & A. Galán 11261* (MA); interoceanica sur rd., 7–8 km E of intersection with rd. 106 (road that drops down to Ichua), 16°28′S, 70°20′W, 13 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13158* (USM); General Sánchez Cerro, Ubinas, reserva de Vicuñas, Matazo–Chaclaya, 16°10′S, 70°53′W, 2 Mar 2018, *D. Montesinos & J. Calvo 5905* (HSP). **Puno:** above San Antonio de Esquilache (new SAE) on alternate road out of valley, 16°7′S, 70°16′W, 14 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13163* (USM); abra Pampilla (or abra Tocotoco) on rd. from Putina to Ananea and on to La Rinconada, 136 km from Puno (city), 14°43′S, 69°36′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13174* (USM); just W of abra on unpaved track, ~17 km from Puno–Ananea rd., 14°41′S, 69°41′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13185* (USM); Puno to Arequipa via old Panamerican Hwy, road from Mañazo to abra Toroya and on to Arequipa (city), near abra Toroya, 15°54′S, 70°28′W, 17 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13188* (USM); Lampa, Santa Lucía, alrededor de la represa de Bamputañe, 15°25′S, 71°0′W, 17 May 2017, *V. Quipuscoa et al. 5554* (HSP).

18. ***Werneria pinnatifida*** J. Rémy, Fl. Chil. 4: 216. 1849. Type. Chile. Coquimbo: in herbosis humidis andinum Los Patos, 1837, *C. Gay 703* (lectotype: P-02088545 [digital image!], designated by Freire and Ariza-Espinar [2014: 223]; isolectotypes: F-974712!, GH s.n.!, P s.n.!, SGO-000006432!).

Werneria heteroloba Wedd., Chlor. Andina 1: 88. 1856. Type. Bolivia. Potosí: montagnes des lagunas de Potosí, Mar [without year], *A. D. d'Orbigny 1415* (lectotype: d'Orbigny's collection as the first-step lectotype, designated as "typus" by Rockhausen [1939: 283]; P-02088558 [digital image!] as the second-step lectotype, designated by Freire and Ariza-Espinar [2014: 222]; isolectotypes: G-00305497 [digital image!], GH s.n.!, P-02088560 [fragment, digital image!], W-115298!), **syn. nov.**

Werneria obtusiloba S. F. Blake, J. Washington Acad. Sci. 18: 489. 1928. *Werneria heteroloba* var. *obtusiloba* (S. F. Blake) Rockh., Bot. Jahrb. Syst. 70: 283. 1939. Type. Peru. Moquegua: cordillera east of Carumas, 4,500–4,600 m, 7/8 Mar 1925, *A. Weberbauer 7362* (holotype: F-552591!; isotypes: G-00305496 [digital image!], US-00037327!), **syn. nov.**

Werneria heteroloba f. *microcephala* Rockh., Bot. Jahrb. Syst. 70: 283. 1939. Type. Chile. Arica y Parinacota: lago Chungará, 4,550 m, 5 Mar 1927, *C. Troll 3222* (lectotype: B s.n.!, **designated here**), **syn. nov.**

Werneria pinnatifida var. *heteroloba* (Wedd.) Rockh., *nom. inval. in sched.* (Turland et al., 2018, ICN Art. 32.1) (P-02088559 [digital image!]).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 2–5 cm tall. **Rhizome** 2–4 cm long, 0.3–0.6 cm in diameter, horizontal to oblique, glabrous. **Leaves** pseudopetiolate;

leaf lamina oblong, 10–65 mm long, 4–15 mm wide, pinnatifid to 1–2-pinnatisect with 10–15 lobes per side (rarely some subentire leaves), acute at the apex, attenuate to cuneate at the base, rather flat in cross section, arachnoid to sparsely arachnoid above, glabrescent beneath, 1-nerved above, 1-nerved beneath, somewhat fleshy, matte; pseudopetiole 5–40 mm long, glabrescent. **Capitulum** discoid, solitary, terminal, sessile to shortly pedunculate; peduncle up to 30 mm long, glabrescent, usually without bracts. **Involucre** cupuliform, with bracts fused at the base, 6–11 mm long, 4–10 mm wide, glabrescent to covered with scattered arachnoid trichomes; involucral bracts 13–19, 2.9–3.4 mm long, 1.1–1.5 mm wide at the base, acute to obtuse at the apex, greenish to purplish; supplementary bracts absent (sometimes with 1–2 peduncle bracts reaching the involucre). **Florets** 40–60; corollas 5.7–6.6 mm long, 5-lobed, whitish to purplish tipped; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** 2.5–2.8 mm long, 0.7–0.8 mm wide, cylindrical, 8–9-ribbed, glabrous; pappus 5.6–9 mm long, barbellate, whitish to partially purplish. Chromosome number unknown (Figure 39A,B).

Additional Iconography. Weddell (1856: pl. 16A, sub *W. heteroloba*); Blake (1928: 496, fig. 1A, sub *W. obtusiloba*); Cabrera (1948: 51, fig. 1, sub *W. heteroloba* f. *microcephala*; 1978: 470, fig. 198I–K, sub *W. heteroloba*); Freire and Ariza-Espinar (2014: 222–223, *W. heteroloba* A–D, *W. pinnatifida* A–F); Beltrán (2017: 61, fig. 3E, sub *W. heteroloba*, as photo).

Distribution and Habitat. Argentina (Catamarca, Jujuy, Salta, San Juan, Tucumán), Bolivia (Cochabamba, La Paz, Oruro, Potosí), Chile (Antofagasta, Arica y Parinacota, Atacama, Coquimbo, Tarapacá), Peru (Ancash, Arequipa, Cusco, Huancavelica, Puno, Tacna [expected]). It grows in moist grassy slopes and Andean marshes (bofedales, "vegas") of the puna and the southern Andean steppe ecoregions, between elevations of 3,200 and 4,925 m (Figure 40).

Phenology. Flowering from December to May.

Etymology. The epithet *pinnatifida* refers to the leaf shape that characterizes this species.

Notes. *Werneria pinnatifida* is one of the two species of the genus with discoid capitula. It is characterized by its pinnatifid to 1–2-pinnatisect leaves with 10–15 lobes per side. The adaxial leaf surface varies from arachnoid to sparsely arachnoid, and the abaxial leaf surface is glabrescent. The pappus is usually purplish at its upper half, but specimens with entirely whitish pappus are also found.

Traditionally, *W. pinnatifida* has been differentiated from *W. heteroloba* by its larger size and the higher number of involucral bracts, that is, 20–25 versus 10–15 in *W. heteroloba* (Rockhausen, 1939; Cabrera, 1948; Tombesi and Freire, 2013; Freire and Ariza-Espinar, 2014). Various authors, however, disagreed about the identification of some specimens and the distribution of each species. Rockhausen (1939) identified the collection *Venturi 8467* (US) from Jujuy as *W. pinnatifida*, whereas Cabrera (1948) pointed out that it probably corresponds to *W. heteroloba*. Likewise, Cabrera (1978) indicated Catamarca as the southern limit of the distribution of *W. heteroloba*, but Tombesi and Freire (2013) and Freire and Ariza-Espinar (2014) cited both species farther south in the Argentinian province of San Juan. We found that larger plants have a higher number of involucral bracts, which is expected, considering that larger plants tend to have a larger capitulum. However, the variation in the mentioned characters is continuous, and it is not supported by a geographical pattern. The southern populations of Chile have been widely accepted as the core of *W. pinnatifida*; notwithstanding, we also observed plants from this region that have a low number of involucral bracts (e.g., *Teillier 5057*, CONC). The recognition of two distinct taxonomic entities is therefore not recommended, and *W. heteroloba* is synonymized with *W. pinnatifida*, which has priority.

Werneria obtusiloba was transferred to the varietal rank of *W. heteroloba* by Rockhausen (1939). More recently, Beltrán (2017) treated it as an accepted species. We consider that it is a mere variation displaying 1-pinnatisect leaves with entire lobules. Since we observed high variability in leaf division within populations, we believe that this taxon should not be recognized. Moreover, it is noteworthy that variation in leaf division can even be found in a single individual. Plants displaying pinnatisect, pinnatifid, and subentire leaves have been studied from the Chilean regions of Coquimbo and Atacama (*Marticorena et al. 83507*, CONC; *Arancio 92-157*, CONC).

Werneria pinnatifida may be confused with *W. solivifolia*, a species that has a partially overlapping distribution area (see comments under the latter species).

Additional Specimens Examined. **ARGENTINA. Catamarca:** pr. Antofagasta Alta, Calalaste, 25°22′S, 67°23′W, 25 Jan 1885, *F. Philippi s.n.* (SGO). **Jujuy:** near cuesta del Gallo, 13 km SW on rd. to Sta. Rosa de los Pastos Grandes (rt. 129) from junction with rt. 51, 24°30′S, 66°30′W, 4 Mar 1993, *V. A. Funk, L. Katinas, & V. Núñez 11134* (US); Tumbaya, cerro de Chañi, 23°51′S, 65°35′W, 31 Jan 1929, *S. Venturi 8467* (US). **Salta:** abra Colorada (pr. Huamahuaca), 23°11′S, 65°3′W, 24 Mar 2014, *C. Aedo 21454* (MA); 4 km before abra del Acay on rd. from San Antonio de los Cobres to La Poma (rt. 40), 24°30′S, 66°20′W, 3 Mar 1993, *V. A. Funk, L. Katinas, & V. Núñez 11128* (US); turnoff to Lizote, 5 km E abra Lizote, E La Quiaca, on rd. to Sta. Victoria, 39 km E of río Yaví bridge and pueblo Yaví, 22°30′S, 65°15′W, 7 Mar 1993, *V. A. Funk & L. Katinas 11154* (US); 8 km W of abra Lizote on rd. from La Quiaca to Sta. Victoria, 25 km E of bridge over río Yaví and pueblo Yaví, 22°30′S, 65°45′W, 7 Mar 1993, *V. A. Funk & L. Katinas 11156* (US). **San Juan:** Iglesia, valle del Cura, Alojo Los Catres, 23 Jan 1981, *R. Kiesling 3177* (LPB). **Tucumán:** cumbres Calchaquíes, lagunas de Vacaguasi [Huaca Huasi], 26°39′S, 65°44′W, 17 Jan 1913, *L. Castillón 2555* (LIL); Calchaquíes, quebrada del Matadero, 26°41′S, 65°43′W, 13 Jan 1963, *E. de la Sota 2735* (LIL); Tafí, cumbres Calchaquíes, 1 Feb 1907, *M. Lillo 5590* (LIL); Tafí, lagunas de San José, 26°39′S, 65°43′W, Jan 1933, *D. Olea 8730* (LIL); Tafí, lagunas del Negrito, 26°39′S, 65°44′W, 6 Apr 1926, *A. Schereiter 4242* (LIL); Tafí, Calchaquíes, lagunas

FIGURE 39. A, B. *Werneria pinnatifida*. A. Peru, Moquegua, Querala (*D. Montesinos & J. Calvo 5928*, HSP); photograph by Joel Calvo. B. Chile, Arica y Parinacota, Chungará Lake (not collected); photograph by Bárbara Knapton. **C, D.** *Werneria solivifolia*. Peru, Lima, Laraos (*H. Beltrán 4191*, USM); photographs by Hamilton Beltrán.

de San José, 26°39′S, 65°43′W, 28 Jan 1952, *B. Sparre 9363* (LIL); Tafí, Calchaquíes, laguna de Amaicha, 26°35′S, 65°45′W, 8 Mar 1952, *B. Sparre 9695* (LIL).

BOLIVIA. Cochabamba: cordillera del Tunari, zona de Tahua Cruz, 17 Mar 1990, *G. Navarro 671* (BOLV); Tapacarí, comunidad de Japo (km 125 Cbba–Oruro), Wallojo Churu, 17°40′S, 66°45′W, 1 Mar 1996, *H. U. Pestalozzi 841* (BOLV); Tapacarí, comunidad de Japo (km 125 Cbba–Oruro), Chilliwa, 17°40′S, 66°46′W, 9 Apr 1997, *H. U. Pestalozzi 981* (LPB); Quillacollo, on road from Cochabamba to Cocapata, just E of high pass between estancia Tampin and río Peñas, 17°4′S, 66°26′W, 16 Apr 2000, *J. R. I. Wood & M. Zárate 16238* (BOLV). **La Paz:** Murillo, ~15 km al NNE de La Paz, pie del nevado Chacaltaya, 16°22′S, 68°7′W, 27 Mar 1983, *S. G. Beck 9127* (LPB); Zongo, en la montaña detrás de la casa del cuidador del refugio del Wayna Potosí, 16°16′S, 68°7′W, 18 Apr 1999, *G. Bourdy 2214* (LPB); am Chacaltaya (30 km von La Paz), Dec 1934, *O. Buchtien 9402* (LPB); Murillo, Chacaltaya, 16°21′S,

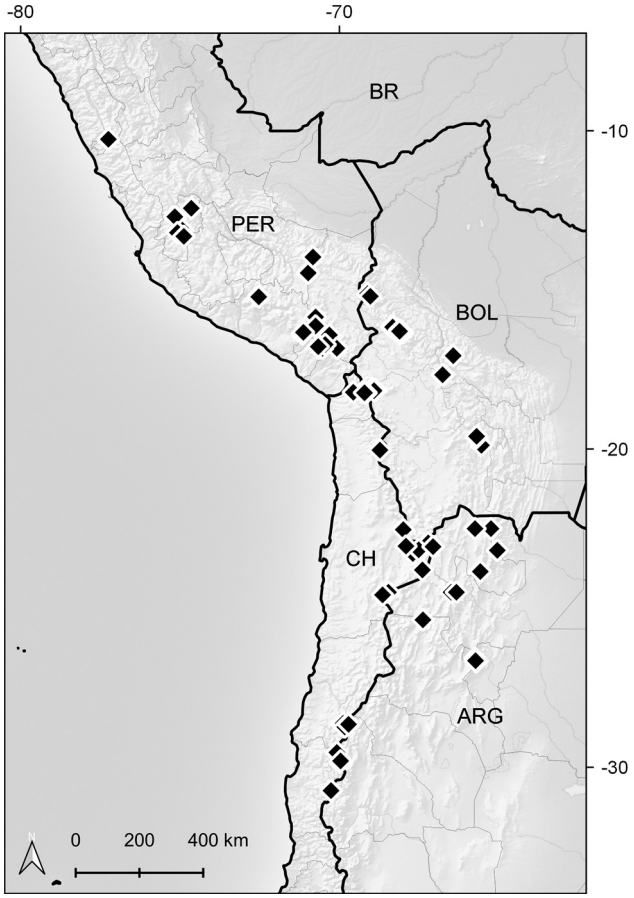

FIGURE 40. Distribution map of *Werneria pinnatifida*.

68°6′W, 2 Mar 1983, *D. K. de Ávila 30* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 289* (LPB); Bautista Saavedra, Seitental des Chajaya–Tales unterhalb Pumazani, 15 Apr 1981, *T. Feuerer 5960* (LPB); Murillo, Zonga valley, lgn. Pata Kkota, 1.5 km S of pass, 16°18′S, 68°7′W, 11 Apr 1995, *V. A. Funk & N. Bernal 11265* (LPB); Los Andes, Hichu-Kkota valley, 19 km from base of lgn. Khara Kkota along rd. to mina Fabulosa, 16°10′S, 68°20′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11376* (LPB); Bautista Saavedra, Charazani, Mamilluni, 15°12′S, 69°2′W, 19 Apr 1993, *P. Gutte & B. Herzog 487* (LPB); Murillo, Milluni, quebrada frente al centro de Milluni, 16°19′S, 68°9′W, 6 May 1995, *R. I. Meneses 203* (LPB); Murillo, Milluni, frente al centro Milluni, 16°19′S, 68°9′W, 9 May 1995, *R. I. Meneses 286* (LPB); Murillo, Milluni, frente al centro Milluni, frente a la escuela, a unos 3 m de la orilla de la laguna bajo Milluni, 16°19′S, 68°9′W, 17 May 1995, *R. I. Meneses 303* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 6 Jan 1996, *R. I. Meneses 440* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 8 Jan 1996, *R. I. Meneses 453* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 9 Feb 1996, *R. I. Meneses 571* (LPB); Franz Tamayo, Ulla Ulla, orillas de la laguna Llacho Kkota [Qachu Quta], 15°7′S, 69°7′W, 6 Nov 1982, *X. Menhofer 1637* (LPB); Omasuyos, Hichu Cota, después de la laguna Khara Khota, cerca al río Pauchintani, 16°10′S, 68°22′W, 14 Apr 1985, *M. Moraes 121* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1086* (LPB); Los Andes, por debajo de la represa Condoriri, bordes del río proveniente del glacial Condoriri, 16°12′S, 68°15′W, 24 Mar 2010, *T. Ortuño, A. P. Sandoval, & N. Pyrooz 981* (LPB); Los Andes, valle de Hichu Kkota, 3 Mar 1985, *C. Ostria 317* (LPB). **Oruro:** Sajama, fondo del valle Pirallani, 18°9′S, 68°52′W, 10 Mar 2006, *S. G. Beck 30575* (LPB); Sajama (al W del nevado), 3 km al N del pueblo de Sajama, cerca de las aguas termales, 18°6′S, 68°58′W, 6 May 1981, *M. Liberman 322b* (LPB); Sajama, cantón Lagunas, 18°10′S, 68°55′W, 17 Feb 1998, *F. Loza de la Cruz 357* (LPB). **Potosí:** cordillera Kari Kari, ~3.2 km arriba de la laguna San Sebastián, 19°37′S, 65°42′W, 13 Feb 2019, *J. Calvo & M. Zárate 7873* (BOLV); José M. Linares Lizarazu, comunidad de Alkatuyo, Pasto Grande, 53 km al SE de Potosí, 16 km al N de la escuela Alkatuyo, 19°53′S, 65°33′W, 24 Feb 1994, *F. Marino 193* (LPB); Tomás Frías, between laguna Lobato and laguna Chalviri, cordillera Kari Kari, 19°38′S, 65°42′W, 6 Mar 1999, *J. R. I. Wood 14607* (LPB).

CHILE. Antofagasta: El Loa, cerro Nevados de Poquis, ladera SO, 23°4′S, 67°4′W, 9 Apr 1997, *M. Arroyo, L. Cavieres, & A. Humaña 97356* (CONC); Loa, San Pedro de Atacama, Toconao, quebrada Aguas Blancas, 23°17′S, 67°42′W, 22 Feb 2001, *M. Ackermann 76* (SGO); quebrada de Las Zorritas, 24°35′S, 68°39′W, 14 Mar 1992, *G. Arancio 92-335* (CONC); El Loa, vegas de Aguas Amargas, 23°3′S, 67°55′W, 18 Mar 1992, *G. Arancio 92-374* (CONC); El Loa, rd. from San Pedro de Atacama to El Tatio, 66 km from San Pedro, 22°32′S, 68°0′W, 14 Mar 1993, *V. A. Funk & L. Katinas 11186* (SGO); El Loa, 25 km W of the Chile/Argentina frontier on the rd. from Paso Sico, in front of salar Laco, 23°48′S, 67°24′W, 12 Mar 1993, *V. A. Funk & L. Katinas 11191* (SGO); vegas del río Zapaleri, 22°57′S, 67°13′W, 18 Dec 1996, *A. Moreira-Muñoz 262* (CONC, SGO); salar Quepiacó, 23°10′S, 67°31′W, 15 Dec 1998, *M. Muñoz 3932* (SGO); Guanaqueros, 24°30′S, 68°28′W, 1901, *J. Rémy s.n.* (SGO). **Arica y Parinacota:** cerca de Parinacota, 18°13′S, 69°34′W, 8 Mar 1984, *M. Arroyo 84-688* (CONC); Parinacota, camino entre laguna Cotacotani y lago Chungará, 18°14′S, 69°13′W, 10 Mar 1984, *M. Arroyo 84-743* (CONC); lago Chungará, 18°14′S, 69°10′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 250* (CONC); Parinacota, 18°12′S, 69°16′W, 27 Feb 1948, *F. Sudzuki 455* (SGO); vega de Parinacota, 18°13′S, 69°14′W, 19 May 1979, *C. Villagrán et al. 1213* (CONC). **Atacama:** Huasco, quebrada Cantarito, entre laguna Grande y quebrada Vizcachas, 28°44′S, 69°50′W, 12 Feb 1981, *M. Arroyo 81651* (CONC); Vallenar, vicinity of laguna Valeriano, 8 Jan 1926, *I. M. Johnston 6071* (BA, CONC, GH, US); Huasco, quebrada Cantarito, entre

quebrada Marancel y portezuelo de Cantarito, vega del río Cantarito, 28°39′S, 69°43′W, 23 Jan 1983, *C. Marticorena, M. Arroyo, & C. Villagrán 83483* (CONC); Huasco, quebrada Cantarito, entre quebrada Marancel y portezuelo de Cantarito, 28°39′S, 69°43′W, 24 Jan 1983, *C. Marticorena, M. Arroyo, & C. Villagrán 83507* (CONC); vega La Colgada, en curso superior del río Sancarrón, 29°32′S, 70°5′W, 22 Jan 1979, *R. Osorio s.n.* (SGO); Huasco, cuenca de el Tránsito, quebrada Larga, 28°39′S, 69°55′W, Feb 2002, *S. Teillier 4999* (CONC); Huasco, cuenca de el Tránsito, quebrada de la mina Fortuna, 28°37′S, 69°53′W, Feb 2002, *S. Teillier 5057* (CONC). **Coquimbo:** Baño del Toro, 30°44′S, 70°16′W, 1860, *G. Volkmann s.n.* (SGO); Elqui, cordillera Doña Ana, quebrada Las Mangueras, 29°48′S, 69°58′W, 19 Feb 1992, *G. Arancio 92-157* (CONC); río Rocas [Vacas] Heladas, 29°50′S, 69°59′W, 10 Apr 1997, *M. Edding & A. Aron s.n.* (SGO). **Tarapacá:** Pica, bofedal de Piga Alto, 20°2′S, 68°44′W, 22 Mar 2003, *S. Teillier & G. Mieres 5418* (CONC).

PERU. Ancash: Bolognesi, Chini, camino a Chonta, 10°16′S, 77°15′W, 29 Apr 1956, *E. Cerrate 2664* (USM); collado sobre el río Pumapampa, 18 Mar 1983, *O. Tovar et al. 9628* (USM); collado encima río Pumapampa, 18 Mar 1983, *O. Tovar et al. 9634* (USM). **Arequipa:** laguna las Salinas, 16°20′S, 71°8′W, 4 Nov 2002, *H. Beltrán, M. Benavente, & H. Montoya 3170* (USM); Castilla, Orcopampa, minas de Poracota, alrededor de laguna Tintarcocha, 15°13′S, 72°32′W, 20 Apr 2011, *H. Beltrán 7109* (USM); Reserna Nacional Salinas y Aguada Blanca, 58.8 km from plaza de armas in Arequipa (city), near laguna Salinas, 16°23′S, 71°10′W, 18 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13192* (USM); Condesuyos, Salamanca, bofedal de Tintarcocha, 15°12′S, 72°32′W, 26 Mar 2012, *I. Treviño 763* (HSP). **Cusco:** La Raya, 14°28′S, 71°0′W, 22 Apr 1925, *F. W. Pennell 13524* (US). **Huancavelica:** alrededores del puente Licapa, Vizcachayoj, 13°19′S, 74°53′W, 19 Jun 2007, *H. Beltrán 6397* (USM); Huachocolpa, alrededores de la unidad minera Caudalosa, 13°4′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3513* (USM); Huachocolpa, alrededores de la unidad minera Caudalosa, 13°4′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3520* (USM); Tansiri, cerca a Manta, 12°42′S, 75°10′W, Mar 1953, *O. Tovar 1123* (USM); Tayacaja, arriba de la hda. Tocas, entre Colcabamba y Paucarbamba, 12°26′S, 74°39′W, 23 Apr 1954, *O. Tovar 2089* (USM [mixed with *W. apiculata*]); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2870* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2917* (USM [mixed with *W. pygmaea*]). **Moquegua:** pampa Tijipampa, laguna Luripungo, 16°50′S, 70°5′W, 12 Apr 2005, *C. Aedo & A. Galán 11285* (MA, USM); area between the carretera-binacional and the interoceanica sur, on unpaved road that connects the two main roads and borders a large bofedal, 16°50′S, 70°32′W, 12 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13154* (USM); rd. from Moquegua to Puno, interoceanica sur hwy. about 2.5 km west of highway, 16°43′S, 70°27′W, 13 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13157* (USM); General Sánchez Cerro, Ubinas, laguna Querala, 16°8′S, 70°45′W, 8 Apr 2011, *D. Montesinos 3109* (HSP, MOL, USM); General Sánchez Cerro, Ubinas, Querala, 16°7′S, 70°45′W, 2 Mar 2018, *D. Montesinos & J. Calvo 5928* (HSP). **Puno:** abra de la Raya, 14°28′S, 70°59′W, 6 Apr 2005, *C. Aedo & A. Galán 11195* (MA); pr. Huaychuni, 16°25′S, 70°19′W, 10 Apr 2005, *C. Aedo & A. Galán 11265* (MA); Carabaya, Quelcaya, 13°58′S, 70°50′W, 15 Feb 2009, *E. Mondragón & J. Postigo 88* (USM); San Román, hacienda Tincopalca, 15°51′S, 70°45′W, 11 Mar 1953, *E. Petersen & J. P. Hjerting 1088* (LIL).

19. ***Werneria plantaginifolia*** Wedd. ex Klatt, Ann. K. K. Naturhist. Hofmus. 9: 367. 1894. *Werneria plantaginifolia* Wedd. ex Sch. Bip., Bull. Soc. Bot. France 12: 80. 1865, *nom. nud.* (Turland et al., 2018, ICN Art. 38.1). Type. Bolivia. La Paz: Larecaja, viciniis Sorata, adscensu a Millipaya ad nives, 3,800 m, May 1859, *G. Mandon 89* (lectotype: P-04388253 [digital image!], **designated here;** isolectotypes: BM s.n.!, F-1013242!, G-00305795 [digital image!], K-000527610 [digital image!], LL-00374331 [digital image!], NY s.n.!, P-02690589 [digital image!], P s.n.!, S-R-6526 [digital image!], W-120474!, W s.n.!).

Werneria plantaginifolia var. *macrocephala* Cuatrec., Feddes Repert. Spec. Nov. Regni Veg. 55: 153. 1953. Type. Peru. Apurímac: Abancay, punas de Ampay, 3,900 m, June 1938, *C. Vargas 1047* (holotype: F-1401940!; isotype: CUZ-34206 [digital image!], GH s.n.!), **syn. nov.**

Rhizomatous herb, scapiform, forming lax clumps or solitary plants, 15–55 cm tall. **Rhizome** 3–5 cm long, 0.5–1 cm in diameter, oblique to vertical, covered with leaf base remnants. **Leaves** pseudopetiolate; leaf lamina oblanceolate, 45–190 mm long, 10.6–30 mm wide, entire, acute to obtuse at the apex, attenuate at the base, flat in cross section, glabrous, pinnately veined (more conspicuous beneath), somewhat fleshy, drying chartaceous, matte; pseudopetiole 70–160 mm long, glabrescent. **Capitulum** radiate, solitary, terminal, pedunculate; peduncle up to 280 mm long, glabrescent, bearing foliose bracts that decrease in size up the peduncle. **Involucre** cupuliform, strongly partite (barely fused at the base), 14.9–27 mm long, 14–20 mm wide, glabrous; involucral bracts 16–25, 12.9–21 mm long, 2.2–3.2 mm wide at the base, acute at the apex, greenish; supplementary bracts absent. **Ray florets** 35–43; corollas 20–20.2 mm long, 1.9–2 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** ~140; corollas 7–8.1 mm long, 5-lobed, yellowish; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** ~3.3 mm long, ~1.3 mm wide, cylindrical, ~7-ribbed, glabrous; pappus 11.1–24 mm long, barbellate, whitish. Chromosome number unknown (Figures 41, 42).

Distribution and Habitat. Bolivia (La Paz), Peru (Apurímac, Ayacucho, Cusco, Junín). This species grows in moist grasslands and wet places of the humid puna ecoregion, between elevations of (2,800–)3,625 and 4,525 m (Figure 43).

Phenology. Flowering from March to July (also collected in bloom in November).

FIGURE 41. *Werneria plantaginifolia*. **A.** Habit. **B.** Capitulum and peduncle bracts. **C.** Ray floret (frontward bristles removed). **D.** Disc floret (ovary and pappus removed). **E.** Stamen. **F.** Style. All details are drawn from *C. Vargas 1047* (GH) except for A (drawn from *J. C. Solomon et al. 16510,* US) and B (drawn from *G. H. H. Tate 88,* NY; referenced to Figure 42). Illustration by Alice Tangerini.

FIGURE 42. *Werneria plantaginifolia*. Bolivia, La Paz, Illampu (*M. Zárate 4568*, BOLV); photograph by Modesto Zárate.

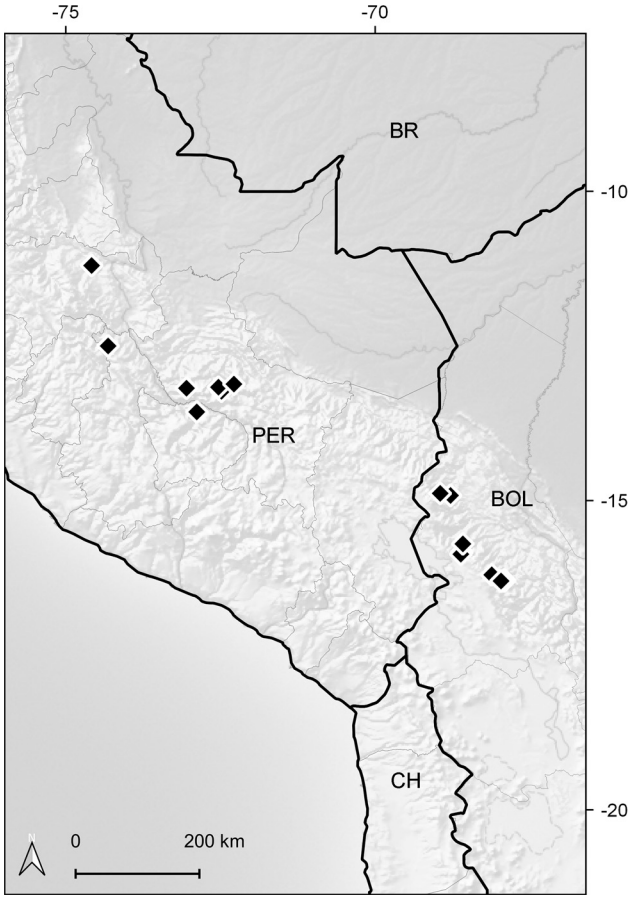

FIGURE 43. Distribution map of *Werneria plantaginifolia*.

Etymology. The epithet *plantaginifolia* refers to the resemblance between the leaves of this taxon and some species belonging to the genus *Plantago* L. (Plantaginaceae).

Notes. *Werneria plantaginifolia* is readily recognizable by its large oblanceolate, entire, glabrous leaves with a differentiated pseudopetiole, pedunculate capitulum, strongly partite involucre, and white ray corollas. It is also characterized by its foliose peduncle bracts, which are usually denticulate and decrease in size upward. The most similar species is *W. glandulosa*, a scarcely collected species that has a partially overlapping distribution area. They can be distinguished by the leaf lamina length (45–190 mm in *W. plantaginifolia* vs. 20–43 mm in *W. glandulosa*) and leaf indumentum (glabrous in *W. plantaginifolia* vs. pilose in *W. glandulosa*). The differences from *W. staticifolia* are discussed under this species.

Werneria plantaginifolia var. *macrocephala* was described on the basis of a specimen displaying larger capitula and florets. We consider these differences to fall within the variability of *W. plantaginifolia*, and therefore, Cuatrecasas's varietal name is included in the synonymy of *W. plantaginifolia*.

Specimen P-04318258, although numbered *Mandon 89*, does not represent type material of *W. plantaginifolia* because the information of the locality does not match that of the protologue. Moreover, it is important to note that it contains mixed material (the individual in the center of the sheet corresponds to *W. staticifolia*).

Additional Specimens Examined. **BOLIVIA. La Paz:** Sud Yungas, subiendo de Unduavi hacia la mina San Luis, 16°17′S, 67°55′W, 29 Jul 1995, *S. G. Beck 21764* (LPB); Murillo, bajando de la cumbre 17 km, entrando por la antigua gravera, pasando la mina Lourdes, subiendo 3 km, PN-ANMI Cotapata, Kalasani, 16°18′S, 67°58′W, 1 Mar 2003, *S. G. Beck, E. Emshwiller, & S. Laegaard 28723* (LPB, US); Nor Yungas, antes de llegar a Unduavi, ex mina San Luis, arriba, 16°18′S, 67°55′W, 25 Aug 2003, *S. G. Beck, O. Rangel, & S. Halloy 29209* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, Juchuy Queñua a medio día de Laji Sorapata, 14°55′S, 68°47′W, 16 Apr 2009, *I. Loza et al. 815* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, Juchuy Queñua a medio día de Laji Sorapata, 14°55′S, 68°47′W, 16 Apr 2009, *I. Loza et al. 924* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, frente a Pallalani, 14°53′S, 68°57′W, 4 Apr 2009, *I. Loza et al. 954* (LPB); Larecaja, viciniis Sorata, prope Las Trincheras de Chiliata, 15°42′S, 68°35′W, Mar 1859, *G. Mandon 89b* (P [mixed with *W. staticifolia*]); Murillo, valle del río Zongo, 14.8 km al N de la cumbre, arriba de laguna Viscachani, 16°12′S, 68°7′W, 11 Apr 1987, *J. C. Solomon et al. 16510* (BOLV, LPB, US); Murillo, mina Lourdes, 2.7 km al N del camino entre La Paz y Unduavi, a lo largo del río Kkota khuchu (~14 km al E de la cumbre), 16°18′S, 67°58′W, 25 Apr 1987, *J. C. Solomon & R. Chevalier 16590* (LPB); Alaska Mine, 3 miles [~4.8 km] north of Pongo, Unduavi Valley, 16°19′S, 67°59′W, 1/4 Mar 1926, *G. H. H. Tate 88* (NY, US); Larecaja, Sorata, on ascent from laguna Challata to la abra de Illampu on trail to la laguna glacial, 15°50′S, 68°36′W, 7 Apr 2004, *J. R. I. Wood 20650* (LPB [mixed with *W. staticifolia*]); Larecaja, Sorata, base de la cordillera Illampu, 15°48′S, 68°35′W, 19 May 2014, *M. Zárate 4568* (BOLV).

PERU. Ayacucho: Huanta, Ayahuanco, alrededor de Sacsahuilca (Llamanniyocc), 12°30′S, 74°19′W, 3 May 2002, *L. Vargas 113* (USM). **Cusco:** Urubamba, ~33 km above Ollantaytambo on road over abra Málaga to Quillabamba and Quelluno, just below (~8.5 km from) abra Málaga, 13°7′S, 72°17′W, 13 Mar 2012, *S. Knapp et al. 10395* (USM); Urubamba, Machupijchu, 13°10′S, 72°32′W, Nov 1989, *B. Peyton 118* (CUZ); La Convención, Vilcabamba, large prominent ledge on the S facing cliff at the end of the Totora-Purkay valley, 4 km E of the Totora-Purkay village, 13°11′S, 73°3′W, 1 May 2013, *S. P. Sylvester 1878* (LPB); Urubamba, Machu Picchu, Pacaymayo, laguna Pacaymayo, 13°14′S, 72°29′W, 26 Jun 2001, *A. Tupayachi et al. 5063* (CUZ). **Junín:** Satipo, carretera Tarma-Oxapampa, desvío a Huasahuasi y luego desvío a Cuchapata, 11°12′S, 74°35′W, 9 Jul 2011, *O. M. Vargas et al. 422* (HSP).

20. ***Werneria pumila*** Kunth, Nov. Gen. Sp. (folio ed.) 4: 150. 1818. Type. Ecuador. ["in summis Andibus Quitensium" according to the *ind. loc.*], [without date], *F. W. H. A. Humboldt & A. J. A. Bonpland s.n.* (lectotype: P-00320182 [digital image!], designated as "holotype" by Nordenstam [1999: 314]; isolectotype: B-W-16430-01-0 [digital image!]).

Werneria densa Benth., Pl. Hartw.: 211. 1845. *Werneria pumila* var. *subspathulata* Wedd., Chlor. Andina 1: 82. 1856. Type. Ecuador. Napo: Antisana, 4,570 m, [without date], *K. T. Hartweg 1168* (lectotype: K-000527603 [digital image!], **designated here**; isolectotypes: BM s.n.!, E-00413267 [digital image!], K s.n.!, LD-1211958 [digital image!], LE s.n.!, NY s.n.!, P-02088562 [digital image!], P-02088563 [digital image!], US-00037304 [fragment! (almost nothing left)], W-9102!, W s.n.!).

Werneria calyculata Turcz., Bull. Soc. Imp. Naturalistes Moscou 24(1): 204. 1851. Type. Ecuador. Pichincha: from the summit of the Andes ["alpibus Quitensibus" according to the *ind. loc.*], 1848, *W. Jameson 618* (lectotype: KW-001001520 [digital image!], **designated here**; isolectotypes: BM s.n.!, G-00305796 [digital image!], G-00305797 [digital image!], K s.n.!).

Oresigonia angustifolia Willd. ex Rockh., Bot. Jahrb. Syst. 70: 310. 1939, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 3–8 cm tall. **Rhizome** 6.5–12 cm long, 0.5–0.8 cm in diameter, horizontal to oblique, covered with arachnoid-lanate indumentum. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear to narrowly oblanceolate, 18–85 mm long, 2.1–4.8 mm wide, entire, obtuse at the apex, barely narrowed at the base, flat to slightly curved forward in cross section, glabrous, 1-nerved above, 1-nerved beneath, somewhat fleshy, drying coriaceous, matte, finely papillose. **Capitulum** radiate, solitary, terminal, sessile to pedunculate; peduncle up to 80 mm long, arachnoid, bearing linear bracts. **Involucre** cupuliform, with bracts fused at the base, 12–18.1 mm long, 9–16.5 mm wide, glabrescent to sparsely arachnoid at the base; involucral bracts 19–21, 7.8–11.3 mm long, 1.6–2.2 mm wide at the base, acute at the apex, greenish to dark purplish; supplementary bracts 12–16, linear, with long, arachnoid trichomes near the base. **Ray florets** 19–21; corollas 11.1–18 mm long, 2–2.1 mm wide, 4–5-veined, subentire at the apex, conspicuously surpassing the involucre, yellow, usually dark reddish beneath. **Disc florets** 68–126; corollas 4.2–5.6 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellow. **Achenes** 3.8–4 mm long, 0.8–1 mm wide, cylindrical, 7–9-ribbed, with some scattered arachnoid trichomes near the base; pappus 5–6 mm long, barbellate, whitish. Chromosome number unknown (Figures 25C,D, 44, 45).

Additional Iconography. Kunth (1818: plate 368-II).

Distribution and Habitat. Colombia (Caldas, Risaralda, Tolima, Valle del Cauca), Ecuador (Azuay, Bolívar, Cañar, Chimborazo, Cotopaxi, Imbabura, Loja, Morona-Santiago, Napo, Pichincha, Tungurahua, Zamora-Chinchipe), Peru (Piura). This species grows on moist, grassy slopes, open areas, and rocky outcrops of the paramo and jalca ecoregions, between elevations of (2,700–)3,200 and 4,825 m (Figure 46).

Phenology. Flowering nearly all year round.

Etymology. The epithet *pumila* means very small. However, this species is not particularly minute compared to other species of the genus.

Notes. This species was described from Ecuador on the basis of material collected by Humboldt and Bonpland in 1802 (see Sandwith [1926] for details about the voyage). It is unique among the species from the northern Andes in having yellow ray corollas. Another characteristic feature is the presence of supplementary bracts at the base of the involucre. These are usually dark purplish and bear a sparse arachnoid indumentum near the base. The leaves are linear to narrowly oblanceolate, finely papillose, and coriaceous and rigid when dried. The capitulum is usually sessile or subsessile, although specimens with a pedunculate capitulum are also found (up to 80 mm long with numerous peduncle bracts and arachnoid indumentum).

The presence of true supplementary bracts is a rare character in the genus *Werneria* and is present only in *W. pumila* and *W. villosa*. The latter species, also with yellow ray corollas, can be easily distinguished from *W. pumila* because it usually has a pedunculate capitulum and its leaves are much longer and generally very narrow linear (leaf width/length ratio of 0.01–0.03 vs. leaf width/length ratio of 0.06–0.12 in *W. pumila*). However, some small acaulescent or shortly pedunculate specimens from central and southern Peru are more difficult to identify, for example, *Tovar 2893* (USM) and *Roque 4890* (USM). These specimens have short leaves that progressively broaden upward and resemble those of *W. pumila*, which likely led some authors to identify them as the latter species (Beltrán, 2017). We consider them to belong to *W. villosa* because of the abundant floccose indumentum on the peduncle and supplementary bracts. In addition, the leaves differ from those of *W. pumila* in being less rigid and not papillose. Nonetheless, the aforementioned morphological similarities and the fact that both species have supplementary bracts and yellow ray corollas suggest a close evolutionary relationship. *Werneria pumila* has also affinities with *W. canaliculata*, *W. cornea*, and *W. huascarana* (see comments under these species).

Werneria pumila is distributed from the northern Cordillera Central in Colombia to northeastern Piura in northern Peru, from where we studied only one collection (*Friedberg 805*, USM). In Piura, the distribution area of *W. pumila* partially overlaps that of *W. villosa*, although they grow in quite different habitats. *Werneria pumila* thrives in humid grasslands (paramo, jalca), whereas *W. villosa* tends to occur in drier places (puna). Freire and Ariza-Espinar (2014) cited *W. pumila* from northwestern Argentina on the basis of *Zuloaga et al. 10879* (SI), which we identify as *W. nubigena* (see further comments under the latter species).

The sheet of the lectotype of *W. pumila* (P-00320182) has an envelope with a plant fragment inside. This fragment is excluded because it corresponds to *Xenophyllum humile*

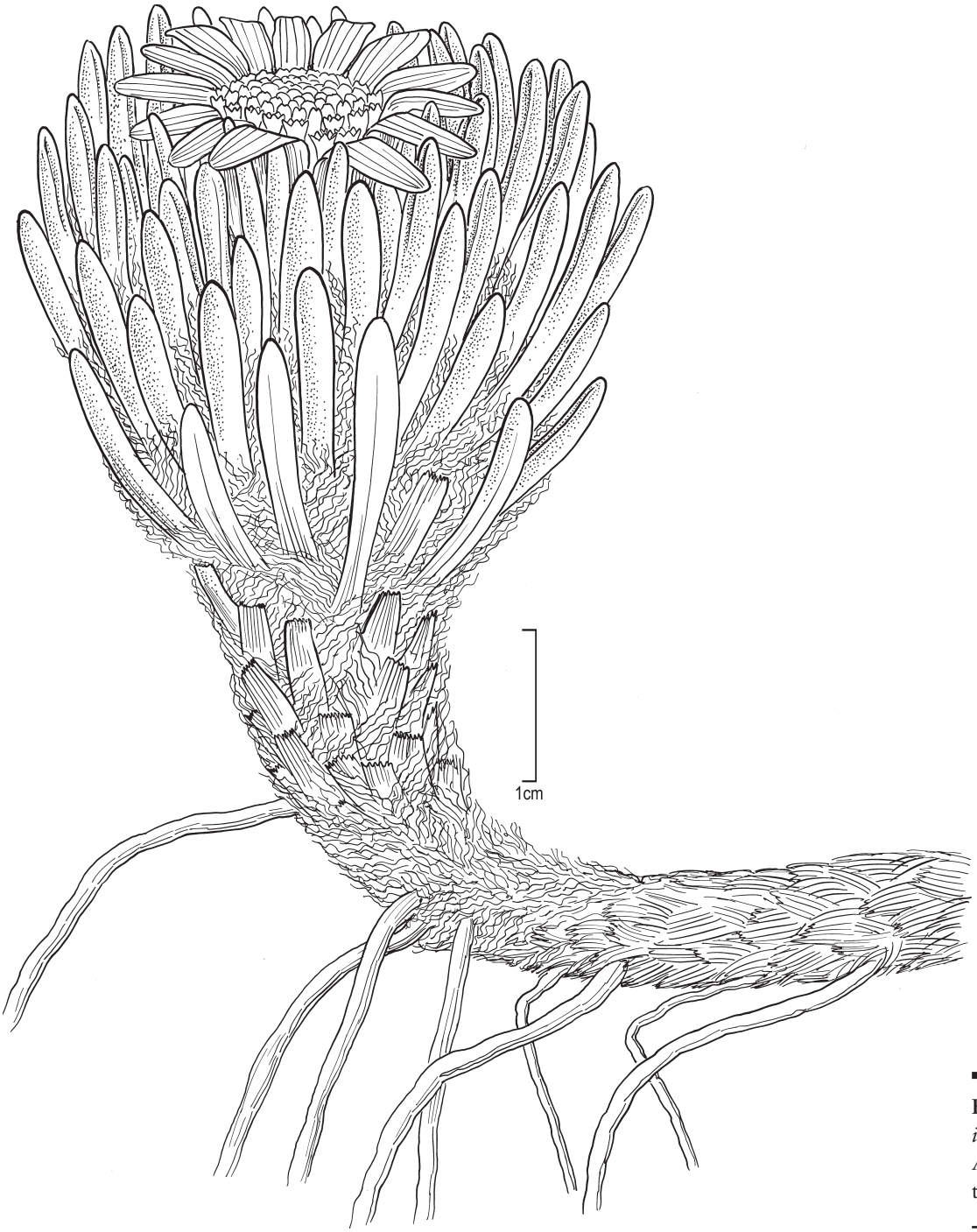

FIGURE 44. *Werneria pumila*. Habit (drawn from *E. Asplund 8369*, US). Illustration by Alice Tangerini.

(Kunth) V. A. Funk. The specimen at Willdenow Herbarium (B-W) corresponds to Humboldt and Bonpland's material as marked by Schlechtendal on a blue label. Moreover, the individuals show a phenology and preservation conditions similar to those of the lectotype; for these reasons we consider it an isolectotype. See Hind and Jeffrey (2001) for further details about Humboldt and Bonpland's material in the Willdenow Herbarium.

Additional Specimens Examined. **COLOMBIA. Caldas:** Nevado de Santa Isabel, 4°46′N, 75°25′W, 15 Jan 2006, *F. García 242* (COL); alrededores del Nevado del Ruiz y de Sta. Isabel, 10 Oct 1978, *O. Rangel, H. Sturm, & O. Vargas 1818* (COL). **Risaralda:** Cordillera Central, páramo del Quindío, 4°44′N, 75°23′W, 15 Aug 1922, *F. W. Pennell & T. E. Hazen 9921* (GH, NY, US). **Tolima:** S side of Nevado el Cisne near laguna Verde, 4°50′N, 75°21′W, 28 Jan 1986, *V. A. Funk 8079*

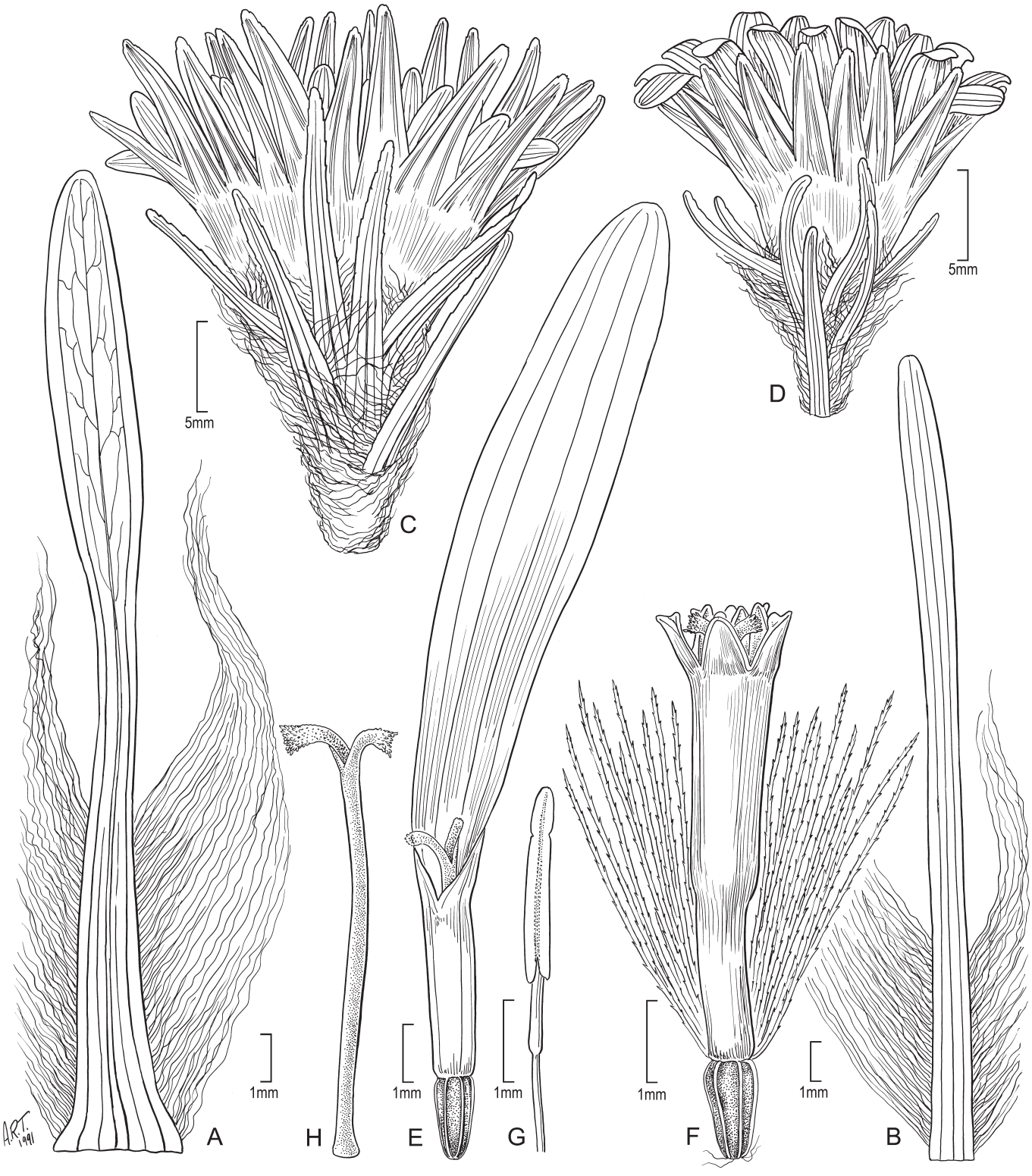

FIGURE 45. *Werneria pumila*. **A.** Leaf. **B.** Peduncle bract. **C, D.** Capitula at different stages of development. **E.** Ray floret (pappus removed). **F.** Disc floret (frontward bristles removed). **G.** Stamen. **H.** Style. All details are drawn from *E. Asplund 8369* (US) except for A, B, E (drawn from *H. E. Anthony & G. H. H. Tate 313*, US) and C (drawn from *A. S. Hitchcock 21046*, US). Illustration by Alice Tangerini.

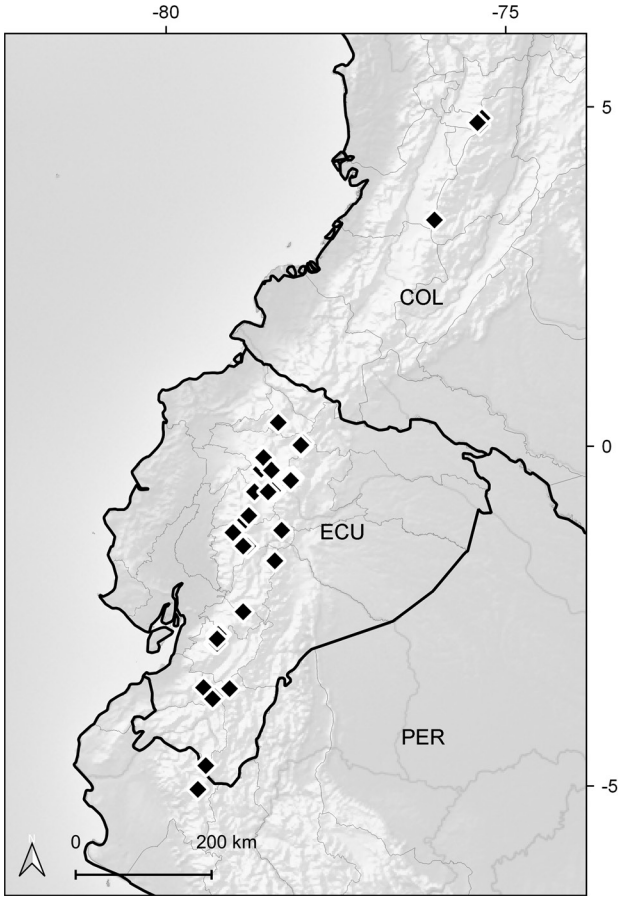

FIGURE 46. Distribution map of *Werneria pumila*.

(COL, US). **Valle del Cauca:** páramo de Tinajas, Cordillera Central, rocky summit of the mountain ridge above laguna Guayabal, 3°20′N, 76°3′W, 21 Oct 2009, *P. Sklenář & D. Vásquez 12300* (UDBC).

ECUADOR. Azuay: Loma del Oro cerca de Yacuambi, cerca de las lagunas de Condorcillo, 3°34′S, 79°4′W, 25 Oct 1997, *R. Bussmann & S. Lange s.n.* (HUTPL); Cajas, ~30 km W of Sayausí, 2°46′S, 79°14′W, 23 Oct 1995, *V. Funk & X. Montezuma 11427* (HA); 8 km W of Soldados on Cuenca–San Joaquín–Angas rd., near laguna Estrellas Cocha, 2°54′S, 79°15′W, 24 Oct 1995, *V. A. Funk & X. Montezuma 11438* (QCA); páramo de Cajas près du col, 10 Apr 1989, *C. Huttel 1654* (QCA); [sine data], 7 Jul 1995, *B. León & K. Young 3606* (QCA); Cuenca, Sayausí, P.N. Cajas, cerca de la laguna Patococha, 2°46′S, 79°12′W, 26 Oct 2012, *D. Minga & A. Verdugo 2417* (HA); eastern cordillera, between Oña and the río Yacuambi, 10/19 Sep 1945, *F. Prieto 281* (F, GH, MO, NY, UC, US); área nacional de recreación Cajas, laguna Luspa, 2°50′S, 79°15′W, 23 Aug 1985, *P. M. Ramsay et al. 116* (QCNE); Cajas N.P., right hand side of the mountain pass of the road Cuenca–Miguir, 2°46′S, 79°15′W, 15 Jul 1997, *P. Sklenář & V. Sklenářová 2606* (QCA); Cajas, 2°46′S, 79°14′W, 24 Jun 1999, *M. Smeets & M. Lind van Wijngaarden 399* (QCA); P.N. Cajas, km 35.7, redondel Cuenca–Molleturo, en el paso, sendero Paragüillas, 2°46′S, 79°14′W, 13 Jan 2003, *C. Ulloa, P. Jørgensen, & X. Clavijo 1183* (HA, QCNE); Cuenca, P.N. Cajas, vía San Joaquín–Soldados–Chaucha, km 40.2 (12.8 km desde Soldados), 2°54′S, 79°17′W, 18 Jan 2003, *C. Ulloa, P. Jørgensen, & D. Minga 1302* (HA); área nacional de recreación Cajas, desde el paso hasta Miguir, 2°46′S, 79°15′W, 16 Aug 1987, *C. Ulloa 460* (QCA). **Bolívar:** carretera Ambato–Arenal del Chimborazo, km 63, 1°28′S, 78°52′W, 13 Jul 2000, *A. Álvarez, L. Suin, & J. C. Valenzuela 2678* (QCNE); carretera Guaranda-Salinas, km 24, 1°16′S, 79°1′W, 13 Jul 2000, *A. Álvarez, L. Suin, & J. C. Valenzuela 2683* (QCNE [mixed with *Hypochaeris sp.*]); road to refugio on Chimborazo, 6.7 km SE of Guaranda–Ambato hwy., 1°27′S, 78°50′W, 25 Jun 1989, *L. J. Dorr & I. Valdespino 6464* (QCA, QCNE); volcán Chimborazo, W side of the mountain, ~4 km from the road Ambato–Guaranda, 1°28′S, 78°48′W, 13 Sep 1995, *P. Sklenář & V. Kostečková 127-9* (QCA); volcán Chimborazo, W side of the mountain, ~4 km from the road Ambato–Guaranda, 1°28′S, 78°48′W, 14 Sep 1995, *P. Sklenář & V. Kostecková 135-1* (QCNE). **Cañar:** camino de la laguna Culebrillas hasta Ingapirca, cerca de la comunidad de Cajontambo, 2°26′S, 78°52′W, 11 Mar 2009, *D. Minga & F. Nugra 1596* (HA). **Chimborazo:** southern slope of Mount Chimborazo, 1°29′S, 78°48′W, 18 Aug 1939, *E. Asplund 8369* (BR, CAS, F, LIL, NY, P, US); nevado Chimborazo, cercano al refugio, 1°29′S, 78°48′W, 13 Jul 2009, *D. Cárate et al. 916* (QCA); rd. to el refugio, ~7 km from Ambato–Guaranda rd., 1°28′S, 78°50′W, 21 Oct 1995, *V. A. Funk 11421* (QCA); rd. to el refugio, ~17 km from Ambato–Guaranda rd., 0.5 km from refugio Whymper, 1°28′S, 78°50′W, 21 Oct 1995, *V. A. Funk 11423* (QCA); arenal du Chimborazo, 13 Sep 1984, *C. Huttel 374* (QCA); SW slope of volcano Chimborazo, 1°1′S, 78°47′W, 27 Jun 2012, *N. Morueta-Holme, K. Engemann, & P. Sandoval 85* (QCA); El Altar, N side of the volcano, on the ridge below the Canoningo peak, 1°41′S, 78°24′W, 20 Aug 1995, *P. Sklenář & V. Kostečková 1085* (QCA); El Altar, N side of the volcano, on the ridge below the Canoningo peak, 1°41′S, 78°24′W, 19 Aug 1995, *P. Sklenář & V. Kostečková 941* (QCA). **Cotopaxi:** P.N. Cotopaxi, faldas N bajo el refugio, 0°40′S, 78°30′W, 5 Jun 1982, *H. Balslev 2712* (QCA); P.N. Cotopaxi, 0°40′S, 78°30′W, 8 Jun 1982, *D. Bastidas 117* (QCA); P.N. Cotopaxi, a 200 m del refugio, 0°40′S, 78°30′W, 5 Jun 1982, *E. Bravo 346* (QCA); P.N. Cotopaxi, alrededores de zona de parqueo, 0°40′S, 78°30′W, 5 Jun 1982, *R. Briones 34* (QCA); P.N. Cotopaxi, camino al refugio, 0°40′S, 78°30′W, *J. Carrión 49* (QCA); P.N. Cotopaxi, falda NNO, 6 Jul 1986, *A. Ehrenburg 91* (QCA); P.N. Cotopaxi, camino al refugio, 0°40′S, 78°30′W, 5 Jun 1982, *G. Falconí 52* (QCA); P.N. Cotopaxi, 250 m antes del refugio, 0°40′S, 78°30′W, 5 Jun 1982, *E. Fegan 89* (QCA); P.N. Cotopaxi, 0°40′S, 78°30′W, 28 Nov 1987, *A. Freire et al. 920* (QCA); P.N. Cotopaxi, camino para el refugio, 0°40′S, 78°30′W,

5 Jun 1982, *M. García 20* (QCA); P.N. Cotopaxi, Jul 1989, *X. Izurieta 101* (QCA); P.N. Cotopaxi, Sep 1989, *X. Izurieta 154* (QCA); P.N. Cotopaxi, 0°40′S, 78°30′W, 5 Jun 1982, *L. Muñoz 204* (QCA); volcán Iliniza Sur, on the E side of the mountain, slope to the left from the trail to the refuge, 0°40′S, 78°42′W, 28 May 1995, *P. Sklenář & V. Kostecková 406* (QCA); volcán Cotopaxi, N slope to the right from the trail to the refuge, 0°39′S, 78°26′W, 17 Jul 1995, *P. Sklenář & V. Kostečková 76-2* (QCA); paramo de Quispicacha, E slope of loma Pucyucuchu, 1°5′S, 78°50′W, 24 Oct 2006, *P. Sklenář 9057* (QCA). **Imbabura:** nevado Cotacachi, SE ridge of the volcano, 0°21′N, 78°21′W, 9 Sep 1995, *P. Sklenář & V. Kostečková 1230* (QCA). **Loja:** Saraguro, Manú, cerro de Arcos, 3°33′S, 79°27′W, 16 Sep 1999, *Z. Aguirre 103* (LOJA); Horta-Naque, 9 Nov 1946, *R. Espinosa 997* (LOJA); Fierro Urco, Saraguro-Loja, km 12.4 turnoff toward Fierro Urco, km 23.8, 3°43′S, 79°19′W, 6 Dec 1994, *P. M. Jørgensen et al. 1194* (LOJA, QCA, QCNE); road San Lucas–Saraguro km 9, turn off to Fierro Urcu, 11 km to the pass, 3°43′S, 79°19′W, 4 Nov 2000, *P. M. Jørgensen, C. Ulloa, & J. Caranqui 2226* (QCNE, US); road Loja–Cuenca, km 50, track to Fierro Urco, km 11.5, 3°41′S, 79°17′W, 25 Oct 1996, *G. P. Lewis & P. Lozano 2732* (LOJA, US); lagunas Negras de Jimbura, 4°42′S, 79°25′W, 10 Sep 2001, *P. Lozano & R. Bussmann 52* (LOJA); cordillera las Lagunillas (de Sabanilla), paramo de las lagunas Negras, above the N shore of the lower laguna Negra, 4°42′S, 79°25′W, 16 Jun 2009, *P. Sklenář, J. Macková, & P. Macek 12051* (QCA). **Napo:** Antisana, Oct 1923, *H. E. Anthony & G. H. H. Tate 313* (US); morenas WNW del Antisana, 0°28′S, 78°9′W, 3 Feb 1980, *S. Halloy B-68* (LIL); NE side of volcán Antisana, 0°27′S, 78°8′W, 18 Aug 1997, *P. Sklenář & V. Sklenářová 3460* (QCA); Quijos, reserva ecológica Antisana, faldas occidentales del volcán Antisana, NE de laguna Santa Lucía, 0°28′S, 78°10′W, 1 Aug 1998, *H. Vargas & E. Narváez 2114* (QCNE); Quijos, reserva ecológica Antisana, faldas SW del volcán Antisana, 0°30′S, 78°10′W, 28 Nov 1998, *H. Vargas & E. Narváez 3124* (QCNE, US). **Pichincha:** faldas SE volcán Guagua Pichincha, proximidades del refugio, 0°10′S, 78°35′W, 25 May 1985, *J. Bosco & M. Marcillo 48B* (QCA); Quito, parroquia Amaguaña, bosque protector Pasochoa, sendero hacia la cumbre del Pasochoa, 0°21′S, 78°27′W, 13 Jun 1992, *C. E. Cerón 19116* (QCNE); Antisana, falda WSW, 14 Sep 1986, *A. Ehrenburg 171* (QCA); Quito, parroquia Lloa, sector NE del volcán Guagua Pichincha, 0°10′S, 78°35′W, 12 Aug 2014, *D. Fernández et al. 1733* (QCNE); cráter moderno del Guagua Pichincha, 0°10′S, 78°36′W, 7 Jun 1983, *R. Gómez 17A* (QCA); filo NE del volcán Cotopaxi, 0°39′S, 78°24′W, 29 Dec 1979, *S. Halloy A-985* (LIL); Mt. Pichincha, near Quito, 17 Aug 1923, *A. S. Hitchcock 21046* (GH, NY, US); volcán Iliniza, NE slope below the refugio, 0°39′S, 78°42′W, 13 Aug 1980, *L. Holm-Nielsen, B. Øllgaard, & C. Sperling 24915* (QCA); 1 km SE of Cayambe on road to hacienda Piemonte, 10 May 1990, *R. M. King, P. M. Peterson, & E. J. Judziewicz 10053* (QCA, QCNE); volcán de Cayambe, S side near refugio, 0°0″ 78°0′W, 18 Mar 1991, *C. Körner 20* (QCA, QCNE); volcán Cayambe, 0°0″ 78°1′W, 22 Jul 1943, *E. L. Little & A. Paredes 6795* (US); volcano de Pichincha, inside crater, 5 Sep 1935, *I. Mexia 7647* (B, BM, GB, GH, NY, UC, US); in Guamaní, Aug 1898, *L. Mille 468* (QPLS); upper SE slopes of Guagua Pichincha, between the refuge and the crater rim, 0°11′S, 78°36′W, 9 Jan 1988, *U. Molau, B. Eriksen, & B. B. Klitgaard 2404* (QCA, QCNE); faldas occidentales del volcán Antisana, 0°28′S, 78°12′W, 4 Mar 1984, *L. Muñoz 346* (QCA); faldas occidentales del volcán Antisana, 0°28′S, 78°12′W, 8 Mar 1984, *L. Muñoz 367* (QCA); Guagua Pichincha, around refugio above Lloa, 0°11′S, 78°33′W, 18 Nov 1990, *B. Øllgaard 98282* (QCA, QCNE); nevado Cayambe, 0°0″ 78°1′W, 3 Sep 2017, *P. Sklenář & J. Ptacek 14061* (QCA); Rucu Pichincha, NE side of the volcano, 0°10′S, 78°34′W, 13 May 1995, *P. Sklenář & V. Kostecková 257* (QCNE); NE slopes of Rucu Pichincha, 0°10′S, 78°34′W, 13 May 1995, *P. Sklenář & V. Kostecková 6-6* (QCNE); NE side of the Cotopaxi volcano, 0°39′S, 78°25′W, 28 Jun 1999, *P. Sklenář 7461* (QCA, QCNE); nevado Cayambe, SW side, 0°1′N, 78°1′W, 2 Jul 1995, *P. Sklenář & V. Kostečková 749* (QCNE); N side of nevado Cayambe, 0°3′N, 77°59′W, 6 Aug 2004, *P. Sklenář 8096* (QCA); in m. Rucu Pichincha, 22 Dec 1871, *L. Sodiro 61/46* (QPLS); cerro Atacazo, pendiente N cumbre Atacazo, 0°20′S, 78°36′W, 18 Jun 1983, *B. Treiber de Espinosa 122* (QCA). **Tungurahua:** cerro Hermoso, SW ridge of the mountain, 1°14′S, 78°18′W, 6 Sep 1997, *P. Sklenář & V. Sklenářová 3692* (QCA). **Zamora-Chinchipe:** páramo de Yacuambi, 3°34′S, 79°2′W, 30 Oct 2018, *I. Arnelas, J. L. Armijos-Barros, & J. Calvo 1130* (HUTPL); cordillera de Sabanilla, cerca de la carretera Jimbura-Zumba, arriba de la laguna Negra, 4°42′S, 79°25′W, 23 Oct 1996, *R. Bussmann & S. Lange s.n.* (HUTPL).

PERU. Piura: Talanco [Talaneo], 5°3′S, 79°32′W, 29 Nov 1961, *C. Friedberg 805* (USM).

21. ***Werneria pygmaea*** Gillies ex Hook. & Arn., J. Bot. (Hooker) 3: 348. 1841. *Werneria pygmaea* var. *remyi* Wedd. ["Remyi"], Chlor. Andina 1: 84. 1856, *nom. inval.* (Turland et al., 2018, ICN Art. 26.2). Type. Argentina. Mendoza: Andes of Mendoza, valle de los Ciegos, 5,000 m, [without date], *J. Gillies 164* (lectotype: E-00322678 [digital image!], designated as "holotype" by Freire and Ariza-Espinar [2014: 224]).

Werneria minima Walp., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 277. 1843. *Werneria pygmaea* var. *praemorsa* Wedd., Chlor. Andina 1: 84. 1856. Type. Chile/Peru. ["Tacora, 4000–4800, Apr 1831, F.J.F. Meyen s.n." according to Rockhausen (1939: 321)] (B, destroyed). Neotype, **designated here**: Chile. Arica y Parinacota: near road to Tacora (rt. A23), 4 km from hwy. 11, 18°08′S, 69°32′W, 4,473 m, 7 Mar 2014, *V. A. Funk, M. Diazgranados, & J. M. Bonifacino 13099* (US-01324695!).

Werneria rhizoma J. Rémy, Fl. Chil. 4: 215. 1849. Type. Chile. Coquimbo: in editissimis humidisque andinum Los Patos, 1837, *C. Gay 654* (lectotype: P s.n.!, **designated here**; isolectotype: F-971892!, K-000527751 [digital image!], SGO-000006436!).

Werneria brachypappa Sch. Bip., Bonplandia (Hannover) 4: 53, 55. 1856.
Werneria pygmaea var. *iodopappa* Wedd. ["Iodopappus"], Chlor. Andina 1: 84. 1856. Type. Peru. Puno: Cordillera de Tuno [Puno], May 1854, *W. Lechler 1710a* (lectotype: P-02088539 [digital image!], **designated here**; isolectotypes: G-00305800 [digital image!], G-00305801 [digital image!], GOET s.n.!, K-000527611 [labeled *Lecher 1710*, digital image!], P-02088540 [digital image!], W s.n.!).
Werneria pygmaea var. *caespitosa* Wedd., Chlor. Andina 1: 84. 1856. Type. Peru. Puno: prov. Carabaya, *H. A. Weddell 4753* (lectotype: P-02088565 [digital image!], **designated here**).
Werneria pygmaea var. psychrophila Wedd. ex Sch. Bip., Bull. Soc. Bot. France 12: 80. 1865, *nom. nud.* (Turland et al., 2018, ICN Art. 38.1).
Werneria cherlerioides Sch. Bip., *nom. nud. in sched.* (Turland et al., 2018, ICN Art. 38.1).

Rhizomatous herb, rosettiform, forming lax clumps or solitary plants, 2–4 cm tall. **Rhizome** 3–10 cm long, ~0.5 cm in diameter, horizontal to oblique, covered with arachnoid-lanate indumentum. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear, sometimes slightly broadened in the upper third (narrowly oblanceolate), 7–80 mm long, 0.8–3 mm wide, entire, acute to obtuse at the apex, barely or not narrowed at the base, elliptical to terete in cross section, glabrous, inconspicuously nerved above, 0–1-nerved beneath (barely visible), fleshy, matte. **Capitulum** radiate, solitary, terminal, sessile to pedunculate; peduncle up to 32 mm long, glabrous, bearing bracts similar to the leaves. **Involucre** narrowly cupuliform, with bracts fused at the base, 7–13.2 mm long, 6–10.4 mm wide, glabrous; involucral bracts (8–)11–13(–14), 3.2–6.3 mm long, 1.2–2 mm wide at the base, acute to obtuse at the apex, greenish, usually purple edged; supplementary bracts absent. **Ray florets** 8–15; corollas 9.4–12.5 mm long, 1.1–1.7 mm wide, 4–5-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, sometimes purple tipped beneath. **Disc florets** 22–55; corollas 4–6.8 mm long, 5-lobed, creamy to yellowish, sometimes purple tipped; style branches truncate with a crown of sweeping hairs, yellowish or purplish. **Achenes** ~1.5 mm long, ~0.6 mm wide, cylindrical, ~7-ribbed, glabrous; pappus 7–7.1 mm long, barbellate, whitish. Chromosome number $2n = 212(\pm 8)$ (Diers, 1961); $n = 50$ (Waisman et al., 1986) (Figure 47).

Additional Iconography. Weddell (1856: pl. 16B); Cabrera (1978: 470, fig. 198L,M); Freire and Ariza-Espinar (2014: 224, *W. pygmaea* var. *pygmaea* A–E).

Distribution and Habitat. Argentina (Catamarca, Jujuy, La Rioja, Mendoza, Neuquén [n.v.], Salta, San Juan, Santa Cruz, Tucumán), Bolivia (Chuquisaca, Cochabamba, La Paz, Oruro, Potosí, Tarija), Chile (Antofagasta, Arica y Parinacota, Atacama, Aysén, Coquimbo, Metropolitan Region, Tarapacá, Valparaíso), Colombia (Arauca, Boyacá, Caldas, Cesar, Cundinamarca, La Guajira, Magdalena, Nariño, Norte de Santander, Risaralda, Santander, Tolima, Valle del Cauca), Ecuador (Azuay, Bolívar, Cañar, Carchi, Chimborazo, Cotopaxi, Imbabura, Morona-Santiago, Napo, Pichincha, Sucumbíos, Tungurahua), Peru (Amazonas, Ancash, Apurímac [expected], Arequipa, Ayacucho, Cusco, Huancavelica, Huánuco, Junín, La Libertad, Lima, Moquegua, Pasco, Puno, San Martín, Tacna), Venezuela (Mérida). It grows in wet places, streamsides, and Andean marshes (bofedales) of the paramo, puna, southern Andean steppe, and Patagonian steppe ecoregions, between elevations of 1,050 and 5,050 m (Figure 48).

Phenology. Flowering all year round.

Etymology. The adjective *pygmaeus, -a, -um* means dwarf, referring to the minute size of this species.

Notes. *Werneria pygmaea* is a small species characterized by having linear leaves (sometimes narrowly oblanceolate) that are entire, glabrous, and acute to obtuse at the apex, by having a radiate capitulum with white ray corollas that is sessile or pedunculate, and by an involucre composed of (8–)11–13(–14) involucral bracts. It commonly develops horizontal rhizomes covered with arachnoid-lanate indumentum from which lateral shoots arise.

This species is widely distributed throughout the whole Andes, from the paramos of Mérida in western Venezuela to the Patagonian province of Santa Cruz in southern Argentina. As observed in other species with a large distribution area, it shows great morphological variability, mainly in leaf morphology. The populations from northeastern Colombia generally have leaves that are broadened in their upper third (not strictly linear), are rather acute at the apex, and have 13–14 involucral bracts. In general, these plants are more robust than typical forms. From this region, specifically from Almorzadero and Cocuy, we studied several collections containing material mixed with small forms of *Xenophyllum crassum* (S. F. Blake) V. A. Funk, for example, *Cuatrecasas 13505* (only duplicate at COL), *Cuatrecasas & García Barriga 10012* (COL, US), and *Barclay & Juajibioy 7352* (COL, US). They can be differentiated by leaf morphology (broadened in its upper third, acute, matte in *W. pygmaea* vs. strictly linear, obtuse, shiny in *X. crassum*) and rhizome (rather horizontal with arachnoid-lanate indumentum in *W. pygmaea* vs. vertical with dense lanate indumentum in *X. crassum*). Moreover, *W. pygmaea* usually develops prostrate lateral shoots with distantly positioned leaves along them. In *X. crassum*, by contrast, the lateral shoots arise upright and bear leaves only in their upper part, which are placed closely together. We studied some individuals from Peru with narrowly oblanceolate leaves that are ~10 mm long, remarkably fleshy, and sometimes somewhat falcate. Populations with these characters are found in Amazonas (Chachapoyas), Ancash (Carhuaz, Huari, Recuay), Cusco (Anta, Urubamba), and Junín (Huancayo). A specimen from northern Bolivia has a similar morphology (*Beck et al. 30098*, LPB). On the other hand, tiny plants with ~8 involucral bracts are frequent in northern Chile (*Funk et al. 13097*, US). Farther south, the populations from central Chile and Argentina are similar to the typical forms, that is, have 25–40 mm long linear leaves and involucres with 11–13 involucral bracts. Because of the puzzling distribution pattern of these forms and the existence of intermediate morphologies, recognizing more than a single species is unadvisable.

FIGURE 47. *Werneria pygmaea*. **A, B.** Ecuador, Azuay, Cajas (not collected). **C, D.** Ecuador, Napo, Papallacta (not collected). **E, F.** Chile, Antofagasta, Machuca (*J. Calvo 7921*, SGO). Photographs by Joel Calvo.

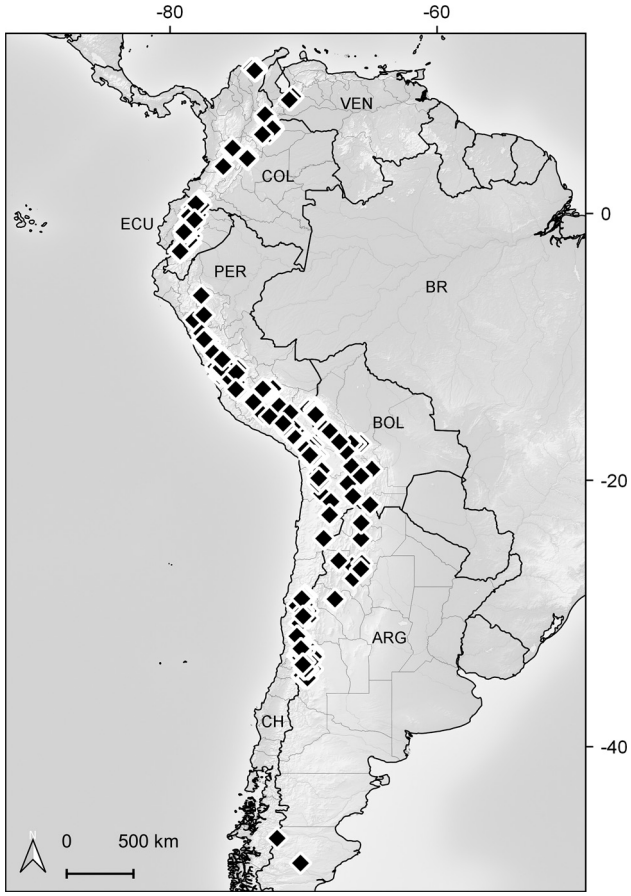

FIGURE 48. Distribution map of *Werneria pygmaea*.

Werneria pygmaea is morphologically close to *W. apiculata*. Annotations on herbarium specimens show that these species have been repeatedly confused. Although most specimens can be identified with certainty, there are a few specimens that are difficult to assign to either species. These problematic specimens probably led some authors to treat them at the varietal rank (Freire and Ariza-Espinar, 2014). In agreement with Rockhausen (1939), Cabrera (1978), and Beltrán (2017), we here accept them as distinct species. See comments under *W. apiculata* about the differences between them. Another similar species is *W. microphylla* (see comments under that species). In Ecuador, *W. pygmaea* has also been confused with *W. graminifolia* (see comments under that species).

The holotype designation of the name *W. pygmaea* by Freire and Ariza-Espinar (2014) is here corrected to lectotype designation as it cannot be established that the author used only this element and that the gathering is represented by a single specimen (McNeill, 2014).

Some discussion about the original material of *W. brachypappa* Sch. Bip. is necessary. *Lechler 1710* was initially selected to describe a species under the name *W. cherlerioides* Sch. Bip. (*nom. nud. in sched.*). However, Schultz Bipontinus (1856) later realized that the collection contains material corresponding to two distinct undescribed species, which he named *W. brachypappa* (*Lechler 1710a*) and *W. solivifolia* (*Lechler 1710b*). P-02088539 shows a Schultz Bipontinus handwritten note containing preliminary descriptions for both species, as well as for the originally intended *W. cherlerioides* (appearing as striketh-rough text). Included among the annotations of *W. cherlerioides* is "folia 2–3 lin. longa angusta linearis" (leaves 2–3 lines long, narrow, linear), which clearly indicates that this name was later superseded by *W. brachypappa* (which has linear leaves) instead of by *W. solivifolia* (which has 1-pinnatisect leaves). For this reason, we place the not validly published name *W. cherlerioides* under *W. brachypappa* (=*W. pygmaea*). Such decision agrees with the fact that the epithet *cherlerioides* refers to a plant resembling a species of *Cherleria* L. (=*Minuartia* Loefl. ex L., Caryophyllaceae), a genus characterized by plants with linear to subulate leaves rather than pinnatisect leaves. All of the original material of *W. brachypappa* appears to be completely tangled with *Distichia muscoides* Nees & Meyen, its study being nearly impossible in most cases (see G-00305800, G-00305801, K-000527611, P-02088540). The specimen P-02088539 is therefore designated as the lectotype because it contains a suitable plant for studying the diagnostic characters. The specimen P-02088531 is excluded from the type material because it corresponds to *W. apiculata*. Since it is not tangled with *Distichia muscoides*, we believe that an error likely occurred during the labeling process.

Weddell's specimen P-02088565 is selected to serve as the lectotype of the varietal name *W. pygmaea* var. *caespitosa* Wedd. The fact that the label shows the name "Werneria minima var. caespitosa Wedd." has minor importance considering that Weddell (1856) included the name *W. minima* Walp. in the synonymy of *W. pygmaea*. Otherwise, this specimen perfectly matches the protologue information (i.e., diagnosis, provenance, and habitat).

Additional Specimens Examined. **ARGENTINA. Catamarca:** El Cajón, Negroara, 26°24′S, 66°22′W, 17 May 1914, *L. Castillón 3360* (LIL); Antofagasta de la Sierra, río Las Pitas, 26°2′S, 67°22′W, 27 Nov 2004, *S. Cuello 139* (LIL); Andalgalá, río Potrero sup., 27°22′S, 66°17′W, 28 Feb 1951, *H. Sleumer 1911* (LIL). **Jujuy:** Humahuaca, mina Aguilar, 23°12′S, 65°41′W, 17 Oct 1949, *K. Hueck 305* (LIL); Humahuaca, mina Aguilares, cerca de la mina, 23°12′S, 65°41′W, 29 Mar 1952, *E. Petersen & J. P. Hjerting 137* (LIL). **La Rioja:** Famatina, camino a la mina Mexicana, 28°58′S, 67°42′W, 19 Feb 2008, *C. Aedo 15418* (MA); Famatina, Sierra de Famatina, La Mesada, 28°55′S, 67°39′W, 29 Apr 1951, *B. Sparre 8870* (LIL). **Mendoza:** San Carlos, camino a la laguna del Diamante, 34°14′S, 69°27′W, 26 Jan 1950, *J. Araque & F. A. Barkley 20Mz373* (LIL); al occidente de la Cuchilla de la Tristeza, A. de las Yeseras, 34°45′S, 69°43′W, 22 Feb 1953, *A. Castellanos s.n.* (LIL); Tupungato, La Carrera, 33°14′S, 69°15′W, 17 Jan 1945, *G. Covas 3225* (MERL); San Carlos, refugio General Alvarado, 34°14′S, 69°22′W, 27 Jan 1950, *A. Cuezzo & F. A. Barkley s.n.* (LIL);

San Rafael, C. Benegas, quebrada de La Manga, entre cerro Bayo y arroyo de La Manga, 34°50′S, 69°43′W, 8 Jan 1985, *S. Marqués et al. 18* (MERL); Tunuyán, Los Chacayes, puente Cajón de los Arenales sobre abra de los Arenales, 33°37′S, 69°30′W, 16 Jan 2007, *E. Méndez 10141* (MERL); Horcones, valley SW of Aconcagua, 32°48′S, 69°56′W, 16 Mar 1980, *G. Miehe 115* (LPB); Tupungato, estación La Carrera, 33°14′S, 69°15′W, 27 Dec 1949, *O. Pací & O. Melis 32* (LIL); depto. San Carlos, vegas de Llancha, 34°9′S, 69°20′W, 19 Jan 1965, *F. A. Roig 5207* (MERL); San Carlos, quebrada del Paso de la Cruz de Piedra, 34°10′S, 69°57′W, 16 Jan 1946, *A. Ruiz Leal 11772* (MERL); San Carlos, laguna del Diamante, 34°10′S, 69°40′W, 16 Jan 1952, *A. Ruiz Leal 14583* (MERL); depto. Perón (Malarhué), alto valle del Atud, cerca del hotel Sosneado, 34°46′S, 70°3′W, 9 Jan 1954, *A. Ruiz Leal & F. A. Roig 15623* (MERL); depto. San Rafael, Sosneado, entre [. . .] y laguna Atuel, 34°38′S, 70°6′W, 17 Feb 1955, *A. Ruiz Leal 16840* (MERL); Tunuyán, La Ladera, 6 Feb 1934, *A. Ruiz Leal 2147* (LIL, MERL); Las Heras, Agua de la Pampa (Pampa de la Polcura), 32°53′S, 69°19′W, 28 Jan 1962, *A. Ruiz Leal 21982* (MERL); Tunuyán, nacimiento del arroyo de Las Cuevas, 20 Mar 1935, *A. Ruiz Leal 3136* (LIL, MERL); Las Heras, laguna Horcones, 32°48′S, 69°56′W, 9 Feb 1940, *A. Ruiz Leal 6504* (MERL); Las Heras, valle de Horcones, 32°44′S, 69°58′W, 14 Feb 1940, *A. Ruiz Leal 6670* (MERL); San Carlos, quebrada del Paso de la Cruz de Piedra, 34°10′S, 69°57′W, Jul 1940, *A. Ruiz Leal 6805* (MERL); Tupungato, río La Carrera, 33°12′S, 69°23′W, 27 Dec 1949, *H. Sleumer 448* (LIL); St. Raphaël, vallée du rio Atuel, laguna del Sosneado, 34°50′S, 69°55′W, Jan 1897, *E. Wilczek 155* (LIL). **Salta:** Caldera, subida al Nevado del Castillo por Malpaso, La Ciénega, 24°23′S, 65°42′W, 15 Mar 1952, *H. Sleumer & F. Vervoorst 2916* (LIL). **San Juan:** Valle del Cura, Los Champones, 29°48′S, 69°40′W, 6 Feb 1950, *A. Castellanos s.n.* (LIL); cordillera de Colangüil, Vaca Muerta, 3 Feb 1950, *A. Castellanos s.n.* (LIL); camino al Paso del Espinacito, río de las Leñas, 32°12′S, 70°2′W, 11 Jan 1953, *A. Castellanos s.n.* (LIL); Calingasta, cabeceras del río Pachón, 31°43′S, 70°17′W, 14 Jan 1996, *M. M. González Loyarte & I. Peralta s.n.* (MERL); depto. Iglesia, quebrada del Agua Negra, El Arenal, 30°20′S, 69°40′W, 24 Feb 1992, *R. Kiesling et al. 7995* (MERL); dpto. Iglesia, cerca río Las Taguas, quebrada Sin Nombre, 29°20′S, 69°57′W, 20 Mar 1998, *R. Kiesling 9046b* (MERL); portezuelo La Fría, 32°5′S, 70°19′W, 1 Feb 1950, *F. A. Roig s.n.* [Herb. Ruiz Leal 13005] (LIL, MERL); Tambillitos (río Las Leñas), 10 Feb 1949, *F. A. Roig s.n.* [Herb. Ruiz Leal 11960] (MERL). **Santa Cruz:** Río Chico, Gobernador Gregores, cerro al NE de INTA [Instituto Nacional de Tecnología Agropecuaria], 48°44′S, 70°14′W, 1 Feb 1965, *E. Ancibor & A. Vizinis s.n.* (LIL). **Tucumán:** cumbres Calchaquíes, Jan 1913, *L. Castillón 13149* (LIL); cumbres Calchaquíes, 27 Dec 1913, *L. Castillón 3224* (LIL); Tafí, Pabellón, 26°46′S, 65°41′W, 16 Jan 1908, *L. Castillón 65* (LIL); Tafí, cumbres Calchaquíes, lagunas, 26°39′S, 65°44′W, 7 Jan 1908, *L. Castillón 8226* (LIL); cerro Muñoz, Piedra Pintada, 26°14′S, 65°38′W, 29 Jan 1903, *M. Lillo 3020* (LIL); Tafí, cerro Muñoz, 26°14′S, 65°38′W, 23 Feb 1905, *M. Lillo 4205* (LIL [mixed with *W. spathulata*]); Tafí, lagunas de San José, 26°39′S, 65°43′W, Jan 1933, *D. Olea 8732* (LIL); Lara, vertientes, 26°24′S, 65°44′W, 15 Feb 1912, *D. Rodríguez 331* (LIL); Tafí, Real del Alazán a las lagunas del Negrito, 26°41′S, 65°45′W, 6 Apr 1926, *R. Schreiter 4246* (LIL); Tafí, Infiernillo, 26°43′S, 65°45′W, 25 May 1951, *H. Sleumer 1985* (LIL); Tafí, Calchaquíes, quebrada Isabel, 8 Mar 1952, *B. Sparre 9678* (LIL); Tafí, Infiernillo, 26°43′S, 65°45′W, 21 Jan 1960, *A. Türpe 306* (LIL).

BOLIVIA. Chuquisaca: Yamparaez, ~3 km from Tarabuco on road to Candelaria, 19°11′S, 64°53′W, 13 Mar 1999, *J. R. I. Wood & M. Serrano 14644* (HSB, LPB). **Cochabamba:** laguna de Wara Wara, 17°17′S, 66°7′W, 30 Jul 2007, *C. Aedo, M. Velayos, & C. Monge 14418* (LPB, MA); Chapare, cordillera del Ronco entre las vertientes expuestas hacia el S, 17°16′S, 65°43′W, 2008, *A. Barrancos et al. 285a* (BOLV); Chapare, Incachaca, 17°14′S, 66°28′W, 25 Jan 1958, *J. Cañigueral 1038* (LPB); Ayopaya, laguna Khoalaqui, 6 May 1990, *E. Hennipman & G. Rödl-Linder 8123* (LPB); Arque, Huancani, cerca de las casas de pastores, 1 Aug 1991, *P. Ibisch 291* (BOLV, LPB); Arque, comunidad Huancani, 15 Oct 1991, *P. Ibisch & P. Rojas 482* (LPB); Arque, La Comuna, cerca del río, 29 Nov 1991, *P. Ibisch 723* (LPB); cordillera del Tunari, cumbres del Tunari, 17°17′S, 66°23′W, 25 Mar 1990, *G. Navarro 647* (BOLV); cordillera del Tunari, entre Tahua Cruz y el camino a Cocapata, 25 Mar 1990, *G. Navarro 654* (BOLV); cordillera del Tunari, por encima de la laguna de Huara-Huara, 17°17′S, 66°7′W, 17 Mar 1990, *G. Navarro 659* (BOLV [mixed with *W. microphylla*]); cordillera del Tunari, entre Tahua Cruz y la cumbre del pico Tunari, 25 Mar 1990, *G. Navarro 668* (BOLV); Tapacarí, rancho Jacha Taqi, comunidad Japo (km 125 de la carretera Cbba–Oruro), 17°40′S, 66°45′W, 10 Sep 1995, *H. U. Pestalozzi 613* (BOLV); Tapacarí, N-ladera del cerro Quiguani, comunidad de Japo (km 125 Cbba–Oruro), 17°40′S, 66°45′W, 1 Dec 1994, *H. U. Pestalozzi 85* (LPB); Tiraque, 30–33 km along old Chapare road from main Cochabamba to Chapare highway, 18 Apr 1999, *J. R. I. Wood 13535* (LPB); Quillacollo, cordillera Tunari, cuenca alta de Pintumayu del Tunari, 17°18′S, 66°8′W, 31 Mar 2006, *M. Zárate & N. Altamirano 2330* (BOLV, LPB). **La Paz:** Murillo, La Paz subiendo unos 10 km hacia la cumbre, al N de la laguna Incachaca, 16°23′S, 68°2′W, 21 Oct 1987, *S. G. Beck 12991* (LPB); Los Andes, La Paz 54 km hacia Agencia Mina Palcoco (abandonada), laguna Taypi Chaka, 25 Nov 1979, *S. G. Beck 1962* (LPB); Murillo, 4 km después de la cumbre bajando al valle de Zongo, 16°16′S, 68°7′W, 20 Aug 1979, *S. G. Beck 2041* (LPB); Murillo, bajando hacia Unduavi entrando en 3,780 m por la mina Lourdes, arriba de la mina, 16°18′S, 67°58′W, 28 Feb 2004, *S. G. Beck, C. Beck, & S. Hitz 30098* (LPB); Murillo, ~20 km hacia el N de La Paz, pie de los nevados Khala Huyo, 10 Jul 1983, *S. G. Beck 8477* (LPB); Pacajes, Berenguela ~20 km hacia Charaña, 17°24′S, 69°17′W, 25 Apr 1982, *S. G. Beck 9017* (LPB); Loayza, sierra de Tres Cruces, cerca de Caxata, 17°8′S, 67°19′W, 22 Feb 1979, *A. Ceballos et al. 511* (MA); Murillo,

Chacaltaya, 16°21′S, 68°6′W, 2 Mar 1983, *D. K. de Ávila 33* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 2 Mar 1983, *D. K. de Ávila 38* (LPB); Franz Tamayo, estación experimental de Ulla Ulla, 15°3′S, 69°14′W, 7 Aug 1982, *A. Dennis 851* (LPB); Franz Tamayo, estación experimental de Ulla Ulla, 15°3′S, 69°14′W, 7 Aug 1982, *A. Dennis 852* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, Mar 1987, *S. Estenssoro 34* (LPB [mixed with *W. microphylla*]); Murillo, valle de La Paz, río Kaluyo, 16°19′S, 68°4′W, 28 Feb 1989, *M. Franken 320* (LPB); Franz Tamayo, P.N. Madidi, Keara Nuevo, camino a Puina, 14°39′S, 69°6′W, 19 Jun 2005, *A. Fuentes et al. 8411* (LPB); Franz Tamayo, P.N. Madidi, entre Puina y Keara, 14°38′S, 69°7′W, 22 Jun 2005, *A. Fuentes 8582* (LPB); Franz Tamayo, P.N. Madidi, laguna Tolca Cocha, al NE de Keara Nuevo, 14°41′S, 69°5′W, 15 Apr 2006, *A. Fuentes et al. 9828* (LPB); Murillo, 6.7 km E of la cumbre (pass) and 8.3 km W of Pongo on rd. to Unduavi, 1 km along old rd. that leads down into valley, 16°19′S, 68°1′W, 16 Apr 1995, *V. A. Funk 11349* (LPB [mixed with *W. apiculata*]); Loayza, along narrow winding rd. from Viloco to Caxata, 17.8 km from Viloco, 16°58′S, 67°30′W, 23 Apr 1995, *V. A. Funk & M. Estarez 11368* (LPB); Loayza, along narrow winding rd. from Viloco to Caxata, 43.8 km from Viloco, 41.1 km from Caxata, 17°0′S, 67°30′W, 23 Apr 1995, *V. A. Funk & M. Estarez 11370* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lgn. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11409* (LPB [mixed with *W. microphylla*]); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lag. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11411* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lag. Khara Kkota, crossroads of road to Tipuani and mina La Fabulosa, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11413* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lgn. Khara Kkota, crossroads of rd. to Tipuani and mina La Fabulosa, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11414* (LPB [mixed with *W. microphylla*]); Murillo, camino a Jampaturi, 200 m al S de la laguna Incachaca, 16°24′S, 68°2′W, 10 Oct 1986, *E. García 843* (LPB); Murillo, Zongo valley, 4 km below pass, 16°14′S, 68°8′W, 6 Aug 1991, *M. Kessler 2845* (LPB); Murillo, 18 km al NE de La Paz, 16°19′S, 68°9′W, 8 May 1995, *R. I. Meneses 252* (LPB); Murillo, Milluni, a 18 km de La Paz, 16°19′S, 68°9′W, 21 May 1995, *R. I. Meneses 403* (LPB); Murillo, Milluni, a 18 km de La Paz, a un costado del río que baja de la mina Milluni, 16°19′S, 68°9′W, 21 May 1995, *R. I. Meneses 411* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 9 Feb 1996, *R. I. Meneses 510* (LPB); Murillo, Milluni, a 18 km al NE de La Paz, 16°19′S, 68°9′W, 13 Jan 1996, *R. I. Meneses & J. Gonzáles 616* (LPB [mixed with *W. microphylla*]); Franz Tamayo, Ulla Ulla, 21 May 1982, *X. Menhofer 1279* (LPB); Franz Tamayo, Ulla Ulla, Okaria, 15°3′S, 69°6′W, 25 May 1982, *X. Menhofer 1303* (LPB); Murillo, nev. Illimani, 30 Jul 1982, *X. Menhofer 1471* (LPB); Franz Tamayo, Puyo-Puyo (Ulla Ulla), 14°59′S, 69°10′W, 22 Feb 1983, *X. Menhofer 1992* (LPB, US); Bautista Saavedra, estancia Joroco (Ulla Ulla–Curva), 15°6′S, 69°6′W, 26 Feb 1983, *X. Menhofer 2047* (LPB); Los Andes, carretera de Penas a la mina Fabulosa, cerca del punto más alto del camino, 16°3′S, 68°18′W, 7 Jun 1984, *X. Menhofer 2350* (LPB); Murillo, NW cerro Cuñamani SSE Apaña, 16°34′S, 68°1′W, 27 Jul 1999, *J. Müller 7199* (LPB); Los Andes, por encima de la represa Condoriri, cerca al glacial Condoriri, 27 Mar 2010, *T. Ortuño & A. P. Sandoval 1007* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1019* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1038* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1059* (LPB); Los Andes, por encima de la represa del Tuni, lugar conocido por los lugareños como "El Corral," 16°13′S, 68°13′W, 26 Mar 2010, *T. Ortuño & A. P. Sandoval 1082* (LPB); Los Andes, por debajo de la represa Condoriri, 16°12′S, 68°15′W, 24 Mar 2010, *T. Ortuño & A. P. Sandoval 965* (LPB); Los Andes, por debajo de la represa Condoriri, 16°12′S, 68°15′W, 24 Mar 2010, *T. Ortuño & A. P. Sandoval 972* (LPB); Los Andes, por debajo de la represa Condoriri, 16°12′S, 68°15′W, 24 Mar 2010, *T. Ortuño & A. P. Sandoval 989* (LPB); Los Andes, valle de Hichu Kkota, 17 Nov 1983, *C. Ostria 10* (LPB [mixed with *W. microphylla*]); Los Andes, valle de Hichu Kkota, 12 Apr 1984, *C. Ostria 140* (LPB); Los Andes, valle de Hichu Kkota, 21 Sep 1984, *C. Ostria 154* (LPB); valle del Zongo, 19 Nov 1983, *C. Ostria 96* (LPB); Los Andes, proximidades de Peñas, 16°13′S, 68°30′W, 28 Jul 2000, *G. Prieto 69* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Palomani, 14°34′S, 69°7′W, 12 Apr 2008, *J. Quisbert et al. 851* (LPB); Milluni, au pied du nevado Huayna-Potosí (environ 13 km au N de La Paz à vol d'oiseau), 16°19′S, 68°8′W, 31 Jul 1979, *A. Raynal-Roques 21369* (LPB); Hichu Kkota, haute vallée au S du cerro Jankho Huyo (50 km au NNW de La Paz à vol d'oiseau), lac supérieur E du cerro, 16°4′S, 68°18′W, 16 Aug 1979, *A. Raynal-Roques & D. Collot 21447* (LPB); Murillo, 6.4 km NE of la cumbre on road to Unduavi, 16°19′S, 68°0′W, 3 Apr 1984, *J. C. Solomon & M. Uehling 12122* (LPB); Murillo, 3.3 km N of (below) the pass at the head of the Zongo valley, 16°16′S, 68°7′W, 15 Sep 1984, *J. C. Solomon 12279* (LPB); Murillo, 5.5 km E of junction with road to Collana, on road between Cota Cota and Palca, 16°32′S, 67°58′W, 25 Sep 1982, *J. C. Solomon 8243* (LPB); La Cumbre, 16°20′S, 68°1′W, 8 Dec 1977, *E. Valdés-Bermejo et al. 3567* (MA); route du Zongo, 27 Mar 1979, *J. P. Ybert 782* (LPB); Franz Tamayo, Pelechuco, al N a 0.58 km del campamento Chocollo, 14°43′S, 69°13′W, 25 Nov 2017, *F. Zenteno, D. Villalba, & L. Mamani 21282* (LPB). **Oruro:** Sajama, alrededor del pueblo de Sajama, 18°7′S, 68°59′W, 31 May 1991, *S. G. Beck 19889* (LPB); Dalence, cerca

de Tolapalca, 17°51′S, 66°50′W, 17 Feb 1979, *A. Ceballos et al. 247* (MA); Eduardo Abaroa, carretera a Potosí, antes de Cruce Culta, localidad Tirani, pasando el bosque de keñua, 19°4′S, 66°20′W, 26 May 2016, *I. Jiménez & A. Palabral 8363* (LPB); Eduardo Abaroa, Challapata, localidad Livichuco, camino a cerro Toro, alrededores de la laguna K'asiri, 18°57′S, 66°24′W, 27 May 2016, *I. Jiménez 8374* (LPB); Sajama (al W del nevado), 3 km al N del pueblo de Sajama, cerca de las aguas termales, 18°6′S, 68°58′W, 6 May 1981, *M. Liberman 322a* (LPB); Sajama, cantón Lagunas, 18°10′S, 68°55′W, 5 Feb 1998, *F. Loza de la Cruz 255* (LPB). **Potosí:** José M. Linares Lizarazu, comunidad de Alkatuyo, Pasto Grande, 53 km al SE de Potosí, 16 km al N de la escuela Alkatuyo, 19°53′S, 65°33′W, 9 May 1993, *F. Marino 151* (LPB); Sud Chichas, 5 mi. [~8 km] N of San Vicente along ridge road toward Animas, 21°12′S, 66°18′W, 13 Mar 1993, *P. M. Peterson et al. 12860* (LPB); Sud Lípez, Chita Phutuncu, östl. mina Corina, 21°36′S, 67°57′W, 19 Feb 2000, *B. J. Ruthsatz & R. M. Vogt 10435* (LPB); Tomás Frías, serranía del Khare-Khare [Kari Kari], arriba de la ciudad de Potosí, a orillas de la laguna Chalviri, 19°39′S, 65°41′W, 20 Feb 1988, *M. Schulte 151* (LPB); Tomás Frías, serranía del Khare-Khare [Kari Kari] 4 km detrás de la ciudad, laguna de Lajachaca [Lakha Chaca], 19°41′S, 65°42′W, 11 Dec 1987, *M. Schulte 45* (LPB); carretera de Sucre a Potosí km 100, desvío hacia Quivincha, 19°33′S, 65°25′W, 7 Aug 2007, *M. Velayos, C. Aedo, & C. Monge 11209* (MA); Linares, 21 km S of Potosí toward Tarija, 19°47′S, 65°44′W, 19 Feb 1996, *J. R. I. Wood 10706* (LPB); Tomás Frías, between laguna Chalviri and mina Illimani, cordillera Kari Kari, 19°39′S, 65°42′W, 20 Mar 1999, *J. R. I. Wood 14725* (LPB [mixed with *W. apiculata*]); Antonio Quijarro, al N de la población Pulacayo ~13.5 km, cerca a la cabecera Calzada, 20°15′S, 66°41′W, 10 Mar 2010, *F. Zenteno & D. Mamani 9766* (LPB); Antonio Quijarro, al N de la población Pulacayo ~7.6 km, represa Yana Pollera, 20°18′S, 66°41′W, 12 Mar 2010, *F. Zenteno & D. Mamani 9808* (LPB). **Tarija:** José María Avilés, pampa de Tajzara, 21°50′S, 65°1′W, 18 Apr 2000, *S. G. Beck & N. Paniagua 27099* (LPB).

CHILE. Antofagasta: vega Aguada de Choscha, 24°22′S, 68°30′W, 10 Oct 1983, *M. Arroyo & C. Villagrán 831273* (CONC); Loa, San Pedro de Atacama, Machuca, bofedal junto al pueblo, 22°36′S, 68°3′W, 5 Mar 2019, *J. Calvo 7921* (SGO); El Loa, rd. from San Pedro de Atacama to El Tatio, 66 km from San Pedro, 22°32′S, 68°0′W, 14 Mar 1993, *V. A. Funk & L. Katinas 11188* (SGO); Putana, 22°32′S, 67°53′W, 18 Feb 1885, *F. Philippi s.n.* (SGO); El Loa, entre Machuca y Tatio, en las vegas del río Putana, 22°30′S, 68°4′W, 15 Feb 1943, *E. Pisano & J. Venturelli 1883* (CONC, SGO); Agua Delgada, 24°25′S, 68°27′W, 1901, *J. Rémy s.n.* (SGO); El Loa, vega de Machuca, 22°36′S, 68°4′W, 15 Jan 1999, *C. Villagrán, F. Hinojosa, & R. Villa 9571* (CONC). **Arica y Parinacota:** Aguas Calientes, Tacora, 17°43′S, 69°49′W, 17 Sep 1955, *M. Ricardi 3380* (CONC); Parinacota, bofedal del lago Chungará, 18°14′S, 69°10′W, 20 Apr 1980, *M. Arroyo, C. Villagrán, & J. Moreno 2704* (CONC); Parinacota, camino desde Pacollo hasta nevados de Putre, 18°4′S, 69°29′W, 15 Apr 1984, *M. Arroyo 84-857A* (CONC); Parinacota, camino de Arica al Portezuelo de Chapiquiña, 18°21′S, 69°32′W, 10 May 1997, *E. Belmonte 97080A* (CONC); altiplano de Arica, Las Cuevas, 18°12′S, 69°28′W, 22 Feb 1978, *H. Escobar 221* (CONC); Parinacota, rd. from route 11 and pueblo Parinacota to Visviri, 6 km S of Caquena, 18°5′S, 69°15′W, 18 Mar 1993, *V. A. Funk & L. Katinas 11220* (SGO); rt. 11, quebrada on opposite side of rd. from lago Chungará, 18°16′S, 69°9′W, 6 Mar 2014, *V. A. Funk, M. Diazgranados, & J. M. Bonifacino 13097* (US); Visviri, 17°35′S, 69°29′W, Nov 1955, *U. Levi 88* (CONC); Portezuelo de Chapiquiña, faldeos al lado norte del campamento, 18°19′S, 69°30′W, 10 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 115* (CONC); camino de Chucuyo a las lagunas de Cotacotani, km 5, 18°13′S, 69°16′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 221* (CONC); camino de Chucuyo al Portezuelo de Chapiquiña, km 8, 18°16′S, 69°21′W, 14 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 264* (CONC); orillas lago Chungará, 18°15′S, 69°10′W, 25 May 2011, *A. Moreira-Muñoz, M. Muñoz, & V. Morales 1612* (SGO); bajada desde Portezuelo de Chapiquiña, 18°19′S, 69°30′W, 9 Jun 2012, *A. Moreira-Muñoz 1944* (SGO); bofedal de Parinacota, cruce caminos alto y bajo, 18°12′S, 69°16′W, 18 Mar 2015, *A. Moreira-Muñoz & F. Luebert 2419* (SGO); camino de Arica al Portezuelo de Chapiquiña, 26 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 183* (CONC); Portezuelo de Chapiquiña, 18°19′S, 69°30′W, 26 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 206* (CONC); camino entre el Portezuelo de Chapiquiña y Putre, 27 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 230* (CONC); camino entre Portezuelo de Chapiquiña y Putre, 28 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 245* (CONC); Parinacota, en el bofedal de Parinacota, 18°12′S, 69°16′W, 29 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 299* (CONC); Parinacota, 18°12′S, 69°16′W, 11 Jul 2011, *G. Rojas s.n.* (SGO); Parinacota, 18°12′S, 69°16′W, 27 Feb 1948, *F. Sudzuki 441* (SGO); bofedal de Parinacota, 18°12′S, 69°18′W, 10 Mar 1980, *R. Troncoso s.n.* (SGO); vega de Parinacota, 18°13′S, 69°14′W, 19 May 1979, *C. Villagrán et al. 1229* (CONC). **Atacama:** Huasco, río laguna Grande, entre Las Papas y potrero de Toledo, 28°53′S, 70°8′W, 10 Feb 1981, *M. Arroyo 81511* (CONC); Huasco, río laguna Grande, entre quebrada Candelilla y el extremo O de la laguna Grande, 28°45′S, 69°57′W, 21 Jan 1983, *C. Marticorena, M. Arroyo, & C. Villagrán 83415* (CONC); Huasco, quebrada Cantarito, entre laguna Grande y quebrada Vizcachas, 28°44′S, 69°50′W, 25 Jan 1983, *C. Marticorena, M. Arroyo, & C. Villagrán 83524* (CONC); Huasco, quebrada Cantarito, entre laguna Grande y quebrada Vizcachas, 28°44′S, 69°50′W, 25 Jan 1983, *C. Marticorena, M. Arroyo, & C. Villagrán 83532* (CONC); Huasco, cuenca de el Tránsito, quebrada Larga, 28°39′S, 69°55′W, Feb 2002, *S. Teillier 5009* (CONC); Vallenar, río Laguna Grande, 28°41′S, 69°48′W, Jan 1924, *E. Werdermann 249* (LIL). **Aysén:** prov. Gral. Carrera, comuna

Chile Chico, Reserva Nacional Lago Jeinimeni, 46°52′S, 71°59′W, 7 Mar 2002, *G. Rojas & P. Saldivia s.n.* (SGO). **Coquimbo:** in andibus editioribus prov. Coquimbo, Baño del Toro, 30°44′S, 70°16′W, 1860, *G. Volkmann s.n.* (SGO); Elqui, borde del cerro de Tapado, 30°12′S, 70°2′W, 7 Jan 1981, *M. Arroyo 81075* (CONC); Choapa, mina Pelambres, lado este de sector lagunas Blancas, 31°41′S, 70°28′W, 5 Feb 1999, *M. Arroyo & A. Humaña 991269* (SGO); Choapa, mina Pelambres, lado norte de quebrada Gualtata, 31°42′S, 70°30′W, 6 Feb 1999, *M. Arroyo & A. Humaña 991336* (SGO); Baños del Toro, 30°44′S, 70°16′W, 23 Dec 1971, *K. Beckett, M. Cheese & J. Watson 4660* (SGO); río Rocas [Vacas] Heladas, 29°50′S, 69°59′W, 10 Apr 1997, *M. Edding & A. Aron s.n.* (SGO); Combarbalá, Agua del Diablito, 19 Feb 1965, *C. Jiles 4549* (CONC); Elqui, ruta D-115, 29°25′S, 70°29′W, 14 Mar 2015, *V. Morales & A. Thomas 114* (SGO); valle del Elqui, vega Piuquenes de Baños del Toro, 29°47′S, 70°1′W, 19 Jan 1979, *R. Osorio s.n.* (SGO); Las Mollacas, *F. Philippi s.n.* (SGO); Elqui, canchas de sky, 29°51′S, 70°3′W, 24 Feb 1988, *F. Squeo 88169* (CONC). **Metropolitan Region:** Santiago, valle del río Cepo, 33°19′S, 70°13′W, Feb 1950, *E. Barros s.n.* (CONC); Santiago, valle del Azufre, 15 Jan 1930, *F. Behn s.n.* (CONC); Santiago, Lo Valdés, 33°50′S, 70°3′W, 18 Dec 1940, *H. Schwabe s.n.* (CONC); Santiago, santuario de la naturaleza Yerba Loca, vega en la cuenca alta del estero La Leonera, 33°16′S, 70°15′W, 28 Feb 2000, *M. Arroyo, A. Humaña, & P. McPherson 201455* (CONC, SGO); Santiago, santuario de la naturaleza Yerba Loca, ladera al S de la vega de Las Vacas, 33°19′S, 70°17′W, 28 Jan 1999, *M. Arroyo & C. Castor 991061* (CONC, SGO); Santiago, santuario de la naturaleza Yerba Loca, laderas inmediatamente al NE de la vega de Las Vacas, 33°19′S, 70°17′W, 2 Feb 1999, *M. Arroyo & A. Humaña 991151* (CONC); Santiago, santuario de la naturaleza Yerba Loca, sector casa de Piedra Carvajal, estero de la Yerba Loca, 33°14′S, 70°16′W, 13 Feb 1999, *M. Arroyo & A. Humaña 991712* (CONC, SGO); entre casa de Piedra Carvajal y cerro La Paloma, sector alto del estero de la Yerba Loca, 33°13′S, 70°16′W, 14 Feb 1999, *M. Arroyo & A. Humaña 991751* (CONC, SGO); Santiago, al pie volcán Maipo, 34°9′S, 69°52′W, Feb 1950, *E. Barros s.n.* (CONC); camino entre laguna del Yeso y Baños del Plomo, 33°36′S, 70°0′W, Dec 1992, *C. Bohlen 1463* (SGO); Cordillera Santiago, ad limitem nivis, Feb 1854, *P. Germain s.n.* (SGO); Santiago, quebrada del Morales, 33°47′S, 70°4′W, Apr 1933, *C. Grandjot 1082* (CONC); cordillera de las Arañas [Cordón de los Españoles, pr. Colina], 33°10′S, 70°27′W, Jan 1861, *L. Landbeck s.n.* (SGO); Santiago, La Parva, 33°19′S, 70°16′W, 4 Mar 2007, *M. Mihoc 789* (CONC); Santiago, end of Yeso valley, 33°37′S, 69°54′W, 16 Feb 1967, *H. Mooney & B. Mooney 531* (CONC); La Parva, 33°20′S, 70°17′W, 18 Jan 1980, *M. Muñoz 1597* (SGO); valle Largo, 33°11′S, 70°25′W, Feb 1898, *F. Philippi s.n.* (SGO); Santiago, Puente Alto, valle del Yeso, entre Agua Panimávida y Agua Termal, 33°39′S, 70°4′W, 3 Feb 1960, *F. Schlegel 2592* (CONC, SGO); valle Nevado última pista, trayecto entre Alto Tres Puntas hasta Piedra Numerada, camino a El Plomo, 33°19′S, 70°14′W, Jan 1993, *J. Solervicens s.n.* (SGO); Parque Nacional El Morado, frente a Santiago, 33°49′S, 70°5′W, 11 Jan 1991, *S. Teillier, L. Pauchard, & P. García 2316* (SGO). **Tarapacá:** 50 km south salar Surire, 30 Jan 1997, *D. Benyamini & A. Ugarte 748* (SGO); Iquique, Huara, km 108 on A483 to Colchane, 19°33′S, 68°57′W, 18 Feb 2003, *M. F. Gardner & S. G. Knees 6527* (SGO); camino de Huara a Cancosa, km 108, Pampa Lirima, 19°50′S, 68°52′W, 17 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 342* (CONC); Iquique, Collaguasi, quebrada San Nicolás, 20°59′S, 68°39′W, 23 Jan 1994, *S. Teillier 3303* (CONC, SGO); Pica, bofedal de Piga Alto, 20°2′S, 68°44′W, 22 Mar 2003, *S. Teillier & G. Mieres 5416* (CONC); Pica, bofedal de Piga Alto, 20°2′S, 68°44′W, 22 Mar 2003, *S. Teillier & G. Mieres 5417* (CONC); Pica, salar de Huasco, bofedal de Chullumpine, 20°16′S, 68°53′W, 23 Mar 2003, *S. Teillier & G. Mieres 5454* (CONC); Iquique, comuna Colchane, Colchane, 19°16′S, 68°38′W, Feb 1990, *J. C. Torres s.n.* (SGO); Iquique, bofedal de los ríos Isluga y Sitani, entre Colchane e Isluga, 19°16′S, 68°40′W, 7 Sep 1997, *C. Villagrán, F. Hinojosa, & C. Latorre 9197* (CONC); cordillera cerro Columtusca, Apacheta, 20°7′S, 68°58′W, Mar 1926, *E. Werdermann 1077* (CONC, LIL). **Valparaíso:** Los Andes, laguna Turquesa, cuenca estero Castro-río Blanco, 33°5′S, 70°19′W, 28 Apr 2003, *G. Mieres s.n.* (CONC); Parque Andino Juncal, camino al glaciar, 32°57′S, 70°5′W, 11 Jan 2014, *A. Moreira-Muñoz 2185* (SGO); Parque Andino Juncal, sendero hacia glaciar, vega Los Nacientes, 32°56′S, 70°5′W, 7 Feb 2016, *A. Moreira-Muñoz 2588* (SGO); Aconcagua, Los Andes, valle Juncal, vega Nacimiento, 32°48′S, 70°15′W, 28 Mar 1959, *F. Schlegel 2428* (CONC); Aconcagua, río Blanco, potrero Escondido, 32°38′S, 70°12′W, 7 Apr 1963, *O. Zöllner 247b* (CONC).

COLOMBIA. Arauca: Sierra Nevada del Cocuy, cabeceras de la quebrada El Playón, Patio Bolos [Patiobolas], 2 km al ENE del Alto Cusirí, 6°20′N, 72°17′W, 7 Mar 1973, *A. M. Cleef 8873* (COL, US); Sierra Nevada del Cocuy, cabeceras de la quebrada El Playón, Patio Bolos, hoya S. José, 2.5 km al SW de la laguna La Plaza, 6°21′N, 72°17′W, 10 Mar 1973, *A. M. Cleef 9023a* (COL). **Boyacá:** Cordillera Oriental, Sierra Nevada del Cocuy, Alto Ritacuva, 6°30′N, 72°19′W, 11 Apr 1959, *H. G. Barclay & P. Juajibioy 7352* (COL, US [both mixed with *X. crassum*]); páramos al NW de Belén, cabeceras quebrada Minas, Hoya Cordillera Larga, 6°2′N, 72°57′W, 28 Feb 1972, *A. M. Cleef 2032* (COL, US); páramo de Pisba, carretera Socha–La Punta km 61.5, 6 km al E de Los Pinos, Alto de Granados, 5°59′N, 72°33′W, 11 Jun 1972, *A. M. Cleef 4406* (COL); Sierra Nevada del Cocuy, alto valle Lagunillas, 6°22′N, 72°20′W, 7 Oct 1972, *A. M. Cleef 5949* (COL); páramo de la Rusia, NW-N de Duitama, peña Blanca, 2 km al NE de Buenos Aires, 5°56′N, 73°4′W, 16 Dec 1972, *A. M. Cleef 7315* (COL); Nevado del Cocuy, quebrada de San Paulino, El Morrón, 11 Sep 1938, *J. Cuatrecasas 1402* (US); Duitama, páramo de la Rusia, vereda El Carmen, 5°56′N, 73°5′W, 4 Mar 1981, *S. Díaz-Piedrahita 2276* (COL); Santa Rosa de Viterbo, subida al páramo de El Consuelo y Pan de

Azúcar, 5°53′N, 73°2′W, 28 Mar 2009, *J. L. Fernández-Alonso 27750* (COL); Sierra Nevada del Cocuy, lado S de la Plaza, arriba del campamento, 6°21′N, 72°16′W, 20 Jan 1959, *T. Hammen & E. González 9598* (COL); páramo de la Rusia between Rumania and La Osera on road from Duitama to Charalá, 5°55′N, 73°5′W, 12 Aug 1953, *J. H. Langenheim 3452* (COL); Sierra Nevada del Cocuy, Güicán, laguna Grande de Los Verdes, 6°32′N, 72°19′W, 20 Sep 1978, *O. Rangel & H. Sturm 1529* (COL); Duitama, lagunita cerca el campamento, páramo de Belén, 22 Sep 1985, *O. Rangel et al. 3583* (COL). **Caldas:** páramo del Ruiz, higher slopes, 29 Aug 1957, *H. G. Barclay 5230* (COL); Cordillera Central, vertiente occidental, páramos del Nevado del Ruiz, 5 May 1940, *J. Cuatrecasas 9304* (US); S side of Nevado el Cisne near laguna Verde, 4°50′N, 75°21′W, 28 Jan 1986, *V. A. Funk 8090* (COL, US); S side of Nevado el Cisne near laguna Verde, 4°50′N, 75°21′W, 28 Jan 1986, *V. A. Funk 8092* (COL, US); SW side of Nevado del Ruiz, ~3 km before turn off to laguna Verde, 28 Jan 1986, *V. A. Funk 8096* (COL, US); páramo del Nevado del Ruiz, au-dessus de Termales, 4°57′N, 75°21′W, 31 Oct 1952, *H. Humbert et al. 27059* (COL). **Cesar:** Sierra Nevada de Santa Marta, SE slopes, hoya del río Donachui, laguna de Calocribe (E of Meollaca), 10°45′N, 73°31′W, 30 Sep 1959, *J. Cuatrecasas & R. Romero Castañeda 24526* (COL, US). **Cundinamarca:** páramo de Sumapaz, alto de Caicedo, 4°8′N, 74°13′W, *J. M. Bristow 117* (COL); páramo de Sumapaz, Andabobos, 4°6′N, 74°14′W, 9 Feb 1972, *A. M. Cleef 1547* (US); páramo de Sumapaz, Chisacá, 50 m al E-NE de la laguna Larga, 4°17′N, 74°12′W, 23 Mar 1972, *A. M. Cleef & H. Hart 2576* (COL); páramo de Sumapaz, Chisacá, 50 m al E-NE de la laguna Larga, 4°17′N, 74°12′W, 23 Mar 1972, *A. M. Cleef & H. Hart 2583* (COL); macizo de Bogotá–macizo de Sumapaz, vertiente oriental, Media Naranja, 4°11′N, 74°15′W, 4 Jan 1969, *J. Cuatrecasas & J. M. Idrobo 27005* (COL [mixed with *Xenophyllum humile*], US); macizo de Sumapaz, lado norte, Andabobos, 4°6′N, 74°14′W, 8 Jan 1969, *J. Cuatrecasas & J. M. Idrobo 27052* (COL); páramo de Sumapaz, near headwaters of río San Juan, Alto San Juan, 18 km E of Cabrera, 4°5′N, 74°12′W, 9 Aug 1943, *F. R. Fosberg 20734* (US); P.N.N. Sumapaz, alrededores de la laguna la Media Naranja y la Balsa, 4°11′N, 74°15′W, 6 Dec 1999, *P. Pedraza et al. 728* (COL); P.N.N. Chingaza, 22 Oct 2000, *P. Pedraza 859* (COL); páramo de Chisacá, 4°17′N, 74°12′W, 5 Oct 1966, *T. R. Soderstrom 1293* (US [mixed with *X. humile*]). **La Guajira:** Sierra Nevada de Santa Marta, alrededores de la cabecera del río Ancho, páramo de Macotama, 10°53′N, 73°31′W, 30 Jun 1959, *H. G. Barclay 6980* (COL); Sierra Nevada de Santa Marta, alrededores de cabeceras de río Ancho, páramo de Macotama, 10°52′N, 73°32′W, 13 Feb 1959, *H. G. Barclay & P. Juajibioy 7061* (COL, MO, US); Sierra Nevada de Santa Marta, vertiente río San Mequel [Miguel], 10°54′N, 73°33′W, 16 Aug 1986, *H. Cuadros & A. H. Gentry 2788* (US). **Magdalena:** Sierra Nevada de Santa Marta, alrededores de cabeceras de río Sevilla, 10°53′N, 73°53′W, 23 Jan 1959, *H. G. Barclay & P. Juajibioy 6638* (COL, US); Sierra Nevada de Santa Marta, Moraines of the Mamancanaca valley, 10°42′N, 73°38′W, Jan 1942, *R. Clements 25* (COL); Sierra Nevada de Santa Marta, valley descending SW from Picos Reina and Ojeda, around laguna Naboba, laguna Mamito and laguna Mamo, 10°48′N, 73°38′W, 3 Oct 1959, *J. Cuatrecasas & R. Romero Castañeda 24572* (COL, US); Sierra Nevada de Santa Marta, valle del río Donachui, camino Corisa-Naboba lake, en el valle glaciar, 10°47′N, 73°37′W, 17 Oct 1958, *T. Hammen 1196* (COL); Sierra Nevada de Santa Marta, caserío de San Sebastián-Bellavista, 7 Dec 1978, *O. Rangel, H. Sturm, & E. Wedler 1891* (COL); flanco occidental de la Sierra Nevada de Santa Marta, 29 Jan 1959, *R. Romero Castañeda 7138* (COL, US); valley of río Guiachinacopunameina, 10°44′N, 73°40′W, 28 May 1977, *S. White & W. S. Alverson 623* (COL). **Nariño:** Cumbal, volcán Cumbal, ~6.5–9 km W of Cumbal, 0°55′N, 77°50′W, 13 May 1989, *J. L. Luteyn, J. Fuertes, & O. Rangel 12893* (COL); Cumbal, alrededores de la laguna de Cumbal, 0°57′N, 77°49′W, 2 Sep 1962, *L. E. Mora 2342* (COL); Cumbal, filo cerca a la laguna, 0°56′N, 77°48′W, 21 Oct 1978, *H. Sturm & A. Abouchaar 69* (COL). **Norte de Santander:** Chitagá, corregimiento Presidente, vereda Presidente, laguna El Tambor, sobre margen al costado SE, 7°0′N, 72°42′W, 15 Mar 2007, *D. I. Capacho-Navia et al. 362* (COL [mixed with *X. crassum*]); Cordillera Oriental, páramo de Santurbán, extremo este, 7°15′N, 72°51′W, 27 Jul 1940, *J. Cuatrecasas & H. García Barriga 10299* (COL, US); Cordillera Oriental, páramo del Almorzadero, vertiente norte, 6°58′N, 72°43′W, 28 Nov 1941, *J. Cuatrecasas 13505* (COL [mixed with *X. crassum*], US); Cucutilla, Vereda Sisavita, páramo El Romeral, 7°25′N, 72°53′W, 10 Apr 2001, *S. Y. Galván, N. Y. Ortiz, & R. Sánchez 98* (COL); Cucutilla, Vereda Carrizal, páramo El Romeral, 28 Feb 2002, *N. Y. Ortiz, S. Y. Galván, & W. O. Villamizar 1055* (COL). **Risaralda:** P.N.N. Los Nevados, alrededores de la laguna Otún, 4°46′N, 75°25′W, 1992, *C. G. Koops 247* (US); Cordillera Central, páramo del Quindío, 4°44′N, 75°23′W, 15 Aug 1922, *F. W. Pennell & T. E. Hazen 9852* (US); Pereira, laguna del Otún, 4°46′N, 75°25′W, 28 Oct 2009, *W. G. Vargas 21035* (ICESI). **Santander:** páramo de Almorzadero, on road between Chitagá and Cerrito, ~7 km S of highest point of paramo, 6°59′N, 72°40′W, 31 Dec 1959, *H. G. Barclay & P. Juajibioy 10370* (COL [mixed with *X. crassum*], US); Alto del Almorzadero, vertiente sur, 6°58′N, 72°43′W, 20 Jul 1940, *J. Cuatrecasas & H. García Barriga 10012* (COL, US [both mixed with *X. crassum*]); páramo Rico, 5 km S of California, 7°17′N, 72°54′W, 15 Sep 1944, *H. S. John 20759* (US); páramo de Santurbán, near Vetas, 7°15′N, 72°53′W, 17 Jan 1927, *E. P. Killip & A. C. Smith 17540* (US); páramo de Mogotocoro [Mogorontoque], near Vetas, 7°4′N, 72°49′W, 18 Jan 1927, *E. P. Killip & A. C. Smith 17620* (US); páramo de las Coloradas, above La Baja, 32°56′N, 70°5′W, 27 Jan 1927, *E. P. Killip & A. C. Smith 18402* (US). **Tolima:** Cordillera Central, Nevado del Ruiz, páramos entre Termales y Nevado y Líbano, 4°55′N, 75°19′W, 9 Dec 1958, *H. G. Barclay & P. Juajibioy 6316* (COL, US); Cordillera Central, Nevado del Ruiz, páramos entre Termales y Nevado y Líbano, 4°55′N,

75°19′W, 7 Dec 1958, *H. G. Barclay & P. Juajibioy 6339* (COL). **Valle del Cauca:** Cordillera Central, flanco occidental, Palmira, P.N.N. las Hermosas, margen derecha, aguas abajo de la quebrada "Toche," 3°32′N, 76°1′W, 16 Aug 2012, *A. Giraldo 7842* (CUVC).

ECUADOR. Azuay: 8 km W of Soldados on Cuenca–San Joaquín–Angas rd., near laguna Estrellas Cocha, 2°54′S, 79°15′W, 24 Oct 1995, *V. Funk & X. Montezuma 11436* (HA, QCA); 8 km W of Soldados on Cuenca–San Joaquín–Angas rd., near laguna Estrellas Cocha, 2°54′S, 79°15′W, 24 Oct 1995, *V. Funk & X. Montezuma 11437* (QCA); E ascent to páramo de Las Cajas, 27 Jan 1985, *G. Harling & L. Andersson 21232* (QCA); páramo de Las Cajas, E slope, 29 Mar 1985, *G. Harling & L. Andersson 23402* (QCA); arriba de la laguna Dos Chorreras, llamado "upper meadow," 2°46′S, 79°9′W, 2 Jul 1995, *B. León & K. Young 3514* (QCA); Cuenca, Sayausí, P.N. Cajas, cerca de la laguna de Potaquinoas, 2°46′S, 79°12′W, 17 Nov 2012, *D. Minga & A. Verdugo 2454* (HA); P.N. Cajas, junto a laguna Caballo Shayana, 2°47′S, 79°12′W, 27 Aug 2016, *A. M. Ormaza et al. 37* (HA); área nacional de recreación Cajas, laguna Luspa, 2°50′S, 79°15′W, 23 Aug 1985, *P. M. Ramsay et al. 132* (QCNE); P.N. Cajas, km 32.1 desde redondel Cuenca–Molleturo, sendero este alrededor de laguna Toreadora, 2°46′S, 79°13′W, 8 Jan 2003, *C. Ulloa et al. 1036* (HA); carretera Cuenca–Molleturo–Naranjal, 4.2 km de Molleturo, páramo de río Blanco, caserío, 2°49′S, 79°22′W, 15 Jan 2003, *C. Ulloa et al. 1217* (HA, QCNE); P.N. Cajas, km 35.7 Cuenca–Molleturo, sendero Tres Cruces, laguna Negra-laguna Larga, 2°46′S, 79°14′W, 23 Jan 2003, *C. Ulloa, P. Jørgensen, & X. Clavijo 1364* (HA); P.N. Cajas, km 33 Cuenca–Molleturo, alrededor de la laguna Cucheros, 2°47′S, 79°12′W, 31 Aug 2003, *C. Ulloa & D. Minga 1425* (HA); Octavio Cordero, sector Parcarco, 2°45′S, 78°59′W, 25 May 2006, *A. Verdugo & D. Minga 1358* (HA). **Bolívar:** volcán Chimborazo, W side of the mountain, ~4 km from the road Ambato–Guaranda, 1°28′S, 78°48′W, 14 Sep 1995, *P. Sklenář & V. Kostečková 1326* (QCA); Guaranda, reserva de producción faunística Chimborazo, Guanujo–El Sinche, 1°23′S, 78°58′W, 26 Mar 1992, *H. Vargas & M. Villacís 44* (QCNE [mixed with *W. graminifolia*]). **Cañar:** cerro Buerán, páramo de Curiquinga, 5 km S of Cañar, 2°36′S, 78°55′W, 29 Jan 1945, *F. R. Fosberg & M. A. Giler 22629* (US [mixed with *W. graminifolia*]). **Carchi:** páramos del Ángel, alrededores de Voladero, 0°40′N, 77°52′W, 26 Sep 1959, *H. G. Barclay & P. Juajibioy 9375* (COL); paramo El Ángel, between towns of El Ángel and Tulcán near the pass, 4 Mar 1992, *V. A. Funk & M. Gavilanes 11068* (QCA, QCNE [mixed with *X. crassum*]); volcán Chiles, rd. from Tulcán to Maldonado, 32 km W of the bridge at the W edge of Tulcán, 5 Mar 1992, *V. A. Funk & M. Gavilanes 11074* (QCA, QCNE); volcán Chiles, rd. from Tulcán to Maldonado, 28 km W of the bridge at the W edge of Tulcán, 5 Mar 1992, *V. A. Funk & M. Gavilanes 11076* (QCA, QCNE); páramo El Ángel, just before the pass on road El Ángel–Tulcán, 0°41′N, 77°54′W, 14 May 1973, *L. Holm-Nielsen et al. 5281* (COL, QCNE); páramo El Ángel, just before the pass on road El Ángel-Tulcán, 0°41′N, 77°54′W, 14 May 1973, *L. Holm-Nielsen et al. 5316* (COL, QCNE); volcán Chiles, 0°41′N, 77°53′W, 16 Nov 1991, *S. León 1340* (QCA); Espejo, alrededor de laguna Rasococha (Los Ceibos), 0°44′N, 78°4′W, 9 Nov 1993, *W. Palacios 11909* (QCNE); volcán Chiles, W side of the mountain, 0°48′N, 77°57′W, 6 Oct 1995, *P. Sklenář & V. Kostecková 1401* (QCA). **Chimborazo:** Atillo, frente al campamento de ingenieros del ejército, 2°10′S, 78°30′W, 12 Apr 2009, *D. Cárate, J. Salvador, & S. Rojas 158* (QCA); comunidad de Reten Inchumbamba, zona Sangal Grande, sector Tacasapampa, 2°0′S, 78°35′W, 2 May 2009, *D. Cárate et al. 463* (QCA); comunidad de Ambrosio Lazo, laguna de Patacocha, 1°44′S, 78°52′W, 6 Jun 2009, *D. Cárate et al. 693* (QCA); comunidad de Ambrosio Lazo, laguna de Patacocha, 1°44′S, 78°52′W, 6 Jun 2009, *D. Cárate et al. 706* (QCA [mixed with *Plantago rigida* Kunth]); at the pass on the road Riobamba–Guaranda, 1°39′S, 78°50′W, 27 Nov 1981, *P. Filskov, M. Søndergaard, & I. Gregersen 37508* (QCA); Alao valley, 40 km SE of Riobamba, 1°50′S, 78°25′W, 8 Sep 1989, *P. M. Ramsay, L. P. Evans, & S. M. Buckland 55* (QCA); El Altar, N side of the volcano, on the ridge below the Canoningo peak, 1°41′S, 78°24′W, 20 Aug 1995, *P. Sklenář & V. Kostečková 1086* (QCA); Chimborazo volcano, E side of the mountain, 1°28′S, 78°46′W, 2 Jul 1997, *P. Sklenář & V. Sklenářová 2245* (QCA); Atillo, 2°11′S, 78°34′W, 8 Jun 1999, *M. Smeets & M. Lind van Wijngaarden 322* (QCA); P.N. Sangay, lagunas de Atillo, carretera Guamote–Macas, 2°10′S, 78°28′W, 11 Dec 1999, *E. Terneus 489* (QCA); P.N. Sangay, páramo del Altar, al pie de la laguna Negra, 1°43′S, 78°27′W, 9 Feb 2000, *E. Terneus 508* (QCA). **Cotopaxi:** P.N. Cotopaxi, laguna de Los Limpios, 0°40′S, 78°30′W, 2 Oct 1982, *H. Balslev 3304* (QCA); cordillera de Angamarca y Zumbagua, páramo de Zumbagua, near highest point between Zumbagua and páramo de Milín, 0°54′S, 78°48′W, 17 Jul 1959, *H. G. Barclay & P. Juajibioy 8143* (COL); P.N. Cotopaxi, Limpiopungo, 0°40′S, 78°30′W, 3 Apr 1982, *E. Fegan & G. Falconi 1* (QCA); entre Pilaló et le col de la cordillière Apagua, 22 Mar 1988, *C. Huttel 869* (QCA); P.N. Cotopaxi, alrededor de la laguna Limpiopungo, 0°40′S, 78°30′W, 8 May 1992, *S. León 1461* (QCA); Quevedo, páramo de Milín, vía Pujilí, 0°54′S, 78°44′W, 26 Sep 1975, *R. A. A. Oldeman 3378* (QCA); paramo de Quispicacha, E slope of loma Pucyucuchu, 1°5′S, 78°50′W, 24 Oct 2006, *P. Sklenář 9108* (QCA); paramo de Quispicacha, along the road from Quindigua toward the pass between loma Pucyucuchu and cerro Cuchihuasi, 1°4′S, 78°53′W, 23 Oct 2006, *P. Sklenář 9231* (QCA); Latacunga, P.N. Cotopaxi, edge of lago Limpiopungo, 0°40′S, 78°30′W, 5 Sep 1989, *G. L. Webster 27361* (QCA). **Imbabura:** volcán Cotacachi, vía a las lagunas de Piñán, 0°27′N, 78°21′W, 27 Jan 2009, *S. Salgado 791* (QCA). **Morona-Santiago:** cerros Yuibug-Pailacajas, E side of the mountain ridge, 1°45′S, 78°27′W, 30 Jul 1997, *P. Sklenář & V. Sklenářová 2987* (QCA). **Napo:** Quijos, reserva ecológica Antisana, faldas SW del volcán Antisana, 0°29′S, 78°10′W, 28 Nov 1998, *A. Freire & L. Haro 2971* (QCNE); quebrada and W bank of lago Micacocha, 0°35′S, 78°11′W, 3 Nov 1979, *L. Holm-Nielsen 20851A* (QCA);

valle Vicioso E of volcán Cotopaxi, 0°42′S, 78°15′W, 25 May 1980, *L. Holm-Nielsen & H. Balslev 24002* (QCA); Antisana, Jan 1865, *J. Isern 335* (MA); volcán Antisana, W side of the mountain, 0°30′S, 78°10′W, 23 Jul 1997, *P. Sklenář & V. Sklenářová 2854* (QCA); Quijos, reserva ecológica Antisana, laguna La Mica, 0°32′S, 78°13′W, 2 Aug 1998, *H. Vargas & E. Narváez 2153* (QCNE). **Pichincha:** falda occ. del cerro Antisana, origen del río Antisana, 0°28′S, 78°12′W, 27 Jan 1983, *H. Balslev et al. 4018* (QCA); highway Quito to Baeza, km 34.5, 26 Nov 1976, *J. D. Boeke & J. B. McElroy 339* (QCA); laguna Micacocha, ~5 km SW of the volcano Antisana, 0°20′S, 78°15′W, 14 Nov 1987, *F. Hekker & W. H. A. Hekking 10176* (QCA); vía Toctiuco–Chorrera–Pirámide (antena de televisión), faldas del Rucu Pichincha, 0°9′S, 78°31′W, 11 Aug 1979, *J. Jaramillo & M. Lascano 1307* (QCA); páramo de Guamaní, carretera Pifo–Papallacta, km 23, 0°18′S, 78°14′W, 4 Nov 1990, *S. León 1039* (QCA); páramo de Guamaní, carretera Pifo–Papallacta, km 27, 0°19′S, 78°12′W, 13 Jan 1991, *S. León 1167* (LOJA, QCA); in Paluguillo, 0°15′S, 78°18′W, 1897, *L. Mille 470* (QPLS); páramo de Guamaní, laguna de Hoyas, 0°15′S, 78°12′W, 9 Aug 1987, *P. M. Ramsay & P. J. Merrow-Smith 223* (QCA, QCNE); W side of a mountain ridge ~2 km to the W from cerro SaraUrcu, 0°6′S, 77°57′W, 30 Aug 1995, *P. Sklenář & V. Kostečková 107-5* (QCA); Rucu Pichincha, SW side of the mountain, 0°10′S, 78°36′W, 11 Jul 1995, *P. Sklenář & V. Kostecková 827* (QCA); Rucu Pichincha, S side of the mountain, on loma Gorda ridge to the left from Cruz Loma-Pichincha ridge, 0°10′S, 78°33′W, 11 Aug 1995, *P. Sklenář & V. Kostecková 895* (QCNE); Oyacachi, reserva ecológica Cayambe-Coca, laguna Chuspicocha, 12 Feb 1998, *E. Terneus & J. Terneus 153* (QCA). **Sucumbíos:** Cocha Seca below El Mirador, 8 km E of the Pan American hwy. on road to La Bonita, 0°38′N, 77°41′W, 8 Mar 1992, *V. A. Funk et al. 11102* (QCA). **Tungurahua:** Ambato, parroquia Pilahuín, cuenca primaria río Blanco, farallones a la cabecera del río, base W del glaciar del Caryguayrazo, 1°23′S, 78°48′W, 17 Jul 1992, *C. E. Cerón & N. Gallo 19445* (QCNE); Ambato, parroquia Pilahuín, cuenca primaria río Blanco, farallones a la cabecera del río, base W del glaciar del Caryguayrazo, 1°23′S, 78°48′W, 17 Jul 1992, *C. E. Cerón & N. Gallo 19446* (QCNE); Santiago de Píllaro, páramos de Pisayambo, alrededor de la laguna de Pisayambo, 1°5′S, 78°23′W, 11 Oct 1998, *E. Cueva 258* (QCNE); Ambato, parroquia Pilahuín, cabecera de la cuenca alta del río Ambato, sector Lasabanza, comunidad Yatzaputzan, humedal Huambapamba, 1°23′S, 78°48′W, 16 Sep 2010, *D. Fernández et al. 1627* (QCNE); Ambato, Quisapincha, El Galpón, 1°12′S, 78°41′W, 1 Feb 2003, *D. Minga & A. Verdugo 588* (HA); P.N. Llanganates, 1°7′S, 78°21′W, 15 Feb 2009, *S. Salgado 687* (QCA).

PERU. Amazonas: Chachapoyas, north side of Diosan–Molinopampa pass, 6°9′S, 77°40′W, 2 Aug 1962, *J. J. Wurdack 1555* (USM). **Ancash:** Huaraz, altura del km 11 de la carretera Huaraz–Casma, 9°32′S, 77°37′W, 10 Oct 2001, *A. Cano 11830* (USM); Huari, Yanacancha, km 12 de carretera al campamento minero Ladera, 9°36′S, 77°1′W, 13 May 2003, *A. Cano et al. 13199* (USM); Huari, Yanacancha, km 112 de carretera al campamento minero Antamina, 9°36′S, 77°1′W, 13 May 2003, *A. Cano et al. 13204* (USM); Asunción, Chacas, alrededores de la laguna Lebrón, 9°12′S, 77°29′W, 20 May 2009, *A. Cano et al. 19337* (USM); Huari, Rajupampa, laderas hacia el nevado Santa Rosa, 9°29′S, 77°17′W, 7 Oct 2012, *A. Cano et al. 21347* (USM); Huari, camino Olleros a Chavín, entre Pucahueco y el abra, 9°37′S, 77°18′W, 21 Oct 1999, *J. Roque & K. Young 1188* (USM); Huari, camino Olleros a Chavín, desde el abra hasta el lado oriental de la cordillera Blanca, 9°36′S, 77°17′W, 21 Oct 1999, *J. Roque & K. Young 1227* (USM); Huaylas, Macoto, trayecto entre las lagunas Capalo, 20 May 2000, *J. Roque et al. 1444* (USM); Recuay, Huascarán N.P., río Pachacoto drainage, below nevado Pasto Ruri, 9°55′S, 77°12′W, 13 Sep 1985, *D. N. Smith 11427* (USM); Huaylas, Huascarán N.P., Parón valley, E of lake, 8°59′S, 77°38′W, 29 Sep 1985, *D. N. Smith 11536* (USM); Carhuaz, Huascarán N.P., Vinoyapampa, quebrada Honda, 9°18′S, 77°22′W, 2 Oct 1985, *D. N. Smith, M. Buddensiek, & R. Valencia 11597* (USM); Carhuaz, Huascarán N.P., quebrada Honda, between Vinoyapampa and Portachuelo Honda, 9°18′S, 77°24′W, 3 Oct 1985, *D. N. Smith, M. Buddensiek, & R. Valencia 11673* (USM); Huari, Huascarán N.P., quebrada Pachachaca, a lateral valley of quebrada Rurichinchay, 9°23′S, 77°16′W, 13 Jun 1986, *D. N. Smith, A. Gonzales, & D. Maldonado 12643* (USM); Huaraz, Huascarán N.P., quebrada Llaca, 9°27′S, 77°27′W, 5 Jan 1985, *D. N. Smith, K. Goodwin, & A. Gonzales 9012* (USM); Carhuaz, Huascarán N.P., lateral valley of quebrada Ishinca, trail to lago Ishinca, 9°23′S, 77°25′W, 12 Feb 1985, *D. N. Smith, R. Valencia, & A. Gonzales 9475* (USM). **Arequipa:** pr. Chivay, ladera S del nevado Huarancante, 15°45′S, 71°32′W, 1 Apr 2005, *C. Aedo & A. Galán 11006* (MA); pr. Chivay, ladera S del nevado Huarancante, 15°45′S, 71°32′W, 1 Apr 2005, *C. Aedo & A. Galán 11018* (MA [mixed with *W. solivifolia*]); Castilla, Orcopampa, minas de Poracota, cerca a quebrada Faculla, 15°14′S, 72°33′W, 20 Apr 2011, *H. Beltrán 7113* (USM); Reserva Nacional Salinas y Aguada Blanca, 58.8 km from plaza de armas in Arequipa (city), near laguna Salinas, 16°23′S, 71°10′W, 18 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13191* (USM); pampa Cañahuas, 16°1′S, 71°27′W, 1 Jun 2001, *M. Rodríguez 1124* (USM). **Ayacucho:** Páucar del Sara Sara, Oyolo, a 15 km al NO de Pampamarca, camino a Sayla, 15°5′S, 73°2′W, 14 Sep 2013, *C. Tejada 230* (HSP); Sucre, Morcolla, a 100 m del río Jajincura y Cuyto, 14°9′S, 73°46′W, 5 May 2014, *C. Tejada 433* (HSP); Sucre, Morcolla, a 100 m del río Jajincura y Cuyto, 14°9′S, 73°46′W, 5 May 2014, *C. Tejada 434* (HSP). **Cusco:** Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7702* (USM [mixed with *W. canaliculata*]); Velille, Uchucarco, Arizona Norte y Pincullune, 14°27′S, 71°49′W, 23 Apr 2015, *P. Gonzáles 3597* (USM); prov. Cusco, Socorro, May 1949, *F. Marin 1467* (LIL); Espinar, alrededores del poblado de Jayuni, 14°57′S, 71°1′W, 25 Sep 2009, *W. Ramírez 620* (USM); Urubamba, Ollantaytambo, abra Málaga, on the other side of the ridge 600 m S of the abra Málaga church, 13°8′S, 72°18′W,

15 Apr 2011, *S. P. Sylvester 1065* (USM); La Convención, Santa Teresa, in the central Phacchaq valley on the E side of the river, Yanama, 13°15′S, 72°50′W, 3 May 2012, *S. P. Sylvester 1540* (LPB); La Convención, Vilcabamba, toward the top of the Totora-Purkay valley on the N side of the river, 3 km E of the Totora-Purkay village, 13°10′S, 73°3′W, 8 May 2013, *S. P. Sylvester 1965* (LPB); La Convención, Santa Teresa, at the topmost eastern portion of the Phacchaq valley, 8 km N of Yanama, 13°15′S, 72°50′W, 5 Jun 2013, *S. P. Sylvester 2163* (LPB); La Convención, Santa Teresa, at the topmost eastern portion of the Phacchaq valley, 8 km N of Yanama, 13°15′S, 72°50′W, 5 Jun 2013, *S. P. Sylvester 2164* (LPB). **Huancavelica:** alrededores del puente Licapa, Vizcachayoj, 13°19′S, 74°53′W, 19 Jun 2007, *H. Beltrán 6396* (USM); Huaytará, 7 km lineales al NE del abra Apacheta, en el límite entre Huancavelica y Ayacucho, distr. Pilpichaca, 13°18′S, 74°46′W, 11 Apr 2005, *J. Roque 4811* (USM); mina Marta, 12°40′S, 75°3′W, Jun 2007, *I. Salinas 1672* (USM); Tansiri, cerca a Manta, 12°42′S, 75°10′W, Mar 1953, *O. Tovar 1114* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2917* (USM [mixed with *W. pinnatifida*]); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2919* (USM [mixed with *W. apiculata*]). **Huánuco:** Dos de Mayo, Lauricocha, 10°18′S, 76°39′W, Nov 1955, *A. Cardich 207* (USM); Lauricocha, San Miguel de Cauri, laguna Patarcocha, 10°22′S, 76°45′W, 11 Aug 2003, *F. Salvador, M. A. Alonso, & J. Monerris 588* (USM); Lauricocha, San Miguel de Cauri, a 100 m de puesto de control Santa Rosa (campamento Raura), ladera arriba, 11°35′S, 76°11′W, 13 May 2004, *F. Salvador, S. Ríos, & E. Arias 922* (USM). **Junín:** Junín, 30 Nov 1961, *P. Aguilar s.n.* (USM); prov. Yauli, Morococha, 11°35′S, 76°8′W, 10 Jun 1940, *E. Asplund 11565* (LIL); Tarma, punta carretera Oroya–Tarma, 11°24′S, 75°50′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7999* (USM); Huancayo, Pucara, comunidad de Patala, laguna Yauricocha, 12°10′S, 75°3′W, 30 May 2017, *H. Beltrán & S. Castillo 8077* (USM); Carhuamayo en el lago de Junín, 10°57′S, 76°5′W, 7 Jul 1957, *H. Ellenberg 2197* (LPB); lago Junín, Cazapata, 29 Jul 1971, *F. Encarnación, J. Espinoza, & D. Tovar 203* (USM); alrededores de la laguna de Patarcocha, 11°38′S, 74°55′W, 10 Aug 1948, *R. Ferreyra 3923* (USM); Tarma, lago Junín, E side near road, 13 km N of Junín, 11°2′S, 75°59′W, 14 Jul 1964, *P. C. Hutchison, J. K. Wright, & R. M. Straw 5888* (USM); Atocsaico, 11°17′S, 76°4′W, 26 Apr 1982, *B. Maass & K. Tiller 97* (USM); SE-coast of the Junín lake, 16 Sep 1985, *W. Morawetz & B. Wallnöfer 33-16985* (USM); Carhuamayo, sector Yanacocha, 10°51′S, 75°59′W, 29 Jul 1971, *W. Nauray & H. Gutiérrez T18-1* (USM); Ondores, 11°4′S, 76°8′W, 22 Jun 1976, *U. Pettersson 124* (USM); Llanos de Junín, 11°10′S, 76°0′W, 8 Jan 1984, *D. N. Smith et al. 5651* (USM); Huaytapallana, 11°57′S, 75°2′W, Mar 1982, *K. Tiller 274* (USM); Conocancha, 11°18′S, 76°17′W, 29 Apr 1982, *K. Tiller & B. Maass s.n.* (USM); pampa de Junín, cerca a laguna de Junín, 30 Jun 1954, *O. Tovar 2382* (USM [mixed with *W. caespitosa*]). **La Libertad:** Santiago de Chuco, lagunas Los Ángeles, El Toro y alrededores, 7°59′S, 78°14′W, 29 Oct 2002, *A. Cano et al. 12706* (USM). **Lima:** cordillera Raura, base del pico Torre de Cristal, 10°29′S, 76°45′W, 30 May 2013, *C. Aedo & J. Molina 20551* (MA); Huarochirí, Pacomanta km 120 Lima–Huarochirí, quebrada orillas del riachuelo, 12°11′S, 76°18′W, 24 Nov 1987, *S. M. Baldeón 645* (USM); Yauyos, Laraos, camino Jalcacha a Palca, 12°20′S, 75°43′W, 25 May 1995, *H. Beltrán 1717* (USM); Yauyos, Laraos, 12°27′S, 75°40′W, 8 Jul 1997, *H. Beltrán 2752* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7971* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7993* (USM); Cajatambo, Copa, anexo Huayllapa, 10°20′S, 76°53′W, 2 Aug 2017, *H. Beltrán, S. Castillo, & S. Rivera 8147* (USM); Yauyos, Tomas, antes de llegar al abra de Chaucha, 12°16′S, 75°38′W, 10 Aug 2017, *H. Beltrán 8465* (USM); Canta, Huaroz, Culluhuay, 11°24′S, 76°31′W, 7 May 2008, *P. Gonzáles 189* (USM); Canta, Llullum (más arriba de Canta) [Llunllun], 11°29′S, 76°34′W, 9 Jul 1963, *I. Meza 175* (USM); Canta, Llullún (12 km arriba de Canta) [Llunllun], 11°29′S, 76°34′W, 9 Aug 1963, *I. Meza 189* (USM); Huarochirí, along the road at the dept. border NNE of Chicla, 15 Sep 1985, *W. Morawetz & B. Wallnöfer 51-15985* (USM); Oyón, a 1 km de laguna Aguascocha, río Quichas, 10°36′S, 76°41′W, 14 May 2004, *F. Salvador, S. Ríos, & E. Arias 991* (USM); Huarochirí, Ticlio, 11°35′S, 76°11′W, Nov 1975, *F. Weberling 5871* (USM); Huarochirí, San Juan de Iris, 11°41′S, 76°31′W, 18 Aug 1993, *G. Yarupaitán & J. Albán 1001* (USM). **Moquegua:** pampa Tijipampa, laguna Luripungo, 16°50′S, 70°5′W, 12 Apr 2005, *C. Aedo & A. Galán 11286* (MA, USM); rd. from Moquegua to Puno, near abra Huaytire (abra Viscachas), 91.6 km from Moquegua, 16°52′S, 70°36′W, 12 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13143* (USM); General Sánchez Cerro, Ubinas, entre Pirhuani y Rancho, 16°9′S, 70°43′W, 10 Feb 2014, *D. Montesinos 4152* (HSP). **Pasco:** hda. Andachaca [Andacancha], 10°37′S, 76°31′W, 1 Aug 1950, *J. Infantes Vera 2341* (LIL). **Puno:** unpaved track across pampa to the N and W of the road between abra Pampilla and Ananea, 14°40′S, 69°39′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13178* (USM). **San Martín:** Mariscal Cáceres, campamento Chochos y laguna de Chochos y alrededores en el P.N. del río Abiseo, 7°37′S, 77°28′W, 27 Jun 1996, *A. Cano et al. 7356* (USM). **Tacna:** Tarata, quebrada del río Maure, aguas termales de Covire y baños Calachaca, 17°12′S, 69°56′W, 6 Dec 1997, *M. Arakaki 807* (USM); Tarata, Poma [Alto de Poma], 17°25′S, 69°56′W, 26 Mar 1998, *A. Cano 8152* (USM); Tarata, Cano-Susapaya, 17°20′S, 70°7′W, 2 Apr 1998, *A. Cano 8379* (USM); Tarata, cordillera del Barroso, 17°33′S, 69°51′W, 23 Mar 1998, *M. I. La Torre 2228* (US, USM [both mixed with *W. spathulata*]); Tarata, laguna Casire [Casiri], 17°25′S, 69°49′W, 3 Apr 1998, *M. I. La Torre 2377* (USM); Tarata, laguna Casire [Casiri], 17°25′S, 69°49′W, 3 Apr 1998, *M. I. La Torre 2395* (USM); Pasan los Vientos, 7 Dec 1997, *J. Roque 542* (USM).

VENEZUELA. Mérida: Sierra Nevada, páramo alrededor de la laguna Verde próximo picos Humboldt y Bonpland,

at S edge of la laguna Verde, 8°33′N, 70°59′W, 4 Dec 1959, *H. G. Barclay & P. Juajibioy 10040* (COL); Sierra Nevada, páramos alrededor de picos Bolívar y Espejo, alrededores de las lagunas de Los Anteojos, below pico Espejo, 8°32′N, 71°4′W, 15 Dec 1959, *H. G. Barclay & P. Juajibioy 10252* (COL); Sierra de Sto. Domingo, páramo de Mucubají, alrededores de la laguna Grande, 8°47′N, 70°49′W, 19 Nov 1959, *H. G. Barclay & P. Juajibioy 9598* (COL); Sierra de Sto. Domingo, páramo de la laguna de Los Patos, near laguna de Los Patos, 8°46′N, 70°48′W, 23 Nov 1959, *H. G. Barclay & P. Juajibioy 9739* (COL).

22. ***Werneria rockhauseniana*** H. Beltrán, Trinidad, & J. Calvo, Willdenowia 50(1): 7. 2020. Type. Peru. Ancash: Huaylas, Huascarán N.P., pass between quebrada Los Cedros and Hatuncocha, 8°51′S, 77°45′W, 4,600–4,850 m, 12 Mar 1985, *D. N. Smith & R. Valencia 9950* (holotype: USM-68139!; isotypes: F-1962951!, LPB s.n.!, MO-3316189!, QCNE-58168!, US-00622663!).

Rhizomatous herb, rosettiform, forming mats, 2–2.5 cm tall. **Rhizome** 3–6 cm long, 0.2–0.3 cm in diameter, horizontal to oblique, glabrous. **Leaves** pseudopetiolate; leaf lamina spatulate, 2.4–2.6 mm long, 2.2–2.5 mm wide, entire, truncate and thickened at the apex, attenuate to cuneate at the base, strongly curved forward in cross section (sometimes nearly tubular when young), glabrous, 1-nerved above (barely visible), 1-nerved beneath, fleshy, matte, papillose near the apex (rarely without papillae); pseudopetiole 4.8–12.1 mm long, glabrous. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 7.4–8.2 mm long, 5.7–6.5 mm wide, glabrous; involucral bracts 11–13, 3.6–4.8 mm long, 1.6–1.7 mm wide at the base, obtuse at the apex, greenish to purplish; supplementary bracts absent. **Ray florets** 11–20; corollas 5.5–5.6 mm long, 0.6–1 mm wide, 3–4-veined, subentire to 3-toothed at the apex, not surpassing the involucre, yellow. **Disc florets** 32–33; corollas 4.6–4.9 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, yellow. **Achenes** 2.4–2.7 mm long, 0.6–0.7 mm wide, cylindrical, 6–9-ribbed, glabrous, papillose; pappus 3.5–4.5 mm long, barbellate, whitish. Chromosome number unknown (Figure 7C,D).

Additional Iconography. Beltrán (2017: 62, fig. 4F, sub *W. weberbaueriana*, as photo); Calvo et al. (2020: 9, fig. 4, as photo).

Distribution and Habitat. Endemic to Peru (Ancash, Huánuco [expected], Lima). It is distributed throughout the Cordillera Blanca and Cordillera Huayhuash. This species grows on exposed rocky slopes around the upper limit of vegetation, between elevations of 4,200 and 6,040 m (Figure 49).

Phenology. Flowering nearly all year round.

Etymology. It honors the German biologist E. F. M. Rockhausen (1911–?), who published the first comprehensive revision of the neotropical genus *Werneria* in 1939.

Notes. This species is easily recognizable by its spatulate leaves that are strongly curved forward, truncate at the apex, and usually dorsally papillose and by its sessile to subsessile capitulum with yellow ray corollas not surpassing the involucre. It forms crowded mats.

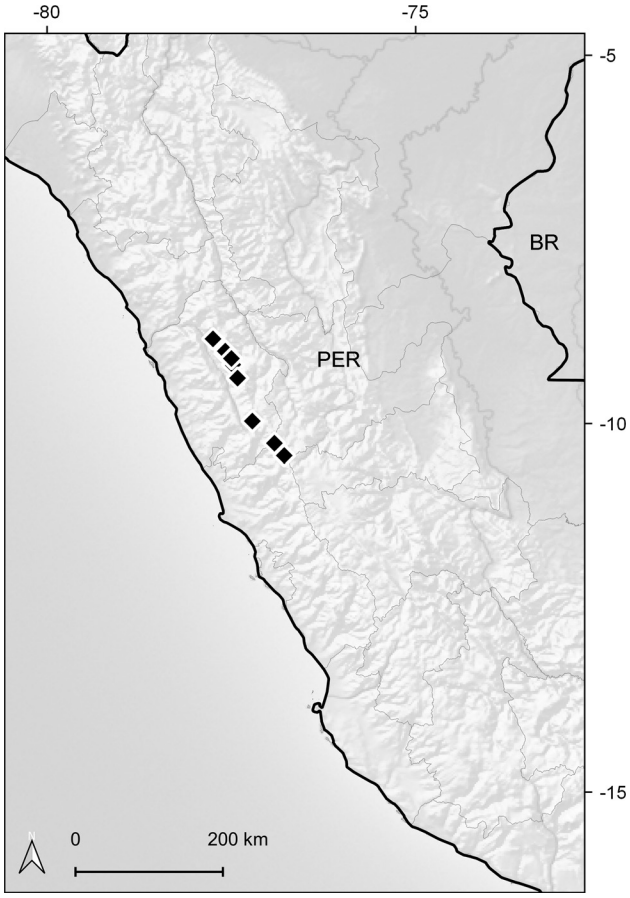

FIGURE 49. Distribution map of *Werneria rockhauseniana*.

Werneria rockhauseniana has been confused with *W. weberbaueriana* (Beltrán, 2017), probably because the type material of the latter species was destroyed at B and its protologue was misinterpreted. Although these two species are morphologically similar, they can be differentiated by the ray corolla color (yellow in *W. rockhauseniana* vs. white in *W. weberbaueriana*), the disc corolla color (yellow in *W. rockhauseniana* vs. white with purple-tipped lobes in *W. weberbaueriana*), the style branches' color (yellow in *W. rockhauseniana* vs. white in *W. weberbaueriana*), and the leaf lamina apex (clearly entire in *W. rockhauseniana* vs. 5–7-notched in *W. weberbaueriana*). Moreover, *W. rockhauseniana* has glabrous pseudopetioles, whereas those of *W. weberbaueriana* bear short and scattered marginal trichomes.

Additional Specimens Examined. **PERU. Ancash:** Bolognesi, Pacllón, sector Jahuacocha, cordillera Huayhuash, cumbre del Nevado Rasác, 10°16′S, 76°55′W, 15 Jun 2004, *C. Callupe s.n.* (USM); Huaylas, 19 May 2000, *A. Cano et al. 10475* (USM); Asunción, Chacas, alrededores de la laguna

Lebrón, 9°12′S, 77°29′W, 20 May 2009, *A. Cano et al. 19372* (USM); near top of divide over cordillera Blanca, upper slopes of Huascarán, above lagunas Llanganuco, 9°1′S, 77°35′W, 10 Jul 1982, *A. Gentry et al. 37441* (MO, USM); Recuay, Huascarán N.P., mouth of quebrada Quenua Ragua, 9°58′S, 77°13′W, 10 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10655* (MO, USM); Carhuaz, Huascarán N.P., quebrada Ishinca, side valley to laguna Ishinca, 9°23′S, 77°25′W, 16 Jul 1985, *D. N. Smith & M. Buddensiek 11213* (F, MO, USM); Carhuaz, Huascarán N.P., quebrada Ulta, near Ulta pass, 9°7′S, 77°30′W, 28 Jul 1985, *D. N. Smith 11309* (F, MO, USM); Yungay, Huascarán N.P., Llanganuco sector, quebrada Ancosh at portachuelo, 9°3′S, 77°35′W, 31 Dec 1984, *D. N. Smith & K. Goodwin 8893* (F, MO, USM). **Lima:** Cajatambo, Raura, 10°26′S, 76°47′W, 15 Apr 1988, *S. Rivas et al. s.n.* (USM).

23. ***Werneria solivifolia*** Sch. Bip., Bonplandia (Hannover) 4: 53, 55. 1856 [“solivaefolia”]. Type. Peru. Puno: Cordillera de Tuno [Puno], May 1854, *W. Lechler 1710* [should be *1710b*] (lectotype: K-000527612 [digital image!], **designated here**).

Rhizomatous herb, rosettiform, forming lax clumps, 2–3 cm tall. **Rhizome** 2–4 cm long, ~0.3 cm in diameter, horizontal to oblique, glabrous. **Leaves** pseudopetiolate; leaf lamina oblong, 4.5–13 mm long, 2.5–9 mm wide, 1-pinnatisect with 3–4 lobes per side, acute at the apex, attenuate to cuneate at the base, flat to slightly curved forward in cross section, glabrous, 1-nerved above, 1-nerved beneath, somewhat fleshy, matte; pseudopetiole 5.3–13 mm long, glabrescent. **Capitulum** discoid, solitary, terminal, sessile to pedunculate; peduncle up to 18 mm long, glabrescent, bearing a few linear-subulate bracts. **Involucre** cupuliform, with bracts fused at the base, 6.3–9 mm long, 3.7–4.8 mm wide, glabrous; involucral bracts 8–11, 3.3–6.5 mm long, 1.4–1.8 mm wide at the base, acute to obtuse at the apex, dark purplish in the upper third; supplementary bracts absent. **Florets** 16–28; corollas 3.9–7.6 mm long, 5-lobed, whitish, dark purplish in their upper third; style branches truncate with a crown of sweeping hairs, dark purplish. **Achenes** ~1.7 mm long, 0.6–0.7 mm wide, cylindrical, 6–9-ribbed, glabrous; pappus 3.8–8.5 mm long, barbellate, usually dark purplish. Chromosome number $2n = 42(\pm 2)$ (Diers, 1961) (Figures 39C,D, 50, 51).

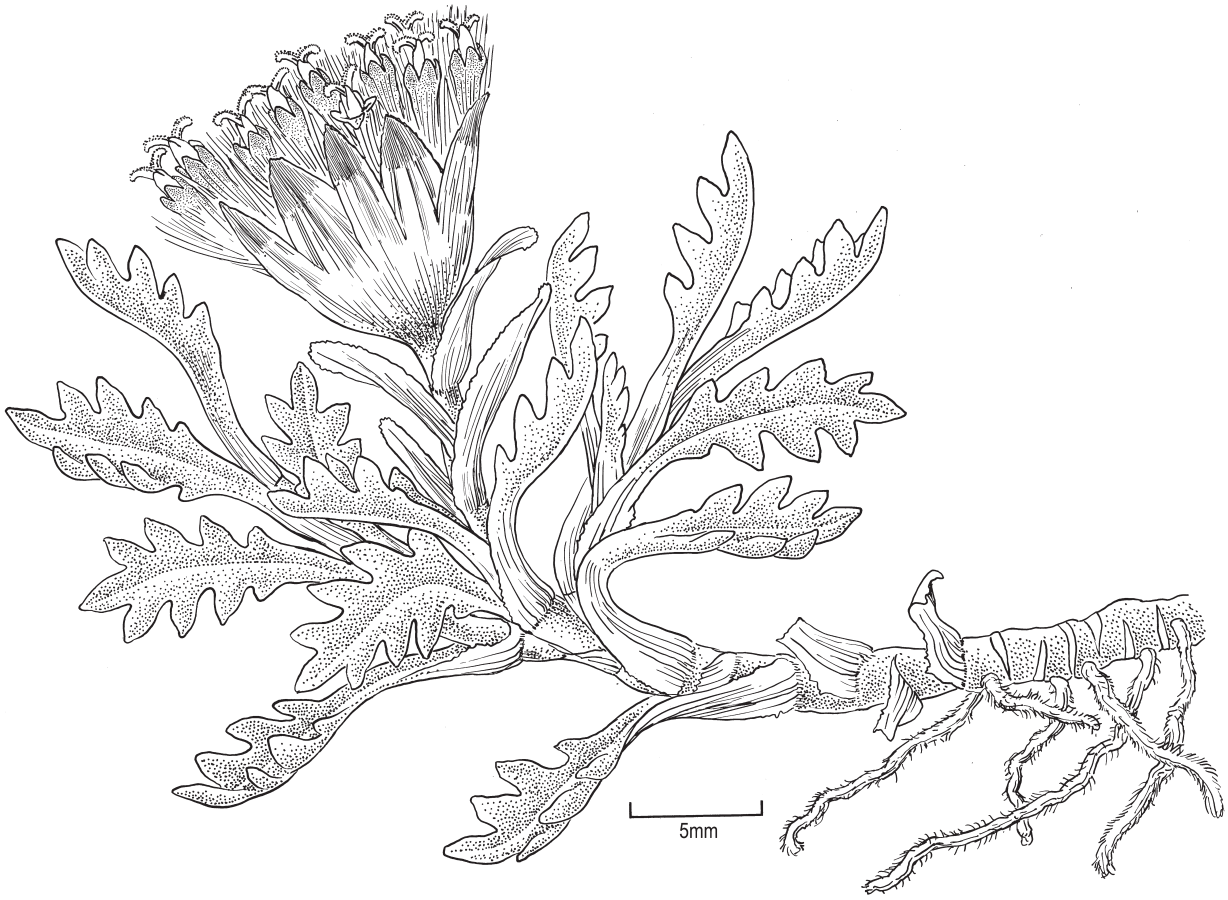

FIGURE 50. *Werneria solivifolia*. Habit (drawn from *X. Menhofer 2018*, US). Illustration by Alice Tangerini.

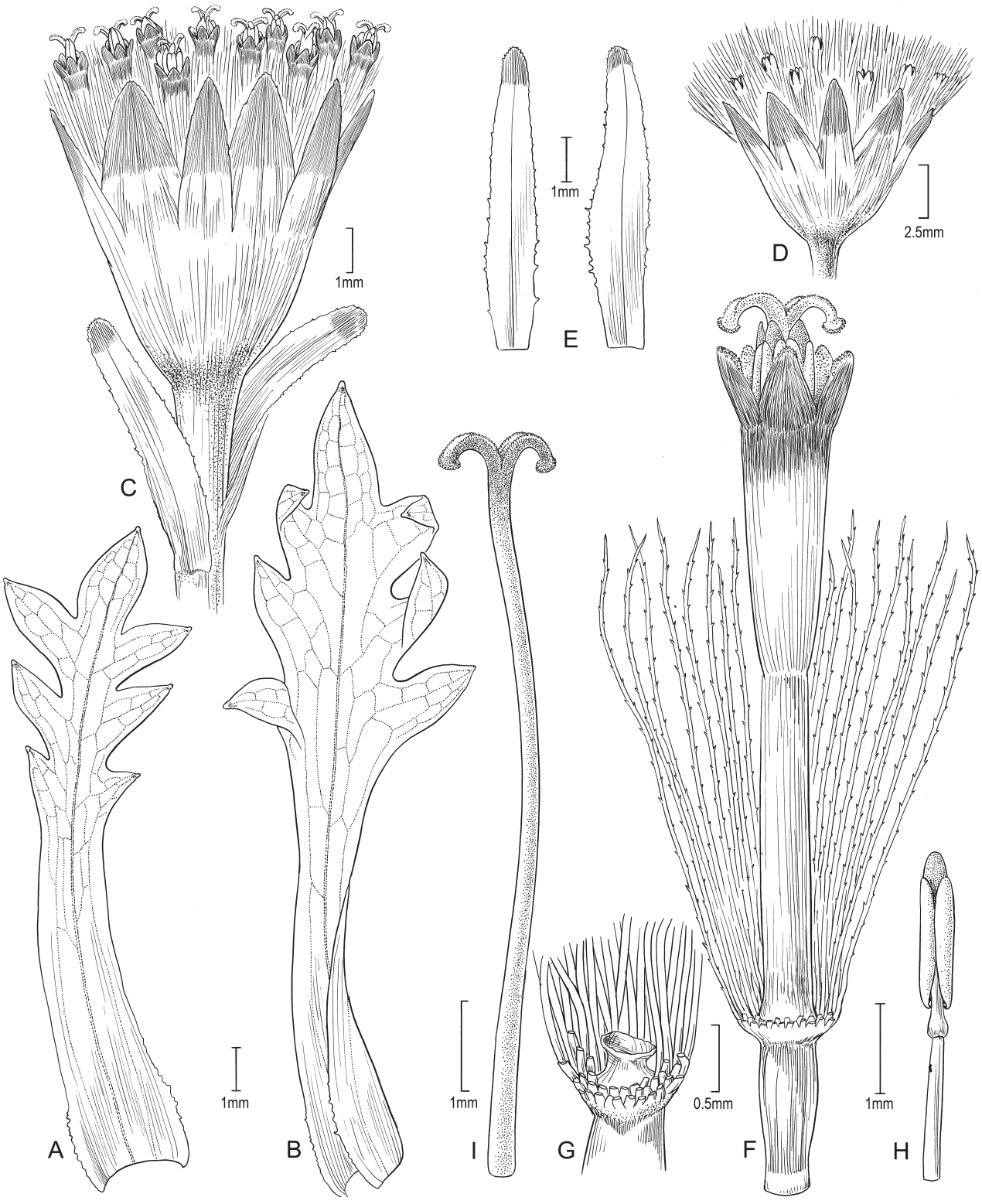

FIGURE 51. *Werneria solivifolia*. **A.** Abaxial leaf surface. **B.** Adaxial leaf surface. **C.** Capitulum. **D.** Mature capitulum. **E.** Peduncle bracts. **F.** Floret (frontward bristles removed). **G.** Pappus base. **H.** Stamen. **I.** Style. All details are drawn from *X. Menhofer 2018* (US) except for A, B (drawn from *G. Mandon 97*, P). Illustration by Alice Tangerini.

Additional Iconography. Weddell (1856: pl. 17B); Beltrán (2017: 62, fig. 4D, as photo).

Distribution and Habitat. Bolivia (La Paz, Potosí), Chile (Arica y Parinacota), Ecuador (Pichincha), Peru (Arequipa, Huancavelica, Junín, Lima, Moquegua, Puno, Tacna). It grows on moist grassy slopes and in Andean marshes (bofedales) of the puna ecoregion, between elevations of 4,000 and 4,925 m (Figure 52).

The collection *Beltrán et al. 7973* (USM) was collected on the border between the Peruvian departments of Lima and Junín. Therefore, it is here considered present in both departments. The location on the map of the single collection from Puno that was studied (*Lechler 1710b*, K) is approximate because the label information is imprecise ("Cordillera de Puno"). *Jameson 149* (K) is the first record of this species from Ecuador and marks the northern limit of its distribution. There is a remarkable gap between the localities from central Peru and the Ecuadorian population, which is also found for *W. spathulata* (see comments for this species).

Phenology. Flowering from November to May.

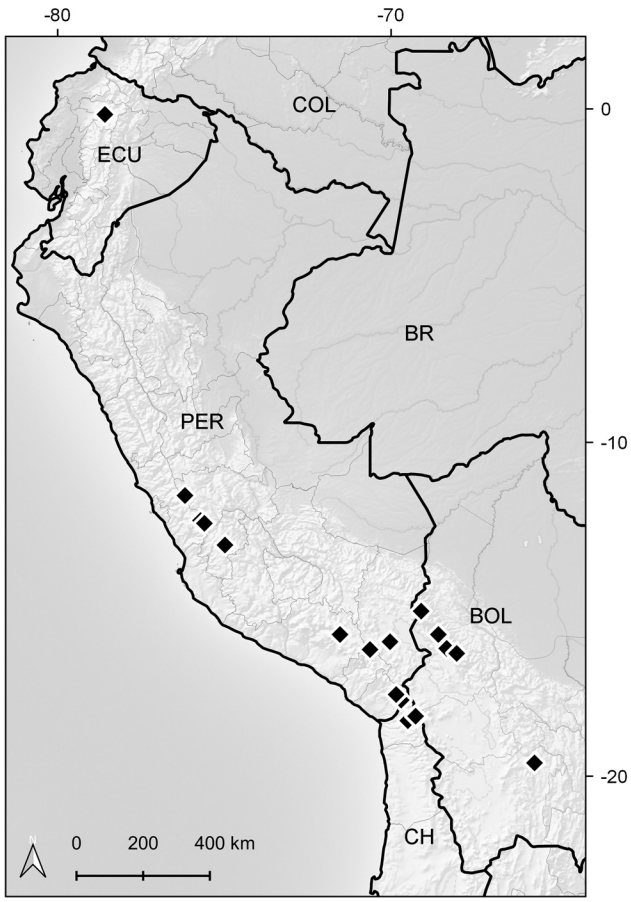

FIGURE 52. Distribution map of *Werneria solivifolia*.

Etymology. The epithet *solivifolia* refers to the resemblance of the leaves of this species to those of *Soliva* Ruiz & Pav. (Compositae).

Notes. This species is small and well defined by its discoid capitula and the 1-pinnatisect, glabrous leaves with 3–4 entire lobes per side. Exceptionally, some specimens have a few scattered trichomes near the pseudopetiole base. The involucre is usually dark purplish in the upper third, as well as the corollas. The pappus is usually dark purplish throughout.

Werneria solivifolia is morphologically close to *W. pinnatifida*, from which it clearly differs in leaf division (1-pinnatisect, 3–4 lobes per side vs. pinnatifid to 1–2-pinnatisect, 10–15 lobes per side in *W. pinnatifida*). The leaf lamina is usually shorter in *W. solivifolia* (4.5–13 mm vs. 10–65 mm in *W. pinnatifida*), and the number of florets is also lower (16–28 vs. 40–60 in *W. pinnatifida*). *Werneria solivifolia* occurs within the distribution area of *W. pinnatifida*.

The only original material of *W. solivifolia* (K-000527612) that was located consists of a few individuals placed in an envelope marked with a cross. The same sheet also contains type material of *W. brachypappa* Sch. Bip. (K-000527611; heterotypic synonym of *W. pygmaea*). However, it bears a single label with the collection number *Lechler 1710* and the name "Werneria cherlerioides." As explained in the discussion of *W. pygmaea*, the name *W. cherlerioides* Sch. Bip. is a *nomen nudum,* and the original number *Lechler 1710* was split into two numbers (*Lechler 1710a* and *Lechler 1710b*) for describing two species (*W. brachypappa* and *W. solivifolia,* respectively).

See comments under *W. caespitosa* for further details regarding the criterion adopted for the lectotypification of the name *W. solivifolia*.

Additional Specimens Examined. **BOLIVIA. La Paz:** Los Andes, Hichu-Kkota valley, 19 km from base of lgn. Khara Kkota along rd. to mina Fabulosa, 16°10′S, 68°20′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11377* (LPB, US); Larecaja, viciniis Sorata [. . .] in paludosis Tanguana, 15°45′S, 68°35′W, Apr 1860, *G. Mandon 97* (P); Franz Tamayo, estancia Okaria (Ulla Ulla), 15°3′S, 69°6′W, 25 Feb 1983, *X. Menhofer 2018* (LPB, US); Los Andes, valle de Hichu Kkota, 26 Jan 1984, *C. Ostria 115* (LPB); Nor Yungas, ~1 km E of la cumbre on road from La Paz to the Yungas, 16°19′S, 68°2′W, 7 Feb 1998, *J. R. I. Wood 12985* (LPB [mixed with *W. pygmaea*]). **Potosí:** cerca de la laguna de Potosí, 19°36′S, 65°42′W, Mar [without year], *A. D. d'Orbigny 1361* (BR, GH, MO, P, UC, W).

CHILE. Arica y Parinacota: Parinacota, 18°13′S, 69°14′W, 7 Mar 1984, *M. Arroyo 84-670* (CONC); camino de Chucuyo a la laguna de Cotacotani, km 5, 18°13′S, 69°16′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 222* (CONC); camino de Chucuyo al Portezuelo de Chapiquiña, km 8, 18°16′S, 69°21′W, 14 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 266* (CONC); camino entre el Portezuelo de Chapiquiña y Putre, 18°20′S, 69°30′W, 27 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 229* (CONC); Parinacota, en el bofedal de Parinacota, 18°12′S, 69°16′W,

29 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 298* (CONC); vega de Parinacota, 18°13′S, 69°14′W, 19 May 1979, *C. Villagrán et al. 1233* (CONC); cordillera volcán Tacora, Ancara, 17°43′S, 69°42′W, Apr 1926, *E. Werdermann 1130* (CONC, GH, K, LIL, NY, MO, UC, US).

ECUADOR. Pichincha: alta planitie montis Pichincha, 0°10′S, 78°35′W, *W. Jameson 149* (K).

PERU. Arequipa: pr. Chivay, ladera S del nevado Huarancante, 15°45′S, 71°32′W, 1 Apr 2005, *C. Aedo & A. Galán 11018* (MA [mixed with *W. pygmaea*]); **Huancavelica:** Huancavelica, Huachocolpa, alrededores de la unidad minera Caudalosa, 13°4′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3500* (USM). **Lima:** Yauyos, Laraos, Viscollo, 12°25′S, 75°36′W, 12 May 2001, *H. Beltrán 4191* (USM); Yauyos, Laraos, pampas de Cura, 12°20′S, 75°43′W, 4 Nov 1992, *H. Beltrán 433* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7973* (USM). **Moquegua:** General Sánchez Cerro, Yunga, bofedales Yaribaya, 16°12′S, 70°38′W, 31 Mar 2011, *D. Montesinos 3033* (HSP, MOL, USM). **Tacna:** Tarata, cordillera del Barroso Chico, 17°33′S, 69°51′W, 23 Mar 1998, *M. I. La Torre 2224* (USM).

24. ***Werneria spathulata*** Wedd., Chlor. Andina 1: 85. 1856. Type. Bolivia. La Paz: ravin de Chuquiaguillo, La Lancha, [without date], *H. A. Weddell s.n.* (lectotype: P-02088537 [digital image!], designated by Freire and Ariza-Espinar (2014: 225); isolectotype: P-02088538 [digital image!)].

Rhizomatous herb, rather scapiform, forming lax clumps, 2–5 cm tall. **Rhizome** 2–4 cm long, 0.1–0.2 cm in diameter, horizontal to oblique, glabrous. **Leaves** pseudopetiolate; leaf lamina spatulate, 4.7–8.1 mm long, 1.9–3.7 mm wide, entire, acute at the apex, attenuate at the base, flat to slightly curved forward in cross section, glabrous, 1-nerved above, 1-nerved beneath, somewhat fleshy, matte; pseudopetiole 4.6–17.1 mm long, glabrous. **Capitulum** radiate, solitary, terminal, pedunculate; peduncle up to 24 mm long, glabrous, bearing a few lanceolate, scarious bracts that sometimes partially enclose the base of the involucre. **Involucre** narrowly cupuliform, with bracts fused at the base, 9.5–10.7 mm long, 3.2–5.9 mm wide, glabrous; involucral bracts 8–12, 4.9–7.1 mm long, 1.2–2.8 mm wide at the base, clearly acute at the apex, greenish; supplementary bracts absent. **Ray florets** 8–12; corollas 7.5–9.1 mm long, 1.1–1.2 mm wide, veins inconspicuous, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white, usually bluish or purplish beneath. **Disc florets** 11–26; corollas 5.2–5.5 mm long, 5-lobed, whitish, usually purple tipped; style branches truncate with a crown of sweeping hairs, whitish to light purplish. **Achenes** 2–2.5 mm long, 0.6–0.8 mm wide, cylindrical, 7–8-ribbed, glabrous; pappus 5.7–10.2 mm long, barbellate, whitish to partially purplish. Chromosome number $2n = 106(\pm 4)$ (Diers, 1961) (Figures 27E,F, 53, 54).

Additional Iconography. Weddell (1856: pl. 17A); Freire and Ariza-Espinar (2014: 225, *W. spathulata* A–E); Gonzáles et al. (2016: 169, fig. 1G, as photo); Beltrán (2017: 62, fig. 4C, as photo).

Distribution and Habitat. Argentina (Jujuy, Salta, Tucumán), Bolivia (La Paz, Oruro, Potosí), Chile (Antofagasta, Arica y Parinacota, Tarapacá), Ecuador (Napo), Peru (Arequipa, Huancavelica, Junín [expected], Lima, Moquegua [n.v.], Puno, Tacna). This species usually grows within the *Distichia* Nees & Meyen and *Oxychloe* Phil. cushions of the Andean marshes (bofedales), between elevations of 3,800 and 5,000 m (Figure 55).

As far as we know, *W. spathulata* has a disjunct distribution with three rather isolated centers: Ecuador, central Peru, and an assembly containing populations from Argentina, Bolivia, Chile, and southern Peru. In Ecuador, this species was recently collected, and it is known only from the Antisana Volcano in Napo (P. Sklenář [Department of Botany, Faculty of Science, Charles University in Prague, Czech Republic] and K. Romoleroux [Herbario QCA, Escuela de Ciencias Biológicas, Pontificia Universidad Católica del Ecuador, Quito, Ecuador], unpublished manuscript "*Werneria spathulata*, nuevo registro para la flora del Ecuador, y redescubrimiento de *Xenophyllum acerosum*," 2020). The distribution pattern of this species needs to be further studied in order to explain the striking gaps among the mentioned populations (see comments under *W. solivifolia*, which shows a very similar distribution pattern).

Phenology. Flowering from January to September.

Etymology. The epithet *spathulata* means spatula shaped, which refers to the leaves of this species.

Notes. This species is delicate, with spatulate, long-pseudopetiolate, glabrous leaves that arise from a very thin rhizome. The capitulum is pedunculate and bears a few lanceolate, scarious bracts that sometimes partially enclose the base of the involucre. The involucre has 8–12 involucral bracts that are clearly acute. The ray corollas are white, usually bluish or purplish on the abaxial surface near the apex.

Additional Specimens Examined. **ARGENTINA. Jujuy:** Humahuaca, mina Aguilar, Molino, 23°12′S, 65°41′W, Mar 1973, *B. Ruthsatz s.n.* (LP). **Salta:** abra de Acay, 24°26′S, 66°14′W, 21 Mar 2014, *C. Aedo 21401* (MA); 4 km before abra del Acay on rd. from San Antonio de los Cobres to La Poma (rt. 40), 24°30′S, 66°20′W, 3 Mar 1993, *V. A. Funk, L. Katinas, & V. Núñez 11132* (US). **Tucumán:** Tafí, cerro Muñoz, 26°14′S, 65°38′W, 23 Feb 1905, *M. Lillo 4205* (LIL [mixed with *W. pygmaea*]).

BOLIVIA. La Paz: Murillo, mina Milluni hacia el N, ladera baja del cerro Huayna Potosí, 19 May 1985, *S. G. Beck 11208* (LPB); Murillo, ~15 km al NNE de La Paz, pie del nevado Chacaltaya, 16°22′S, 68°7′W, 27 Mar 1983, *S. G. Beck 9128* (LPB, US); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 300* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 324a* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987,

FIGURE 53. *Werneria spathulata*. Habit (drawn from *E. Werdermann 1132*, GH). Illustration by Alice Tangerini.

S. Estenssoro 371 (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, camino a Yungas, 16°21′S, 68°1′W, 9 Apr 1987, *S. Estenssoro 394* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, Feb 1988, *S. Estenssoro 626* (LPB); Murillo, nev. Charquini, above aqueduct on N facing slope, 16°17′S, 68°6′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11288* (LPB); Murillo, 6.7 km E of la cumbre (pass) and 8.3 km W of Pongo on rd. to Unduavi, 1 km along old rd. that leads down into valley, 16°19′S, 68°1′W, 16 Apr 1995, *V. A. Funk 11350* (LPB); Los Andes, Hichu-Kkota valley, 19 km from base of lgn. Khara Kkota along rd. to mina Fabulosa, 16°10′S, 68°20′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11379* (LPB); Los Andes, above cumbre (pass) on rd. through Hichu-Kkota valley on rd. to mina La Fabulosa, 21 km from base of lag. Khara Kkota, 16°10′S, 68°20′W, 29 Apr 1995, *V. A. Funk 11412* (LPB); Larecaja, viciniis Sorata, prope Anilaya, laguna de Yuriguana, 15°45′S, 68°33′W, May 1860, *G. Mandon 96* (BR, GH, GOET, LE, NY, P, W); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 9 May 1995, *R. I. Meneses 271* (LPB); Murillo, Milluni, a 18 km de La Paz, 16°19′S, 68°9′W, 22 May 1995, *R. I. Meneses 417* (LPB); Murillo, Milluni, 16°19′S, 68°9′W, 21 May 1995, *R. I. Meneses 427* (LPB); Murillo, paso de Zongo, nev. Charquini, 16°17′S, 68°6′W, 1 Aug 1982, *X. Menhofer 1463* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1037* (LPB); Los Andes, por encima de la

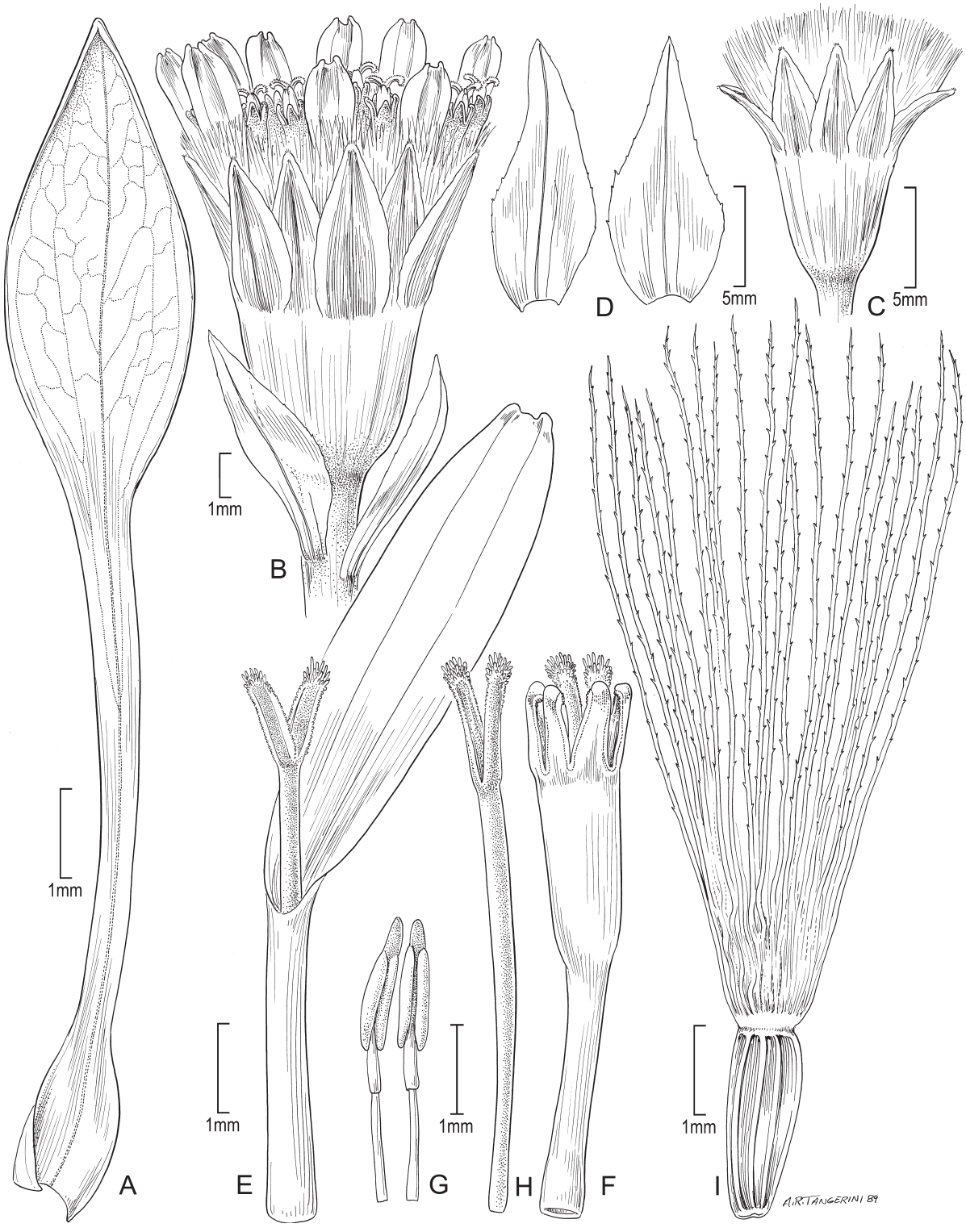

FIGURE 54. *Werneria spathulata*. **A.** Leaf. **B.** Capitulum. **C.** Mature capitulum. **D.** Peduncle bracts. **E.** Ray floret (ovary and pappus removed). **F.** Disc floret (ovary and pappus removed). **G.** Stamens. **H.** Style. **I.** Achene with pappus. All details are drawn from *E. Werdermann 1132* (GH) except for A (drawn from *G. Mandon 96*, GH). Illustration by Alice Tangerini.

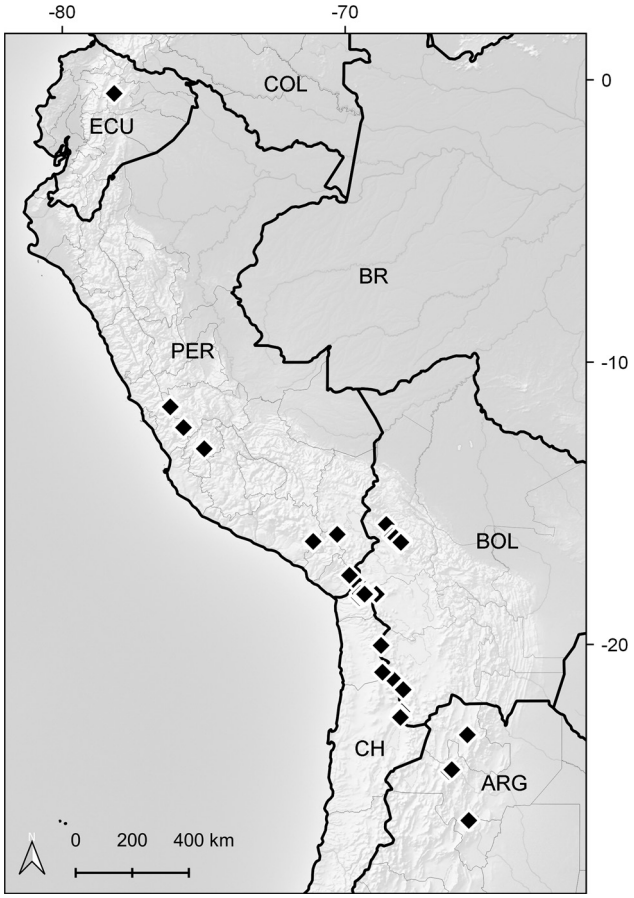

FIGURE 55. Distribution map of *Werneria spathulata*.

represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño, A. P. Sandoval, & N. Pyrooz 1048* (LPB); Los Andes, por encima de la represa del Tuni, 16°13′S, 68°13′W, 25 Mar 2010, *T. Ortuño & A. P. Sandoval 1050* (LPB). **Oruro:** Sajama, ladera sur del nevado Sajama, río Sururia, 18°13′S, 68°54′W, 7 May 1981, *M. Liberman 361* (LPB). **Potosí:** Sud Lípez, Chita Phutuncu, östl. mina Corina, 21°36′S, 67°57′W, 19 Feb 2000, *B. J. Ruthsatz & R. M. Vogt 10436* (LPB).

CHILE. Antofagasta: El Loa, vegas al SE del río Putana, 22°32′S, 68°2′W, 19 Mar 1992, *G. Arancio 92-290* (CONC); Loa, San Pedro de Atacama, Machuca, pasado el pueblo junto a la pista, 22°35′S, 68°3′W, 5 Mar 2019, *J. Calvo 7920* (CONC, SGO); El Loa, near the crater of El Tatio, second vega on rd. toward San Pedro de Atacama, 22°23′S, 68°0′W, 15 Mar 1993, *V. A. Funk & L. Katinas 11192* (SGO); Amincha, 21°12′S, 68°20′W, Feb 1885, *F. Philippi s.n.* (SGO). **Arica y Parinacota:** cordillera de Arica, Chucuyo, 18°13′S, 69°19′W, 23 Feb 1960, *V. Behn s.n.* (CONC [mixed with *W. pygmaea*]); Arica, altiplano de Arica, Las Cuevas, 18°12′S, 69°28′W, 22 Feb 1978, *H. Escobar 225* (CONC); camino de Chucuyo a la laguna de Cotacotani, km 5, 18°13′S, 69°16′W, 13 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 223* (CONC); camino de Chucuyo al Portezuelo de Chapiquiña, km 8, 18°16′S, 69°21′W, 14 Feb 1964, *C. Marticorena, O. Matthei, & M. Quezada 265* (CONC); camino entre el Portezuelo de Chapiquiña y Putre, 18°20′S, 69°30′W, 27 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 227* (CONC); Parinacota, en el bofedal de Parinacota, 18°12′S, 69°16′W, 29 Mar 1961, *M. Ricardi, C. Marticorena, & O. Matthei 302* (CONC); vega de Parinacota, 18°13′S, 69°14′W, 19 May 1979, *C. Villagrán et al. 1230* (CONC); cordillera volcán Tacora, Ancara, 17°43′S, 69°42′W, Apr 1926, *E. Werdermann 1132* (B, BM, CAS, CONC, E, GH, K, LIL, MO, NY, UC, US). **Tarapacá:** Collaguasi, quebrada Huiquintipa, 20°58′S, 68°41′W, 24 Jan 1993, *S. Teillier 3010* (SGO); Collaguasi, quebrada Capella, 20°59′S, 68°41′W, 21 Jan 1994, *S. Teillier 3276* (SGO); Pica, bofedal de Piga Alto, 20°2′S, 68°44′W, 22 Mar 2003, *S. Teillier & G. Mieres 5415* (CONC [mixed with *W. pygmaea*]).

ECUADOR. Napo: volcán Antisana, W side of the mountain, 0°29′S, 78°10′W, 8 Sep 2017, *P. Sklenář, J. Ptacek, & C. Restrepo 14075* (QCA).

PERU. Arequipa: lake of Salinas (between Arequipa and Puno), 16°21′S, 71°8′W, Mar 1943, *C. Sandeman 3859* (K). **Huancavelica:** Huachocolpa, alrededores de la unidad minera Caudalosa, 13°4′S, 74°59′W, 23 Mar 2015, *P. Gonzáles 3514* (USM). **Huánuco:** Lauricocha, San Miguel de Cauri, a 100 m de puesto de control Santa Rosa (campamento Raura), ladera abajo, 11°35′S, 76°11′W, 13 May 2004, *F. Salvador, S. Ríos, & E. Arias 960* (USM). **Lima:** Yauyos, Laraos, laguna Pamparca, 12°19′S, 75°43′W, 11 Jul 1997, *H. Beltrán 2899* (USM); Huarochirí, Chicla, abra Anticona (Ticlio), 11°35′S, 76°11′W, 29 Apr 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7974* (USM). **Puno:** San Antonio de Esquilache, 16°6′S, 70°17′W, 16 May 1937, *D. Stafford 740* (K). **Tacna:** Tarata, cordillera del Barroso, 17°33′S, 69°51′W, 23 Mar 1998, *M. I. La Torre 2228* (US, USM [both mixed with *W. pygmaea*]).

25. ***Werneria staticifolia*** Sch. Bip., Bonplandia (Hannover) 4: 53. 1856 [“staticaefolia”]. Type. Peru. Puno: in summis jugis Cordillera prope San Gabán, Jul 1854, *W. Lechler 2212* (lectotype, P-02088547 [digital image!], **designated here**; isolectotypes: F-974752!, G-00305495 [digital image!], GOET s.n.!, K-000527608 [digital image!], M-0147066 [digital image!], LE s.n.!, P-00711471 [digital image!], P-02088548 [digital image!], S-R-6528 [digital image!], W-9110!, W s.n.!).

Werneria nubigena var. *caulescens* Wedd., Chlor. Andina 1: 81. 1856. *Werneria nubigena* subvar. *leioscapa* Wedd., Chlor. Andina 1: 81. 1856. *Werneria caulescens* (Wedd.) Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 208. 1879. *Werneria caulescens* (Wedd.) Hieron., Bot. Jahrb. Syst. 21(3): 363. 1895 [“caulescenti”], *nom. illeg. superfl.* (Turland et al., 2018, ICN Art. 52.1). *Werneria caulescens* (Wedd.) Rusby, Bull. New York Bot. Gard. 4(14): 398. 1907, *nom. illeg. superfl.* (Turland et al., 2018, ICN Art. 52.1). Type. Peru [“Pérou”]. Cusco [“Dépt. du Cuzco, Octob. 1839-fév. 1840”], *C. Gay 1054 (718)* (lectotype: P s.n.!, **designated here**).

Werneria staticifolia var. *celmisioides* Wedd., Chlor. Andina 1: 82. 1856. Type. Peru. Puno: Tabina, [without date], *W. Lechler 2111* (lectotype: P s.n.!, **designated here**; isolectotype: K-000527609 [digital image!]).

Werneria celmisioides Wedd., Chlor. Andina 1: 82. 1856, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1).

Werneria acerosifolia Hieron., Bot. Jahrb. Syst. 21(3): 363. 1895. Type. Peru. Amazonas: de Pacasmayo a Moyobamba, Fraileyacu entre Ventilla y Bagazán, Apr/June 1875, *A. Stübel 25c* (B, destroyed; photo F0BN015800!), **syn. nov.**

Rhizomatous herb, scapiform (rarely rather rosettiform), forming lax clumps or solitary plants, 3–44 cm tall. **Rhizome** 7–20 cm long, 0.8–2.5 cm in diameter, oblique to vertical, covered with lanate indumentum. **Leaves** extending into a sheath-like base that bears long, arachnoid trichomes; leaf lamina linear to narrowly oblanceolate, (23–)55–202(–320) mm long, (1.6–)2.1–4(–8.3) mm wide, entire, acute to obtuse at the apex, usually slightly narrowed at the base, flat, sometimes slightly curved forward in cross section, glabrous, 1-nerved above, 1-nerved beneath, somewhat fleshy, matte. **Capitulum** radiate, solitary, terminal, pedunculate (rarely very shortly pedunculate); peduncle up to 390 mm long, glabrescent to lanate, bearing linear bracts. **Involucre** cupuliform, strongly partite (barely fused at the base), 10–25 mm long, 9–18 mm wide, glabrous to lanate at the base; involucral bracts (13–)21–33, (6.2–)15–20.1 mm long, 1.5–3.1 mm wide at the base, acute at the apex, greenish; supplementary bracts absent. **Ray florets** 20–33; corollas (9.8–)17.5–22.7 mm long, 0.8–2.1 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, white. **Disc florets** 62 to ~200; corollas 4.1–6.3 mm long, 5-lobed, yellowish; style branches truncate with a crown of sweeping hairs, yellowish. **Achenes** 3.1–3.2 mm long, ~1 mm wide, cylindrical, ~7-ribbed, glabrous; pappus (3.7–)7.3–10.9 mm long, barbellate, whitish. Chromosome number unknown (Figure 56).

Distribution and Habitat. Bolivia (La Paz), Peru (Junín, Cusco, Puno). This species grows on moist grassy slopes and in rocky areas of the humid puna ecoregion, between elevations of 3,400 and 5,250 m (Figure 57).

Phenology. Flowering nearly all year round.

Etymology. The epithet *staticifolia* refers to the resemblance between the leaves of this species and some species belonging to the genus *Statice* L. (=*Armeria* Willd., Plumbaginaceae).

Notes. This species belongs to the *Werneria* group with white ray corollas, a strongly partite involucre (barely fused at the base), and a pedunculate capitulum. It is well characterized by its large rhizome covered with a dense lanate indumentum, which resembles that of *Xenophyllum crassum*. The leaves are linear to narrowly oblanceolate (leaf width/length ratio of 0.02–0.04) and are usually slightly narrowed at the base. *Werneria staticifolia* is a variable species, but mainly in the indumentum of the peduncle. Typical forms are glabrous or almost so, but some specimens have a lanate indumentum (e.g., *Palabral et al. 415*, LPB; *Zenteno et al. 15104* and *15140b*, LPB). These collections come from the Madidi National Park in northern Bolivia.

Werneria staticifolia is morphologically similar to *W. plantaginifolia* because of its relatively large habit, the white ray corollas, and the strongly partite involucre. Although their distribution areas overlap, confusion is unlikely because *W. plantaginifolia* has oblanceolate leaves with a differentiated pseudopetiole. The peduncle bracts of these two species are also different (linear and entire in *W. staticifolia* vs. foliose and usually denticulate in *W. plantaginifolia*). Dried specimens of *W. staticifolia* have been misidentified as *W. villosa*. However, *W. staticifolia* usually has broader leaves ([1.6–]2.1–4[–8.3] mm wide vs. 1–2.1[–6] mm wide in *W. villosa*) and larger rhizomes and does not have supplementary bracts. Living plants are less likely to be confused because they differ in the color of the ray corollas, which are yellow in *W. villosa* (the forms of *W. villosa* with white ray corollas are restricted in northwestern Argentina, where *W. staticifolia* does not occur). There are some specimens in Cusco (Peru) that are considerably smaller than the typical forms, e.g., *Beltrán 7703* (USM), *Beltrán 7673* (USM), *Cano 4290* (USM), *Sylvester 1877* (LPB, USM). However, their proportionally large rhizome, strongly partite involucre, absence of supplementary bracts, and white ray corollas show that they belong to *W. staticifolia*.

A Gay specimen from Cusco (Peru) is selected as the lectotype of *W. nubigena* var. *caulescens* Wedd., which was synonymized with *W. staticifolia* by Rockhausen (1939). The specimen fits well with the information provided in the protologue and certainly corresponds to *W. staticifolia*. In contrast, Grisebach (1879) interpreted Weddell's varietal name as a distinct taxon to be recognized at specific rank and accordingly made the combination *W. caulescens* (Wedd.) Griseb. This name was later synonymized with *W. villosa* by Cabrera (1948). It should be noted that Grisebach apparently did not study the original material and based his nomenclatural action on the specimen *Lorentz & Hieronymus 108*, which was likely destroyed in 1943. A picture of the specimen kept at F (F0BN015804) allows us to identify it as *W. villosa*.

The isolectotype of *W. staticifolia* var. *celmisioides* Wedd. at K bears a label with the name "Achyrophorus Hohenackeri Sch. B." (≡ *Hypochaeris hohenackeri* (Sch. Bip.) Domke). Likewise, a Lechler specimen (K s.n.) that certainly corresponds to the genus *Hypochaeris* L. has a printed label with the information "2111a. Werneria celmisioides Sch. Bip." That is a mistake; see Schultz Bipontinus (1856) for details about Compositae specimens collected by Lechler in Peru and identified by Schultz Bipontinus.

The name *W. acerosifolia* Hieron. was synonymized with *W. villosa* by Rockhausen (1939). The type material of the former name was apparently destroyed at B in 1943, but a picture of it is available at F (F0BN015800). Although it shows a single individual not well preserved, it can be observed that the involucral bracts are strongly partite and that the supplementary bracts are absent. We therefore believe that it corresponds to *W. staticifolia* rather than *W. villosa*. This view is supported by the information provided in the protologue by Hieronymus (1895), who assumed morphological affinities between *W. acerosifolia* and *W. staticifolia*. The original material of *W. acerosifolia* was collected

FIGURE 56. *Werneria staticifolia*. **A.** Bolivia, La Paz, Chuñuña (*M. P. Paco et al. 15*, LPB); photograph by Alfredo Fuentes. **B.** Bolivia, La Paz, Pelechuco (*M. Zárate 4839*, BOLV); photograph by Modesto Zárate. **C, D.** Bolivia, La Paz, near Rinconada (*J. Calvo 7781*, SGO); photographs by Joel Calvo.

in a very humid paramo to the east of Chachapoyas (Peruvian department of Amazonas). Specimens of *W. staticifolia* from this region were not available to be examined in this study, which prevents us from neotypifying the name *W. acerosifolia*. On the basis of specimens examined for this revision, the northernmost population of *W. staticifolia* is located in southern Junín (central Peru; Figure 57). Further collections from the locus classicus of *W. acerosifolia* would contribute to conclusively determining the taxonomic status of this name. Here, it is synonymized with *W. staticifolia*.

Additional Specimens Examined. **BOLIVIA. La Paz:** Bautista Saavedra, área natural de manejo integrado Apolobamba, sector campamento Chaka, por el antiguo camino Hilo Hilo-Apolo, 14°53′S, 68°47′W, 3 Apr 2009, *S. Achá et al. 256* (LPB, MO n.v.); Bautista Saavedra, Puina, Torapata, 14°32′S, 69°7′W, 24 Aug 2006, *G. Aguirre 87* (LPB); Murillo, laguna

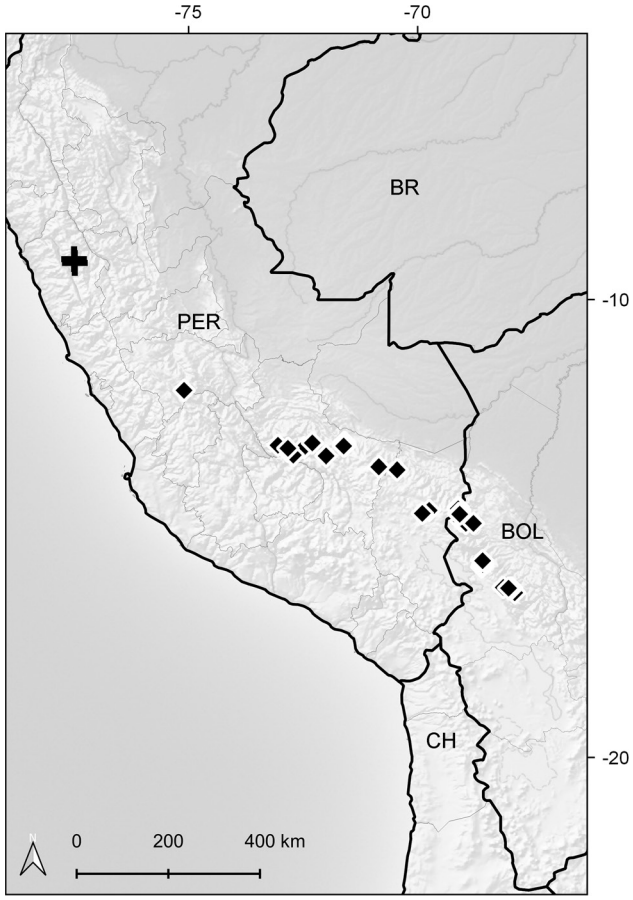

FIGURE 57. Distribution map of *Werneria staticifolia* (diamonds) and *W. weberbaueriana* (cross).

Marimarini, sobre el camino precolombino La Reconquistada, casi 23 km al N de Ventilla, 16°24′S, 67°53′W, 23 Apr 2006, *C. Aldana 509* (LPB); Murillo, bajando de la cumbre 17 km, entrando por la antigua gravera, pasando la mina Lourdes, subiendo 3 km, PN-ANMI Cotapata, Kalasani, 16°18′S, 67°58′W, 1 Mar 2003, *S. G. Beck, E. Emshwiller, & S. Laegaard 28724* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Keara, entre la senda Keara–Sumpulo, 14°41′S, 69°5′W, 16 Feb 2012, *T. E. Boza, E. Renjifo, & R. Villegas 2487* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Keara, entre la senda Keara–Sumpulo, 14°41′S, 69°5′W, 17 Feb 2012, *T. E. Boza, E. Renjifo, & R. Villegas 2497* (LPB); Unduavi, entre laguna Estrellani y Pongo, pr. estancia Rinconada, 16°18′S, 68°1′W, 5 Sep 2018, *J. Calvo 7781* (SGO); Franz Tamayo, P.N. Madidi, Queara, Lampayani, 14°41′S, 69°6′W, 19 Apr 2008, *A. Fuentes, M. P. Paco, & G. Nina 12610* (LPB); Franz Tamayo, P.N. Madidi, Queara, Yana Orcko Wichay, por el camino a Chaconi, 14°40′S, 69°6′W, 20 Apr 2008, *A. Fuentes, M. P. Paco, & G. Nina 12621* (LPB, MO n.v.); Franz Tamayo, P.N. Madidi, Queara, queñual de Quecara, 14°39′S, 69°5′W, 21 Apr 2008, *A. Fuentes et al. 12657* (LPB); Franz Tamayo, P.N. Madidi, Queara, Chaconi, 14°40′S, 69°5′W, 21 Apr 2008, *A. Fuentes & R. Madriaga 12679* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Keara, hacia el NW, 14°41′S, 69°5′W, 17 Jun 2005, *A. Fuentes et al. 8289* (LPB); Franz Tamayo, P.N. Madidi, laguna Tolca Cocha, al NE de Keara Nuevo, 14°41′S, 69°5′W, 15 Apr 2006, *A. Fuentes et al. 9830* (LPB); Murillo, nev. Huayna Potosí, E slopes above rd., 16°17′S, 68°8′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11280* (LPB); Murillo, nev. Huayna Potosí, E slopes above rd., 16°17′S, 68°8′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11281* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, frente a Pallalani, 14°53′S, 68°57′W, 4 Apr 2009, *I. Loza et al. 940* (LPB); Franz Tamayo, área natural de manejo integrado Apolobamba, Hilo Hilo, frente a Pallalani, 14°53′S, 68°57′W, 4 Apr 2009, *I. Loza et al. 956* (LPB); Murillo, 5 km SW of Unduavi, N of Pongo–Unduavi road, between río Choquetango and mina Elba valleys, 17 Dec 1990, *M. Lyle 544* (LPB); Larecaja, viciniis Sorata, inter Choro et montem Illampu, prope laguna de Choquecoa, Feb/May 1859, *G Mandon 86* (BM, BR, GH, K, LE, NY, P, W); Larecaja, viciniis Sorata, valle inter Choquecoa et montem Illampu, prope Puerta del Inca, 15°47′S, 68°35′W, Sep 1858, *G. Mandon 87* (BM, GH, K, NY, P, W); Larecaja, viciniis Sorata, prope Las Trincheras de Chiliata, 15°42′S, 68°35′W, Mar 1859, *G. Mandon 89b* (P [mixed with *W. plantaginifolia*]); Murillo, cerca de la carretera de La Paz a la cumbre, 6 Mar 1983, *X. Menhofer 2078* (LPB); Franz Tamayo, P.N. Madidi, Queara nuevo, Chuñuña, queñual al N del pueblo, 14°41′S, 69°5′W, 9 Apr 2008, *M. P. Paco et al. 15* (LPB, MO n.v.); Franz Tamayo, bosque de Chuñuni, cerca de la comunidad de Queara, 14°41′S, 69°5′W, 20 Jul 2006, *A. Palabral et al. 405* (LPB); Franz Tamayo, bosque de Chuñuni, cerca de la comunidad de Queara, 14°41′S, 69°5′W, 21 Jul 2006, *A. Palabral et al. 415* (LPB); Franz Tamayo, Puina, bosque de Santa Cruzada, 14°34′S, 69°7′W, 21 Aug 2006, *A. Palabral et al. 437* (LPB); Murillo, Pongo, bosque de Choquetanga, 16°18′S, 67°57′W, 8 Jan 2007, *A. Palabral et al. 534* (LPB); Murillo, Pongo, bosque de Choquetanga, 16°18′S, 67°57′W, 21 Jan 2007, *A. Palabral et al. 540* (LPB); Franz Tamayo, Apolobamba, Puina, cerro Queñuapata, 14°36′S, 69°5′W, 10 Apr 2008, *J. Quisbert et al. 806* (MO); Murillo, mina Lourdes, 2.7 km al N del camino entre La Paz y Unduavi, a lo largo del río Kkota khuchu (~14 km al E de la cumbre), 16°18′S, 67°58′W, 25 Apr 1987, *J. C. Solomon & R. Chevalier 16596* (LPB); Larecaja, Sorata, on ascent from laguna Challata to la abra de Illampu on trail to la laguna glacial, 15°50′S, 68°36′W, 7 Apr 2004, *J. R. I. Wood 20650* (LPB [mixed with *W. plantaginifolia*]); Franz Tamayo, Pelechuco, camino 4 km de Pelechuco a Hilo Hilo, 14°50′S, 69°3′W, 6 Apr 2016, *M. Zárate 4839* (BOLV); Franz Tamayo, Pelechuco, Puina, al SO en línea recta 3.3 km de la laguna Celeste, 14°36′S, 69°45′W, 5 Sep 2015, *F. Zenteno, B. Miranda, & F. Flores 15104* (LPB); Franz Tamayo, Pelechuco, Puina, al ESE en línea recta 3.3 km de la laguna Celeste, 14°40′S, 69°54′W, 7 Sep 2015, *F. Zenteno, B. Miranda, & F. Flores 15140b* (LPB [it has been

renumbered as "15140b" because the duplicate corresponds to *W. orbignyana*]); Franz Tamayo, cascada Pata, al NNO en línea recta a 2.2 km del poblado de Keara, 14°40′S, 69°6′W, 2 Feb 2017, *F. Zenteno et al. 19646* (LPB).

PERU. Cusco: Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7673* (USM); Anta, Mollepata, 13°24′S, 72°43′W, 12 May 2013, *H. Beltrán 7703* (USM); Paucartambo, Parque Nacional del Manu, Acjanaco, 13°11′S, 71°35′W, 3 May 1990, *A. Cano 3384* (USM); Paucartambo, Parque Nacional del Manu, alturas de Teleban, 16 Jul 1990, *A. Cano 3787* (CUZ, USM); Paucartambo, Parque Nacional del Manu, altura de Solan, 17 Jul 1990, *A. Cano 3854* (USM); Paucartambo, Parque Nacional del Manu, Qollatambo, 13°12′S, 71°37′W, 10 Sep 1990, *A. Cano 4290* (USM); Paucartambo, Parque Nacional del Manu, Acjanaco, subida a Quellhua Ccocha, 13°11′S, 71°35′W, 1 Jul 1991, *A. Cano & S. M. Baldeón 4908* (US, USM); Paucartambo, Parque Nacional del Manu, Acjanaco, cerro Inambari, 13°11′S, 71°35′W, 21 Mar 1992, *A. Cano 5242* (USM); Urubamba, Chincheros, upstream from community of Taucca, 13°25′S, 72°0′W, 14 Jan 1982, *E. W. Davis et al. 1547* (USM); Paucartambo, Parque Nacional del Manu, camino de El Mirador a cerro Macho Cruz, 13°8′S, 71°37′W, 21 Jul 1990, *B. León 2244* (USM); La Convención, Vilcabamba, on the S facing cliff at the end of the Totora-Purkay valley, 4 km E of the Totora-Purkay village, 13°11′S, 73°3′W, 3 May 2013, *S. P. Sylvester 1877* (LPB, USM); La Convención, Santa Teresa, at the topmost eastern portion of the Phacchaq valley, 8.5 km N of Yanama, 13°15′S, 72°50′W, 26 May 2013, *S. P. Sylvester 2117* (LPB); Urubamba, Ollantaytambo, abra Málaga, on the S facing cliff 1.5 km SW of the abra Málaga church, 13°8′S, 72°18′W, 2 Nov 2010, *S. P. Sylvester 238* (LPB); Urubamba, nevado Yllahuaman, 12 Mar 1994, *A. Tupayachi et al. 2404* (CUZ); Urubamba, Machu Picchu, Pacaymayo, laguna Pacaymayo, 13°14′S, 72°29′W, 26 Jun 2001, *A. Tupayachi et al. 5065* (CUZ); Paucartambo, abajo del tambo "Tres Cruces," 13°7′S, 71°36′W, 8 May 1914, *A. Weberbauer 6977* (F, GH, MOL, USM); Quishpicanchi, Limacpunko, Marcapata, community of Unión Arasa, Cullebrayoc trail, 13°39′S, 70°51′W, 24 Apr 2011, *J. D. Wells & P. Centeno 913* (USM); Paucartambo, Corihuayrachina, 13°19′S, 72°50′W, 15 Mar 1953, *F. Woytkowski 465* (USM); Paucartambo, Llutuyoc, 15 Mar 1953, *F. Woytkowski 612* (USM). **Junín:** Huancayo, Acopalca, 11°59′S, 75°6′W, 6 Nov 1977, *D. Barrón 130* (USM).

26. ***Werneria villosa*** A. Gray, Proc. Amer. Acad. Arts 5: 139. 1861. Type. Peru. Lima: Andes Peru, Alpamarca, Baños, [without date], *Capt. Wilkes Expedition s.n.* (lectotype: US-00037309!, **designated here**; isolectotypes: GH s.n.!, K-000527606 [digital image!], P-02088554 [digital image!]).

Werneria nubigena var. *dombeyana* Wedd., Chlor. Andina 1: 81. 1856 ["Dombeyana"]. *Werneria dombeyana* (Wedd.) Hieron., Bot. Jahrb. Syst. 21(3): 363. 1895 ["Dombeyanae"]. *Werneria dombeyana* (Wedd.) Perkins, Bot. Jahrb. Syst. 49(2): 230. 1913 ["Dombeyana"], *nom. illeg. superfl.* (Turland et al., 2018, ICN Art. 52.1). Type. Peru ["Pérou"]. [Without locality or date], *J. Dombey s.n.* (lectotype: P s.n.!, **designated here**), **syn. nov.**

Rhizomatous herb, scapiform to rosettiform, forming lax clumps or solitary plants, 2–21 cm tall. **Rhizome** 2–4 cm long, 0.5–0.6 cm in diameter, horizontal to oblique, covered with arachnoid-lanate indumentum and leaf base remnants. **Leaves** extending into a sheath-like base that bears long, silky trichomes; leaf lamina usually very narrow linear, rarely progressively broadened towards the apex, (6–)30–145 mm long, 1–2.1(–6) mm wide, entire, acute at the apex, usually not narrowed at the base, strongly curved forward, rarely flat in cross section, glabrous or with some scattered arachnoid trichomes beneath (especially on the midrib), 1-nerved above (barely visible), 1-nerved beneath, rather coriaceous, matte. **Capitulum** radiate, solitary, terminal, pedunculate (rarely subsessile); peduncle up to 180 mm long, floccose-arachnoid to lanate, bearing linear bracts. **Involucre** cupuliform, with bracts fused at the base, 10.3–14 mm long, 8.6–10 mm wide, floccose-arachnoid to lanate in the lower half; involucral bracts 12–21, 6.8–10.9 mm long, 1.3–1.8 mm wide at the base, acute at the apex, usually dark purplish; supplementary bracts (3–)7–12, linear, with long, arachnoid trichomes near the base. **Ray florets** 19–20; corollas 10.8–14.1 mm long, 1.6–1.7 mm wide, 4-veined, subentire to 3-toothed at the apex, conspicuously surpassing the involucre, yellow (rarely white), usually dark reddish beneath. **Disc florets** 47–69; corollas 5.2–5.8 mm long, 5-lobed, yellow; style branches truncate with a crown of sweeping hairs, purplish. **Achenes** 3.4–3.8 mm long, 0.9–1 mm wide, cylindrical, ~7-ribbed, glabrous or with some scattered arachnoid trichomes near the base; pappus 5.1–8 mm long, barbellate, whitish. Chromosome number $2n = 150(\pm 6)$ (Diers, 1961) (Figure 25E,F).

Additional Iconography. Cabrera (1978: 470, fig. 198N,Ñ); Freire and Ariza-Espinar (2014: 225, *W. villosa* A–G); Beltrán (2017: 62, fig. 4E, as photo).

Distribution and Habitat. Argentina (Jujuy, Salta), Bolivia (Chuquisaca, Cochabamba, La Paz, Oruro, Potosí, Tarija), Peru (Ancash, Apurímac, Ayacucho, Cajamarca, Cusco, Huancavelica, Huánuco, Junín, La Libertad, Lambayeque, Lima, Pasco, Piura, Puno, San Martín). This species grows on grassy hillsides, steep slopes, and rocky outcrops of the puna ecoregion, showing a preference for rather dry places, between elevations of (2,600–)3,000 and 4,900 m (Figure 58).

This species is distributed from northern Peru (Piura) to northwestern Argentina (Jujuy, Salta). Cabrera (1948) and Freire and Ariza-Espinar (2014) erroneously reported this species from the Argentinian province of Tucumán on the basis of *Venturi 4101* (LIL, LP n.v.); we studied the specimen at LIL, and it corresponds to *W. apiculata*.

Phenology. Flowering from January to October.

Etymology. The adjective *villosus, -a, -um* refers to an indumentum composed of long hairs, presumably describing the indumentum that this species bears on the peduncle and at the base of the involucre.

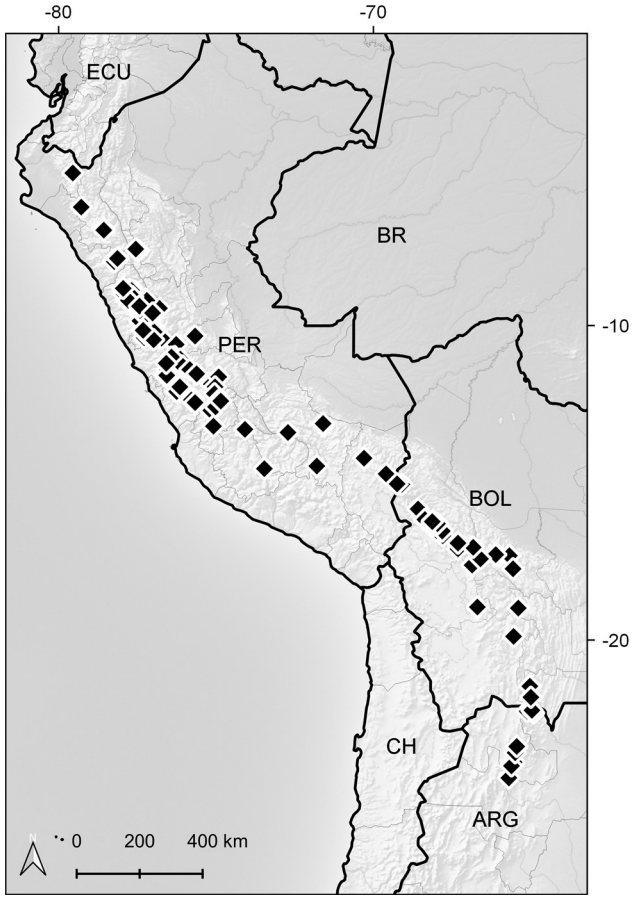

FIGURE 58. Distribution map of *Werneria villosa*.

NOTES. *Werneria villosa* is well characterized by the presence of supplementary bracts and yellow ray corollas (rarely white) and by having copious floccose-arachnoid or lanate indumenta on the peduncle and base of the involucre. However, it is a variable species mainly in its habit and leaf morphology. Typical plants are scapiform and have very narrow linear leaves (leaf width/length ratio of 0.01–0.03) that are usually strongly curved forward (at least on dried specimens). The peduncle can reach 180 mm long and bears linear bracts up to 65 mm long. Nonetheless, some specimens have a subsessile capitulum (*Beltrán 8034*, USM). These subacaulescent forms display shorter leaves that are slightly broadened upward, sometimes with scattered long trichomes along the leaf lamina, mainly on the midrib beneath; they may be confused with *W. pumila* (see comments under that species). Likewise, *W. villosa* specimens have been misidentified as *W. staticifolia*. The distribution area of these species partially overlaps (see further comments under the latter species).

There are a few specimens from Ancash that have narrowly oblanceolate, rather chartaceous, leaves (up to 6 mm wide) with thickened nerves and an indumentum composed of long trichomes on the abaxial surface, that is, *Cano 10220* (USM), *Cano 11267* (USM), and *Cerrate 2676* (USM). Additional collections are needed to better understand the robustness of the mentioned characters. For now, they are best placed in *W. villosa*.

A few populations displaying white ray corollas are found in northwestern Argentina (e.g., *Cabrera & Hernández 13994*, LP; *Kiesling et al. 3972*, LPB). This makes *W. villosa* the single species that shows variation in ray corolla color. In the same region, the typical forms with yellow ray corollas are also found (*Kiesling et al. 3983*, US; *Sleumer & Vervoorst 2937*, LIL, LP, US). According to Cabrera (1948, 1978) and Freire and Ariza-Espinar (2014), these plants are tentatively placed under *W. villosa*; however, additional collections and field work are required to verify this taxonomic decision. Because of the white ray corollas, these forms may be confused with *W. nubigena*, a species that also occurs in northwestern Argentina (Jujuy, Salta). They can, however, readily be discriminated because *W. villosa* has supplementary bracts (vs. absent in *W. nubigena*) and a peduncle covered with a floccose-arachnoid indumentum (vs. glabrescent in the Argentinian populations of *W. nubigena*). The leaves of *W. nubigena* are also wider and lighter green.

There are different opinions about the taxonomic status of *W. nubigena* var. *dombeyana* Wedd. It was related to *W. stuebelii* by Hieronymus (1895). On the other hand, Blake (1928) stated that it was imperfectly described, and Rockhausen (1939) noted that it may correspond to *W. villosa*. We found a Dombey specimen at P that perfectly matches the description provided in the protologue. It contains individuals showing a strongly oblique rhizome, very narrow linear leaves, a peduncle covered with a rusty-brown, lanate indumentum, and an involucre with ~12 involucral bracts. It is therefore designated as the lectotype of the name *W. nubigena* var. *dombeyana* and synonymized with *W. villosa*, as Rockhausen (1939) suggested.

ADDITIONAL SPECIMENS EXAMINED. **ARGENTINA. JUJUY:** Tilcara, quebrada de Ventura, 23°35′S, 65°30′W, 3 Mar 1961, *A. L. Cabrera & P. Hernández 13994* (LP); Tumbaya, Volcán, subida al cerro Abra Morada, 23°53′S, 65°32′W, 5 Mar 1965, *A. L. Cabrera et al. 16962* (LP); Capital, entre León y nevado de Chañi, abra Delgada, 24°0′S, 65°37′W, 10 Mar 1963, *H. A. Fabris, E. Cano, & H. Tello 4186* (LP); Tilcara, cumbre cerro Alto de Mina al oeste de Huacalera, 23°23′S, 65°27′W, 27 Mar 1967, *D. Werner 561* (LP). **SALTA:** Sta. Victoria, camino a Sta. Victoria, abra Colorada, 22°19′S, 64°55′W, 28 Feb 1966, *E. de la Sota 4205* (LP); Sta. Victoria, alrededores de Sta. Victoria, 22°14′S, 64°58′W, 23 Mar 1982, *R. Kiesling et al. 3972* (LPB); Sta. Victoria, de abra de Lizoite a río Sacha Runo, 22°16′S, 65°5′W, 22 Mar 1982, *R. Kiesling et al. 3983* (US); Caldera, subida al Nevado del Castillo, Mal Paso, 24°23′S, 65°42′W, 15 Mar 1952, *H. Sleumer & F. Vervoorst 2937* (LIL, LP, US); Sta. Victoria, Mal Paso (Patahuasi), entre Sta. Victoria y Lizoite, 22°16′S, 65°7′W, 17 Feb 1953, *H. Sleumer 4055* (LIL).

BOLIVIA. CHUQUISACA: Chataquila ridge above Punilla (Sucre–Ravelo), 18°59′S, 65°24′W, 4 Jun 1995, *J. R. I. Wood 9859* (HSB, LPB). **COCHABAMBA:** Ayopaya, cuenca río Tambillo, arriba de la estancia Pajchanti, 17°3′S, 66°50′W, 15 May 1989,

R. Baar 394 (LPB); Mizque, localidad de Sacha Loma, 17°44′S, 65°34′W, 14 May 2003, *S. Durán 20* (BOLV); Mizque, Sacha Loma, al NW de Mizque, subiendo por el camino bordeando la planicie, 17°44′S, 65°34′W, 10 Apr 2003, *E. Gutiérrez, E. Zurita, & J. Terán 521* (BOLV); Cercado, Sapanani Alto, Pacha Wasa, 17°19′S, 66°2′W, 7 Apr 1991, *I. Hensen 2326* (BOLV, LPB); península Copacabana, entre San Pedro y Copacabana, *J. P. Hjerting s.n.* (USM); P.N. Tunari, directly N of Cochabamba, 23 Jul 1989, *M. Kessler & M. Kelschebach 208* (LPB); cordillera del Tunari, laderas sobre laguna de Huara-Huara, 17°17′S, 66°7′W, 16 Feb 1990, *G. Navarro 588* (BOLV); cordillera del Tunari, laderas sobre laguna de Huara-Huara, 17°17′S, 66°7′W, 15 Feb 1990, *G. Navarro 613* (BOLV); Tapacarí, comunidad de Lako Lakoni (km 140 Cbba–Oruro), Qota Loma, 17°37′S, 66°52′W, 28 Feb 1997, *H. U. Pestalozzi 956* (BOLV, LPB); Quillacollo, camino que vincula Quillacollo–San Miguel–Jankho K'ala a 29.7 km, 17°25′S, 66°36′W, 30 Jan 2007, *B. Soto, B. Soto, & A. Dávalos 118* (BOLV); Cercado, cuenca Pajcha, a 13 km subiendo desde la puerta del P.N. Tunari, 27 Mar 2006, *N. Vargas et al. 534* (BOLV, LPB); Tiraque, P.N. Carrasco, cordillera El Ronco, 17°19′S, 65°41′W, 16 Mar 2001, *M. Zárate & D. Méndez 1015* (BOLV). **La Paz:** Murillo, bajando de la cumbre 13 km hacia Unduavi, 16 Jun 1985, *S. G. Beck 11272* (LPB); Murillo, fin del valle Kaluyo pasando el pueblo de Chacaltaya, Pampalarama, 150 m por debajo del glaciar, 16°19′S, 68°4′W, 14 Mar 2013, *S. G. Beck, D. Ibáñez, & C. Beck 34090* (LPB); Los Andes, 42 km NNW línea recta de La Paz, alrededor de la abandonada Agencia Palcoco, 25 Jan 1981, *S. G. Beck 4313* (LPB); Loayza, Caxata 7 km hacia Quime, 17°6′S, 67°19′W, 19 Feb 1981, *S. G. Beck 4367* (LPB); límite de las provincias Nor-Sur Yungas, bajando por los Yungas, arriba de Unduavi, 1 Apr 1982, *S. G. Beck 7488* (LPB); Murillo, bajando a Unduavi 12 km desde la cumbre, entrando por el vallecito de la mina Lourdes, 12 Jun 1983, *S. G. Beck 8424* (LPB); Murillo, La Paz–Calacoto 64 km hacia el nevado Illimani, sobre el pueblo de Pinaya, pie del Illimani, 16°41′S, 67°48′W, 19 Jan 1983, *S. G. Beck 9091* (LPB); Murillo, La Paz–El Alto (tranca) 39 km hacia el SSE, vía Sapahaqui, 30 Jan 1983, *S. G. Beck 9108* (LPB); Zongo, en la montaña detrás de la casa del cuidador del refugio del Wayna Potosí, 16°16′S, 68°7′W, 18 Apr 1999, *G. Bourdy 2208* (LPB); Chacaltaya, 16°21′S, 68°6′W, 11 Aug 1957, *J. Cañigueral 987* (LPB); Murillo, Chacaltaya, 16°21′S, 68°6′W, 2 Feb 1983, *D. K. de Ávila 44* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, 7 Feb 1988, *S. Estenssoro 611* (LPB); Murillo, Jacha Toloko, ~21 km de la ciudad de La Paz, 16°21′S, 68°1′W, 7 Feb 1988, *S. Estenssoro 621* (LPB); Murillo, nev. Huayna Potosí, E slopes above rd., 16°17′S, 68°8′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11278* (LPB); Murillo, nev. Huayna Potosí, E slopes above rd., 16°17′S, 68°8′W, 12 Apr 1995, *V. A. Funk & N. Bernal 11279* (LPB); Murillo, 7.3 km NE of la cumbre (pass) on rd. to Unduavi, and 8 km W of Pongo, on N side of rd., 16°19′S, 68°1′W, 15 Apr 1995, *V. A. Funk 11337* (LPB); Los Andes, Hichu-Kkota valley, 5 km from base of lgn. Khara Kkota along rd. to mina Fabulosa, 16°10′S, 68°23′W, 25 Apr 1995, *V. A. Funk & C. González-Quint 11380* (LPB); Omasuyos, rd. from Achacachito to Sorata (Larecaja) at cumbre (pass), 20 km from Achacachi, 15°50′S, 68°35′W, 27 Apr 1995, *V. A. Funk 11386* (LPB); Murillo, Zongo pass, slope up toward Huayna Potosí, 16°14′S, 68°8′W, 6 Aug 1991, *M. Kessler 2841* (LPB); Franz Tamayo, Ulla Ulla, 15°2′S, 69°15′W, 5 Jun 1980, *R. Lara 1702* (LPB); Inquisivi, 200 m below the power station at the head of the valley of the río Angostura, 1 km NE of mina Argentina and 10 km S of Choquetanga, 16°55′S, 67°19′W, 6 Mar 1991, *M. Lewis 38131* (LPB); Murillo, valle de La Paz, Putupampa, 16°31′S, 68°0′W, 23 Feb 1995, *R. López & N. Salinas 212* (LPB); Murillo, 13.8 km E of la cumbre (and 19.3 km W of Unduavi), 16°20′S, 67°59′W, 7 May 1990, *J. L. Luteyn & L. J. Dorr 13530* (LPB); Murillo, near summit of La Paz–Lambate rd., ~20 km E of Ventilla, 16°32′S, 67°49′W, 26 May 1990, *J. L. Luteyn & L. J. Dorr 13804* (LPB); Murillo, Milluni, a 18 km NE de La Paz, 16°19′S, 68°9′W, 13 Jan 1996, *R. I. Meneses & J. Gonzáles 624* (LPB); Franz Tamayo, estancia Okaria (Ulla Ulla), 15°3′S, 69°6′W, 21 Feb 1983, *X. Menhofer 1965* (LPB); Omasuyos, Hichu Cota, después de laguna Khara Khota, cerca al río Pauchintani, 16°10′S, 68°22′W, 15 Apr 1985, *M. Moraes 130* (LPB); Murillo, 6.4 km NE of la cumbre on road to Unduavi, 16°19′S, 68°0′W, 3 Apr 1984, *J. C. Solomon & M. Uehling 12134* (LPB); Murillo, 4.5 km N of Milluni on road to Zongo pass (~3 km S of pass), 16°18′S, 68°8′W, 7 Feb 1985, *J. C. Solomon 13203* (LPB); Murillo, 7.5 km NE of la cumbre (railroad station), 16°19′S, 68°0′W, 15 May 1985, *J. C. Solomon 13657* (LPB); Murillo, trail from mina San Francisco to the pass, 11 km N of Ventilla along the río Choquekkota, 16°29′S, 67°54′W, 19 May 1985, *J. C. Solomon 13791* (LPB); Murillo, valle del río Zongo, 14.8 km al N de la cumbre, arriba de laguna Viscachani, 16°12′S, 68°7′W, 11 Apr 1987, *J. C. Solomon et al. 16506* (LPB); Murillo, mina Lourdes, 2.7 km al N del camino entre La Paz y Unduavi, a lo largo del río Kkota khuchu (~14 km al E de la cumbre), 16°18′S, 67°58′W, 25 Apr 1987, *J. C. Solomon & R. Chevalier 16575* (LPB); Sud Yungas, oberhalb Ventilla, jenseits des Abra am Camino del Inca, 6 Apr 1987, *S. Stab B65* (LPB); Murillo, la cumbre a 700 m del camino asfaltado, 25 Jan 1987, *E. Valenzuela 996* (LPB); cumbre vers Yungas, 9 Apr 1981, *J. P. Ybert 856* (LPB). **Oruro:** Eduardo Abaroa, Challapata, desde Challapata subiendo hasta el final del camino hacia Azanaque, 18°57′S, 66°42′W, 3 Mar 2016, *I. Jiménez 8088* (LPB); Eduardo Abaroa, Challapata, desde Challapata subiendo hasta el final del camino hacia Azanaque, 18°57′S, 66°42′W, 3 Mar 2016, *I. Jiménez, L. Vargas, & R. Villegas 8109* (LPB). **Potosí:** José M. Linares Lizarazu, comunidad de Alkatuyo, Pasto Grande, 53 km al SE de Potosí, 16 km al N de la escuela Alkatuyo, 19°53′S, 65°33′W, 9 May 1993, *F. Marino 141* (LPB). **Tarija:** José María Avilés, abra de Turcamarca, 21°49′S, 65°0′W, 22 Apr 2000, *S. G. Beck & N. Paniagua 27371* (LPB); Méndez, Sama, 21°28′S, 65°2′W, 23 Mar 1986, *R. Ehrich 210* (LPB); Méndez, Paycho, quebrada loma Kewiña, frente a la quebrada Pinta, 28 Feb 1991, *E. García 2479* (LPB).

PERU. Ancash: pr. Olleros, 9°39′S, 77°24′W, 20 May 2013, *C. Aedo & J. Molina 20325* (MA); San Marcos, mina Antamina, 9°30′S, 77°3′W, 23 May 2013, *C. Aedo & J. Molina 20381* (MA); San Luis, laguna Huatsucocha, 9°10′S, 77°14′W, 24 May 2013, *C. Aedo & J. Molina 20420* (MA); Huaylas, Pamparomás, laguna Negra Huacanan, 9°0′S, 77°55′W, 1 Oct 1992, *J. Albán 7952* (USM); Huaylas, Pamparomás, laguna Negra Huacanan, 9°0′S, 77°55′W, 1 Oct 1992, *J. Albán 8030* (USM); San Marcos, Huari, compañía minera Antamina, botadero este, 9°36′S, 77°1′W, 14 Aug 2011, *H. Beltrán et al. 7327* (USM); Huaylas, Pueblo Libre, altura de Huasta Cruz y Punta Chancay?, 16 May 2000, *A. Cano et al. 10193* (USM); Huaylas, Pueblo Libre, altura de Huasta Cruz y Punta Chancay?, 16 May 2000, *A. Cano et al. 10220* (USM); Huaylas, abajo del abra Tres Cruces, 21 May 2000, *A. Cano et al. 10625* (USM); Huaylas, Pueblo Libre, cumbre de Huashta Cruz, 26 May 2001, *A. Cano et al. 11249* (USM); Huaylas, Pueblo Libre, cumbre de Huashta Cruz, 26 May 2001, *A. Cano et al. 11267* (USM); Recuay, carretera a Pachacoto, 9°51′S, 77°25′W, 28 May 2001, *A. Cano et al. 11432* (USM); Recuay, Huancapeti, en la carretera Recuay–Aija, 9°44′S, 77°1′W, 25 Mar 2002, *A. Cano, I. Salinas, & F. Mellado 12111* (USM); Huari, Yanacancha, km 112 carretera al campamento minero Antamina, 9°36′S, 77°1′W, 12 May 2003, *A. Cano et al. 13180* (USM); Huari, San Marcos, entre el km 112 de la carretera al campamento de la compañía minera Antamina, 9°36′S, 77°1′W, 26 Mar 2004, *A. Cano et al. 14154* (USM); Huari, Tashta, 9°12′S, 77°12′W, 22 Apr 2004, *A. Cano et al. 14397* (USM); Huaylas, Riurín y zonas aledañas, Taqtza Pampa, Huachoq, Hirca, 9°12′S, 77°47′W, 18 May 1999, *A. Cano et al. 9105* (USM); Huaylas, Ocshapampa (Oxapampa), 9°11′S, 77°51′W, 11 Oct 1999, *A. Cano et al. 9717* (USM); Huaylas, Pamparomás, quebrada Cachicorral, 9°10′S, 77°51′W, 12 Oct 1999, *A. Cano et al. 9805* (USM); Bolognesi, Pariarracra, pampa de Lampas, Chiquián, 10°11′S, 77°12′W, 4 May 1952, *E. Cerrate 1502* (USM); Bolognesi, Huancar arriba de Chiquián, 10°9′S, 77°10′W, 15 Apr 1949, *E. Cerrate 214* (USM); Bolognesi, entre Llamac y Jahuacocha, 10°12′S, 76°58′W, 29 May 1954, *E. Cerrate 2324* (USM); Bolognesi, Huasta, Condorcocha, 10°4′S, 76°59′W, 22 Apr 1956, *E. Cerrate 2564* (USM); Bolognesi, Ticllos, paso de Chonta, 10°15′S, 77°15′W, 28 Apr 1956, *E. Cerrate 2647* (USM); Bolognesi, Cajacay, Tin'ya, valle del Fortaleza, 10°9′S, 77°19′W, 30 Apr 1956, *E. Cerrate 2676* (USM); Bolognesi, Huasta, Huaytapana-punta, cerca Huasta, 22 May 1962, *E. Cerrate 3935* (USM); Bolognesi, alrededores de la laguna Condorcocha, 10°23′S, 77°17′W, 10 Aug 1981, *E. Cerrate 8198* (USM); Huaylas, Macoto, trayecto entre las lagunas Capalo, 20 May 2000, *J. Roque et al. 1464* (USM); Yungay, Huascarán N.P., Llanganuco sector, quebrada Demanda, side valley to nevado Pisco, 9°1′S, 77°37′W, 13 Apr 1985, *D. N. Smith & V. Cautivo 10300* (USM); Yungay, Huascarán N.P., quebrada Ranincuray, 8°59′S, 77°34′W, 17 Apr 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10346* (LPB, USM); Yungay, Huascarán N.P., Llanganuco sector, María Josefa trail between Chinancocha and Pucayacu, 9°5′S, 77°39′W, 7 May 1985, *D. N. Smith 10530* (USM); Recuay, Huascarán N.P., mouth of quebrada Quenua Ragra, 10°2′S, 77°15′W, 10 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10619* (USM); Huaraz, Huascarán N.P., quebrada Shallap, 9°31′S, 77°25′W, 22 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10702* (USM); Huaraz, Huascarán N.P., quebrada Llaca, NW slope of valley, 9°27′S, 77°27′W, 24 May 1985, *D. N. Smith, R. Valencia, & A. Gonzales 10789* (USM); Huari, Huascarán N.P., 1 km below Manto Mina, ~3 km from Catac–Chavin road, 9°42′S, 77°15′W, 4 Jul 1985, *D. N. Smith & M. Buddensiek 11014* (USM); Carhuaz, Huascarán N.P., quebrada Ishinca, N side of valley, 9°23′S, 77°26′W, 15 Jul 1985, *D. N. Smith & M. Buddensiek 11162* (USM); Carhuaz, Huascarán N.P., quebrada Honda, Vinoyapampa, 9°18′S, 77°22′W, 2 Oct 1985, *D. N. Smith, M. Buddensiek, & R. Valencia 11609* (USM); Huaylas, Huascarán N.P., environs of Auquispuquio, 8°49′S, 77°57′W, 9 Apr 1986, *D. N. Smith, R. Valencia, & M. Buddensiek 12090* (USM); Huari, Huascarán N.P., quebrada Rima Rima, a lateral valley of quebrada Carhuazcancha, 9°29′S, 77°15′W, 6 May 1986, *D. N. Smith et al. 12214* (USM); Huari, Huascarán N.P., quebrada Pachachaca, a lateral valley of quebrada Rurichinchay, 9°23′S, 77°16′W, 12 Jun 1986, *D. N. Smith, A. Gonzales, & D. Maldonado 12532* (USM); Yungay, Huascarán N.P., Morococha, 8°55′S, 77°35′W, 14 Jan 1985, *D. N. Smith, L. Sánchez, & H. Vidaurre 9211* (USM); Huaylas, Huascarán N.P., quebrada Alpamayo at foot of snow-free peak above lago Jancarurish, 8°53′S, 77°41′W, 9 Mar 1985, *D. N. Smith, R. Valencia, & A. Gonzales 9785* (USM); Huaylas, Huascarán N.P., environs of Hatuncocha, 8°52′S, 77°45′W, 12 Mar 1985, *D. N. Smith & R. Valencia 9972* (USM); del puerto Huaraz a cerro Alconacan […], 16 Mar 1983, *O. Tovar et al. 9525* (USM). **Apurímac:** Aimaraes, road from Puquío to Chalhuanca, 102 km E-NE of Poquio, 14°33′S, 73°28′W, 21 Apr 1982, *V. A. Funk, H. Bedell, & J. L. Cracraft 3567* (US); Andahuaylas, Pampachiri, Jan 2004, *L. Vargas & G. Mora 264* (USM). **Ayacucho:** Huamanga, Acocro, entre los cerros Chancarahuaycco y Osoro, 12 km lineales al S de Tambillo, 13°18′S, 74°5′W, 23 Jun 2001, *J. Roque & C. Arana 3209* (USM). **Cajamarca:** mina Yanacocha, 6°58′S, 78°34′W, 17 Jun 2009, *C. Aedo 16527* (MA, USM); Celendín, cerca a Celendín, 24 Jun 1963, *R. Ferreyra 15150* (USM); Cajamarca–Bambamarca road, 55 km N of Cajamarca, 6°55′S, 78°35′W, 2 Jun 1984, *D. N. Smith & I. Sánchez-Vega 7405* (USM). **Cusco:** Anta, Mollepata, 13°24′S, 72°43′W, 9 May 2013, *H. Beltrán 7633* (USM); Paucartambo, Parque Nacional del Manu, Tres Cruces, 13°7′S, 71°36′W, 5 May 1990, *A. Cano 3465* (USM); Paucartambo, Parque Nacional del Manu, altura de Teleban, 16 Jul 1990, *A. Cano 3825* (USM); Velille, Uchucarco, alrededores de la mina Constancia, 14°28′S, 71°48′W, 23 Apr 2015, *P. Gonzáles 3581* (USM); Paucartambo, Acjanaco, 13°11′S, 71°35′W, 6 Jul 1948, *C. Vargas 7301* (CUZ). **Huancavelica:** Tayacaja, carretera entre Acraquia y Pampas, 12°22′S, 74°54′W, 29 May 2017, *H. Beltrán & S. Castillo 8054* (USM); Tayacaja, Pampas, 12°24′S, 74°51′W, 8 Aug 1973, *P. Gutte 1070* (USM [mixed

with *W. canaliculata*]); Tansiri, cerca a Manta, 12°42′S, 75°10′W, Apr 1953, *O. Tovar 1189* (USM); Occoro, entre Conaica y Tansiri, 12°35′S, 75°1′W, Apr 1953, *O. Tovar 1202* (USM); Tayacaja, hacienda Alalay entre Mariscal Cáceres y Pampas, Apr 1953, *O. Tovar 1345* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2893* (USM); Castrovirreyna, Choclococha, 13°12′S, 75°5′W, May 1958, *O. Tovar 2937* (USM); arriba de Machaichuay, entre Conaica y Tinyacalle, Mar 1952, *O. Tovar 873* (USM); cerros de Raria, a 8 km de Conaica, 12°33′S, 75°2′W, Mar 1952, *O. Tovar 891* (USM). **Huánuco:** Lauricocha, entre la laguna Tinquicocha y Patarcocha, 10°24′S, 76°44′W, 24 Jun 2000, *A. Cano & N. Valencia 10777* (USM); Gayco, 10°24′S, 76°46′W, Jun 1956, *A. Cardich s.n.* (USM); Huamalíes, Punchao, 9°27′S, 76°48′W, 12 Mar 1999, *C. Ortiz 2* (USM). **Junín:** Patarcocha, 11°38′S, 74°55′W, 7 May 1948, *P. Aguilar s.n.* (USM); Tarma, punta carretera Oroya–Tarma, 11°24′S, 75°50′W, 26 May 2017, *H. Beltrán, S. Castillo, & M. Arakaki 7998* (USM); Tarma, Huaricolca, carretera Huancayo Jauja, 11°32′S, 75°37′W, 27 May 2017, *H. Beltrán & S. Castillo 8034* (USM); Huancayo, Pucara, comunidad de Patala, laguna Yauricocha, 12°10′S, 75°3′W, 30 May 2017, *H. Beltrán & S. Castillo 8067* (USM); SAIS [Sociedad Agrícola de Interés Social] Atocsayco, 11°17′S, 76°4′W, 23 Jul 1981, *D. M. Pearsall 834* (USM); Ondores, 11°4′S, 76°8′W, 1976, *U. Pettersson 102* (USM); Huaytapallana, 11°57′S, 75°2′W, Feb 1982, *K. Tiller 221* (USM); Huancayo, Jun 1913, *A. Weberbauer s.n.* (MOL); Huancayo, Quilcas, bajando desde Tunacorral hacia Sutuli, 11°52′S, 75°9′W, 5 Apr 1994, *G. Yarupaitán 1313* (USM). **La Libertad:** pr. Shore, cerca de laguna el Toro, 7°58′S, 78°14′W, 12 Jun 2009, *C. Aedo & S. Leiva 16445* (MA, USM); Santiago de Chuco, Shulcahuanga, 7°56′S, 78°15′W, 30 Oct 2002, *A. Cano et al. 12725* (USM); Sánchez Carrión, quebrada Sayapamba, 12 km lineales al SO de Huamachuco, 7°52′S, 78°8′W, 3 Jul 2006, *J. Roque 5304* (USM); Bolívar, Condormarca, 7°34′S, 77°33′W, 24 Jul 2011, *D. Wong 4* (USM). **Lambayeque:** Ferreñafe, arriba de Incahuasi, 6°14′S, 79°17′W, 8 Jul 1987, *R. Ferreyra 20914* (USM). **Lima:** Yauyos, Laraos, entre Soca y Achiquina, 12°20′S, 75°43′W, 27 May 1995, *H. Beltrán 1781* (USM); Yauyos, Laraos, alrededores de la laguna de Huachaca, 12°22′S, 75°47′W, 1 Mar 1991, *H. Beltrán 298* (USM); Yauyos, Laraos, Malpaso, 12°27′S, 75°40′W, 12 May 2001, *H. Beltrán 4203* (USM); Cajatambo, cumbres, 10°27′S, 76°59′W, 3 Aug 2017, *H. Beltrán, S. Castillo, & S. Rivera 8288* (USM); Chicre, cerro al N de Huarochirí, 12°6′S, 76°15′W, 10 May 1953, *E. Cerrate 1790* (USM); Huarochirí, alrededores de la laguna de Chumpicocha, 11°57′S, 76°9′W, 27 May 1953, *E. Cerrate 2000* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 24 May 2010, *P. Gonzáles & E. Navarro 1277* (USM); Canta, Arahuay, laguna Tambillo y alrededores, 11°37′S, 76°35′W, 24 May 2010, *P. Gonzáles & E. Navarro 1279* (USM); Canta, Lachaqui, Quinán, muy cerca a la laguna, 11°35′S, 76°34′W, 20 May 1995, *A. Granda 1461* (MOL); Canta, Carhuapampa (Lachaqui Canta), 11°33′S, 76°36′W, 12 May 1963, *I. Meza 163* (USM); Canta, Huamalle (13 km arriba de Canta), 9 Aug 1963, *I. Meza 178* (USM); near Antaicocha, cerro Colorado, E of Canta, 11°25′S, 76°33′W, 20 Jun 1925, *F. W. Pennell 14660* (USM); Canta, Lachaqui, Yacanguana en camino a Quinan, 11°34′S, 76°36′W, 17 May 1998, *G. Vilcapoma 4802* (USM); Huarochirí, San Juan de Iris, lugar conocido como Huatia, 11°41′S, 76°31′W, 18 Aug 1993, *G. Yarupaitán & J. Albán 1051* (USM). **Pasco:** Oxapampa, Huancabamba, Sta. Bárbara, above Lanturachi, 10°20′S, 75°40′W, 2 Jul 1985, *R. B. Foster, B. d'Achille, & A. Brack 10426* (USM); on the road to Huánuco, 6.5 km N of and below Cerro de Pasco, 10°36′S, 76°16′W, 15 Jul 1964, *P. C. Hutchison, J. K. Wright, & R. M. Straw 5899* (USM); Huaron, 11°0′S, 76°25′W, 12 Jun 1922, *J. F. Macbride & F. Featherstone 1115* (CONC); Cerro de Pasco, bosque de piedra, 10°59′S, 76°19′W, 24 Jun 1976, *N. Urquizo 39* (USM). **Piura:** Huancabamba, Chulucanas, Pariamarca Alto, 5°9′S, 79°33′W, 28 Apr 2006, *A. Cano, N. Valencia, & I. Salinas 16530* (USM). **Puno:** abra Pampilla (or abra Tocotoco) on rd. from Putina to Ananea and on to La Rinconada, 136 km from Puno (city), 14°43′S, 69°36′W, 16 Mar 2014, *V. A. Funk, M. Diazgranados, & E. Cochachin 13171a* (USM); Melgar, quebrada Chuquisani, abajo de la laguna Estancococha, 14°13′S, 70°18′W, 16 Feb 2006, *J. Roque 4890* (USM). **San Martín:** Mariscal Cáceres, cerro al SW del campamento Chochos, P.N. del río Abiseo, 7°37′S, 77°28′W, 2 Jul 1996, *A. Cano et al. 7461* (USM).

27. ***Werneria weberbaueriana*** Rockh., Bot. Jahrb. Syst. 70: 323. 1939 ["Weberbaueriana"]. Type. Peru. Ancash: ["Cordillera Blanca bei Huaraz, 4300–4500, May 1903, *A. Weberbauer 2984*" according to the *ind. loc.*] (B, destroyed). Neotype, designated by Calvo et al. (2020: 6): Peru. Ancash, Huari [Asunción], Huascarán N.P., just crossing the Ulta pass, 9°07′S, 77°30′W, 4,870 m, 28 Jul 1985, *D. N. Smith 11303* (US-00622845!; isoneotypes: F-1960115!, MO-3316165!, USM-69993!).

Rhizomatous herb, rosettiform, forming mats, 2–2.5 cm tall. **Rhizome** 4–7 cm long, 0.3–0.6 cm in diameter, horizontal to oblique, glabrous. **Leaves** pseudopetiolate; leaf lamina spatulate to flabellate, 2–2.5 mm long, 2.5–3.5 mm wide, entire, truncate, thickened, and 5–7-notched at the apex, attenuate to cuneate at the base, strongly curved forward in cross section, glabrous, 1-nerved above (barely visible), 1-nerved beneath, fleshy, matte, papillose-verrucose near the apex; pseudopetiole 6.5–7.5 mm long, with scattered short marginal trichomes 0.05–0.1 mm long. **Capitulum** radiate, solitary, terminal, sessile to subsessile. **Involucre** cupuliform, with bracts fused at the base, 10–12 mm long, 7–8 mm wide, glabrous; involucral bracts ~11, ~5 mm long, ~2 mm wide at the base, obtuse at the apex, purplish; supplementary bracts absent. **Ray florets** 11–12; corollas 7–8.1 mm long, ~1 mm wide, 3-veined, subentire to 3-toothed at the apex, not surpassing the involucre, white. **Disc florets** ~29; corollas 5–5.5 mm long, 5-lobed, white with the lobes purple tipped; style branches truncate with a crown of sweeping hairs,

white. **Achenes** 2.7–2.8 mm long, 0.6–0.8 mm wide, cylindrical, 7–8-ribbed, glabrous, papillose; pappus 3.5–6.6 mm long, barbellate, whitish. Chromosome number unknown (Figure 7E,F).

Additional Iconography. Calvo et al. (2020: 6, fig. 1, as photo).

Distribution and Habitat. Endemic to Peru (Ancash). Known only from the central part of the Cordillera Blanca. This species grows on exposed rocky slopes and cryoturbated soils around the upper limit of vegetation, between elevations of 4,400 and 4,875 m (Figure 57).

Phenology. Collected in bloom from May to July.

Etymology. It honors the German botanist A. Weberbauer (1871–1948), who devoted part of his life to the study of the Peruvian flora.

Notes. This species is characterized by having spatulate to flabellate leaves that are strongly curved forward and 5–7-notched and dorsally papillose-verrucose at the apex. The capitulum is radiate, sessile or subsessile, with 11–12 ray florets with white corollas.

In the past, *W. weberbaueriana* has been considered a species with yellow ray corollas. This interpretation contradicts the information in the protologue, which depicts them as white. Recent studies brought to light that two distinct species were interchangeably identified as *W. weberbaueriana*. Accordingly, the taxonomic entity with yellow ray corollas was described as a new species under the name *W. rockhauseniana* (see comments under that species).

Additional Specimen Examined. **PERU. Ancash:** Asunción, Chacas, alrededores de la laguna Lebrón, 9°12′S, 77°29′W, 20 May 2009, *A. Cano et al. 19373* (USM).

UNVERIFIED NAMES

Werneria caespitosa var. *haenkei* Wedd., Chlor. Andina 1: 83. 1856 ["Haenkei"]. Syntypes. Peru. ["Cordillères de Cuzco, H.A. Weddell s.n." according to the *ind. loc.*] (not located); Bolivia? ["Bolivie?, T.P.X. Haenke s.n." according to the *ind. loc.*] (not located at PR, Otakar Šída, National Museum in Prague, personal communication) = *Werneria caespitosa* Wedd.

Werneria nubigena subvar. *erioscapa* Wedd., Chlor. Andina 1: 81. 1856. Type. Peru. Syntypes. Peru. ["Cordillères des départements d'Arequipa et de Cuzco (α, γ, ≈, et ε) (Gay, Dombey); parties élevées et humides des montagnes de Carabaya; très commun, en particulier, entre les villages de Sina et de Quiaca! (Wedd., n° 4750); collines des Cordillères de Puno, à une élévation de 4000 mètres" according to the *ind. loc.*] (none found); Bolivia. ["Cordillères de la province de Cinti, haut. 3500 mètres (Wedd., n° 3952); sommet de la Cordillère de la Paz! (d'Orbigny, n° 336)" according to the *ind. loc.*] (none found) = *Werneria staticifolia* Sch. Bip.

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Appendix A: Excluded Names

The names included in the following list were described within the genus *Werneria* or transferred to it; however, they do not belong to this genus. It should be noted that the taxonomic placement indicated here is tentative.

Werneria acerosa Cuatrec., Brittonia 8: 45. 1954 = *Xenophyllum acerosum* (Cuatrec.) V. A. Funk

Werneria africana Oliv. & Hiern, Fl. Trop. Afr. 3: 422. 1877 = *Senecio nanus* Sch. Bip. ex A. Rich.

Werneria amblydactyla S. F. Blake, J. Washington Acad. Sci. 18: 490. 1928 = *Xenophyllum amblydactylum* (S. F. Blake) V. A. Funk

Werneria antinorii Avetta, Nuovo Giorn. Bot. Ital. 21: 348. 1889 = *Euryops antinorii* (Avetta) S. Moore

Werneria aquatica J. Calvo, Phytotaxa 408(2): 137. 2019 = *Senecio breviscapus* DC., **syn. nov.**

Note. The description of *W. aquatica* J. Calvo (Calvo and Beltrán, 2019) was unfortunate, and this name is synonymized with *S. breviscapus* DC., a species that requires further study to be properly circumscribed.

Werneria boraginifolia Kuntze, Revis. Gen. Pl. 3(3): 184. 1898 ["Wernera"] = *Misbrookea strigosissima* (A. Gray) V. A. Funk

Werneria castillensis Hieron., *nom. nud. in sched.* (Turland et al., 2018, ICN Art. 38.1) = *Xenophyllum pseudodigitatum* (Rockh.) V. A. Funk

Werneria ciliata Wedd. ex Sch. Bip., Linnaea 34: 530. 1866, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1) = *Xenophyllum ciliolatum* (A. Gray) V. A. Funk

Werneria ciliolata A. Gray, Proc. Amer. Acad. Arts 5: 140. 1861 = *Xenophyllum ciliolatum* (A. Gray) V. A. Funk

Werneria cortusifolia Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 194. 1874, *nom. illeg. superfl.* (Turland et al., 2018, ICN Art. 52.1) = *Senecio breviscapus* DC.

Werneria crassa S. F. Blake, J. Washington Acad. Sci. 18: 495. 1928 = *Xenophyllum crassum* (S. F. Blake) V. A. Funk

Werneria crassa f. *minor* Cuatrec., *nom. nud. in sched.* (Turland et al., 2018, ICN Art. 38.1) = *Xenophyllum crassum* (S. F. Blake) V. A. Funk

Werneria crassa subsp. *orientalis* Cuatrec., Phytologia 45: 29. 1980 = *Xenophyllum crassum* (S. F. Blake) V. A. Funk

Werneria dactylophylla Sch. Bip., Bonplandia (Hannover) 4: 53, 55. 1856 = *Xenophyllum dactylophyllum* (Sch. Bip.) V. A. Funk

Werneria dactylophylla f. *glabriuscula* Rockh., Bot. Jahrb. Syst. 70: 286. 1939 = *Xenophyllum dactylophyllum* (Sch. Bip.) V. A. Funk

Werneria dactylophylla var. *glanduloso-denticulata* Rockh., Bot. Jahrb. Syst. 70: 286. 1939 = *Xenophyllum dactylophyllum* (Sch. Bip.) V. A. Funk

Werneria decora S. F. Blake, J. Washington Acad. Sci. 18: 491. 1928 = *Xenophyllum decorum* (S. F. Blake) V. A. Funk

Werneria decumbens Hieron., Bot. Jahrb. Syst. 21(3): 364. 1895 = *Xenophyllum weddellii* (Phil.) V. A. Funk

Werneria digitata Wedd., Chlor. Andina 1: 86. 1856 = *Xenophyllum digitatum* (Wedd.) V. A. Funk

Werneria digitata var. *lanata* Rockh., Bot. Jahrb. Syst. 70: 287. 1939 = *Xenophyllum digitatum* (Wedd.) V. A. Funk

Werneria ellisii Hook. f., Fl. Brit. India 3(8): 357. 1881 ["Ellisii"] = *Cremanthodium ellisii* (Hook. f.) Kitam.

Werneria esquilachensis Cuatrec., Brittonia 8: 192. 1956 = *Xenophyllum esquilachense* (Cuatrec.) V. A. Funk

Werneria fontii Cuatrec., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 29: 42. 1935 ["Fontii"] = *Xenophyllum fontii* (Cuatrec.) V. A. Funk

Werneria glareophila Cuatrec., Anales Esc. Nac. Ci. Biol. 18: 10. 1970 = *Anticona glareophila* (Cuatrec.) E. Linares, J. Campos, & A. Galán

Werneria humilis Kunth, Nov. Gen. Sp. (folio ed.) 4: 150. 1818 = *Xenophyllum humile* (Kunth) V. A. Funk

Werneria humilis var. *fontii* Cuatrec., Trab. Mus. Nac. Ci. Nat., Ser. Bot. 27: cuadro 22. 1934 ["Fontii"], *nom. nud.* (Turland et al., 2018, ICN Art. 38.1) = *Xenophyllum fontii* (Cuatrec.) V. A. Funk

Werneria humilis var. *lindenii* Wedd., Chlor. Andina 1: 82. 1856 = *Xenophyllum humile* (Kunth) V. A. Funk

Werneria imbricatifolia (Sch. Bip. ex Wedd.) Hieron., *nom. inval. in sched.* (Turland et al., 2018, ICN Art. 32.1) = *Monticalia imbricatifolia* (Sch. Bip. ex Wedd.) C. Jeffrey

Werneria incisa Phil., Anales Mus. Nac. Santiago de Chile 8: 41. 1891 = *Xenophyllum incisum* (Phil.) V. A. Funk

Werneria incisa var. *pubescens* Rockh., Bot. Jahrb. Syst. 70: 290. 1939 = *Xenophyllum incisum* var. *pubescens* (Rockh.) Cabrera & S. E. Freire

Werneria juniperina Hieron., Bot. Jahrb. Syst. 21(3): 365. 1895 = *Xenophyllum juniperinum* (Hieron.) J. Calvo

Werneria lechleri Lechler, Berberid. Amer. Austr.: 57. 1857 ["Lechleri"], *nom. nud.* (Turland et al., 2018, ICN Art. 38.1) = *Piptocarpha lechleri* (Sch. Bip.) Baker
Note. It corresponds to a confusion with the name *Vernonia lechleri* Sch. Bip.; see Schultz Bipontinus (1855).

Werneria lehmannii Hieron., Bot. Jahrb. Syst. 28(5): 647. 1901 ["Lehmannii"]. *nom. illeg.* (Turland et al., 2018, ICN Art. 53.1), replaced name, *non W. lehmannii* Klatt 1894. *Werneria articulata* S. F. Blake, Contr. U.S. Natl. Herb. 22: 651. 1924, replacement name. *Werneria humilis* f. *articulata* (S. F. Blake) Rockh., Bot. Jahrb. Syst. 70: 294. 1939 = *Xenophyllum humile* (Kunth) V. A. Funk

Werneria lehmannii Klatt, Ann. K. K. Naturhist. Hofmus. 9: 368. 1894, replacement name. *Werneria glandulosa* Klatt, Bot. Jahrb. Syst. 8(1): 50. 1887, *nom. illeg.* (Turland et al., 2018, ICN Art. 53.1), replaced name, *non W. glandulosa* Wedd. 1856. = *Hypochaeris sessiliflora* Kunth

Werneria leucobryoides S. F. Blake, J. Washington Acad. Sci. 18: 494. 1928 = *Xenophyllum sotarense* (Hieron.) V. A. Funk

Werneria lorentziana Hieron., Bot. Jahrb. Syst. 21(3): 364. 1895 ["Lorentziana"] = *Xenophyllum poposa* (Phil.) V. A. Funk

Werneria lycopodioides S. F. Blake, J. Washington Acad. Sci. 18: 493. 1928 = *Xenophyllum juniperinum* (Hieron.) J. Calvo

Werneria macbridei Cuatrec., Collect. Bot. (Barcelona) 3(3): 294. 1953 = *Senecio hyoseridis* (Benth.) L. Salomón & S. E. Freire

Werneria macbridei f. *monocephala* Cuatrec., Collect. Bot. (Barcelona) 3(3): 295. 1953 = *Senecio hyoseridis* (Benth.) L. Salomón & S. E. Freire

Werneria marcida S. F. Blake, J. Washington Acad. Sci. 18: 492. 1928 = *Xenophyllum marcidum* (S. F. Blake) V. A. Funk

Werneria melanandra Wedd., Chlor. Andina 1: 88. 1856 = *Senecio melanandrus* J. Calvo, A. Granda, & V. A. Funk

Werneria nana (Decne.) Benth. & Hook. f. ex C. B. Clarke, Compos. Ind.: 210. 1876. = *Cremanthodium nanum* (Decne.) W. W. Sm.

Werneria poposa Phil., Anales Mus. Nac. Santiago de Chile 8: 40. 1891 = *Xenophyllum poposa* (Phil.) V. A. Funk

Werneria pseudodigitata Rockh., Bot. Jahrb. Syst. 70: 288. 1939 = *Xenophyllum pseudodigitatum* (Rockh.) V. A. Funk

Werneria purpurea Spruce ex Rockh., Bot. Jahrb. Syst. 70: 295. 1939, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1) = *Xenophyllum roseum* (Hieron.) V. A. Funk

Werneria pygmaea var. *cylindrica* Cuatrec., Anales Univ. Madrid, Ci. 4: 245. 1935 = *Senecio gamolepis* Cabrera

Werneria pygmophylla S. F. Blake, J. Washington Acad. Sci. 18: 491. 1928 = *Senecio pygmophyllus* J. Calvo, A. Granda, & V. A. Funk

Werneria rigida Kunth, Nov. Gen. Sp. (folio ed.) 4: 149. 1818 = *Xenophyllum rigidum* (Kunth) V. A. Funk

Werneria rosea Hieron., Bot. Jahrb. Syst. 28(5): 648. 1901. *Werneria humilis* var. *rosea* (Hieron.) Rockh., Bot. Jahrb. Syst. 70: 295. 1939 = *Xenophyllum roseum* (Hieron.) V. A. Funk

Werneria rosenii R. E. Fr., Nova Acta Regiae Soc. Sci. Upsal., ser. 4, 1(1): 90. 1905 ["Rosenii"] = *Xenophyllum rosenii* (R. E. Fr.) V. A. Funk

Werneria sect. *Aciculares* Rockh., Bot. Jahrb. Syst. 70: 277, 291. 1939 = *Xenophyllum* V. A. Funk

Werneria sect. *Digitifoliae* Rockh., Bot. Jahrb. Syst. 70: 276, 285. 1939 = *Xenophyllum* V. A. Funk

Werneria sedoides S. F. Blake, J. Washington Acad. Sci. 18: 493. 1928 = *Xenophyllum marcidum* (S. F. Blake) V. A. Funk

Werneria setosa Wedd. ex Sch. Bip., Linnaea 34: 530. 1866, *nom. inval. pro syn.* (Turland et al., 2018, ICN Art. 36.1) = *Misbrookea strigosissima* (A. Gray) V. A. Funk

Werneria sotarensis Hieron., Bot. Jahrb. Syst. 21(3): 363. 1895 ["soratensis"] = *Xenophyllum sotarense* (Hieron.) V. A. Funk

Werneria staffordiae Sandwith, Hooker's Icon. Pl. 35: pl. 3424. 1940 = *Xenophyllum staffordiae* (Sandwith) V. A. Funk

Werneria strigosissima A. Gray, Proc. Amer. Acad. Arts 5: 140. 1861 ["strigosissma"] = *Misbrookea strigosissima* (A. Gray) V. A. Funk

Werneria weddellii Phil., Anales Mus. Nac. Santiago de Chile 8: 40. 1891 ["Weddelli"] = *Xenophyllum weddellii* (Phil.) V. A. Funk

Werneria wernerioides (Wedd.) Kuntze, Revis. Gen. Pl. 3(3): 184. 1898 ["Wernera wernerodes"] = *Senecio breviscapus* DC.

Appendix B: List of Accepted Names

1. *Werneria apiculata* Sch. Bip.
2. *Werneria aretioides* Wedd.
3. *Werneria caespitosa* Wedd.
4. *Werneria canaliculata* Sch. Bip.
5. *Werneria carnulosa* A. Gray
6. *Werneria castroviejoi* J. Calvo & H. Beltrán
7. *Werneria cochlearis* Griseb.
8. *Werneria cornea* S. F. Blake
9. *Werneria glaberrima* Phil.
10. *Werneria glandulosa* Wedd.
11. *Werneria graminifolia* Kunth
12. *Werneria huascarana* J. Calvo, H. Beltrán, & Trinidad
13. *Werneria lanatifolia* J. Calvo & R. I. Meneses
14. *Werneria microphylla* H. Beltrán & S. Leiva
15. *Werneria nubigena* Kunth
16. *Werneria orbignyana* Wedd.
17. *Werneria pectinata* Lingelsh.
18. *Werneria pinnatifida* J. Rémy
19. *Werneria plantaginifolia* Wedd. ex Klatt
20. *Werneria pumila* Kunth
21. *Werneria pygmaea* Gillies ex Hook. & Arn.
22. *Werneria rockhauseniana* H. Beltrán, Trinidad, & J. Calvo
23. *Werneria solivifolia* Sch. Bip.
24. *Werneria spathulata* Wedd.
25. *Werneria staticifolia* Sch. Bip.
26. *Werneria villosa* A. Gray
27. *Werneria weberbaueriana* Rockh.

Appendix C: List of Exsiccatae

Specimens are listed alphabetically by collector, followed by collection number or date when a collection number was not assigned. Specimens without collection number and date are not listed. The number in parentheses corresponds to the number of the accepted species in the treatment.

Achá, S. et al. 256 (25)
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Index of Scientific Names

Taxon names in bold are accepted names belonging to *Werneria*; names in italics are accepted names from other genera; names in regular type are synonyms, unverified names, excluded names, or names that were not validly published.

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