

Re-circumscription of *Werneria cochlearis* (Compositae): Nomenclature, taxonomic notes, and new synonyms

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Abstract. Much has been written about the taxonomic entity of *Werneria denticulata* albeit there is still a lack of consensus. On the basis of taxonomic evidence and the clarification of the provenance of the type material, we synonymize it under *W. cochlearis*. The names *W. brachypappa* and *W. pygmaea* var. *rhodopappa* are lectotypified.

Keywords: Argentina, Asteraceae, Chile, lectotypification, “salitreras de Antofagasta”.

Werneria denticulata S.F. Blake (1924) was published as a replacement name for *W. brachypappa* Phil. (1873) [“brachypappus”], an illegitimate homonym of *W. brachypappa* Sch. Bip. (1856) [= *W. pygmaea* Gillies ex Hook. & Arn. (1841)]. The taxonomic interpretations of *W. denticulata* have been disparate over time and depending on the authors, and nowadays it is still lacking a consensus. Rockhausen (1939) considered it a doubtful species without adding further comments. On the other hand, Cabrera (1948) recognized it as an accepted species thriving through the northern mountains of Chile and northwestern Argentina. Following this criterion, Marticorena and Quezada (1985) included it in the catalogue of the vascular flora of Chile. More recently, Ariza-Espinar (2007) and Freire and Ariza-Espinar (2014) synonymized *W. denticulata* to *W. pygmaea* arguing that the leaves of the Philippi type material are not minutely denticulate. It has to be noted that these authors took the mentioned decision based on a digital picture of the type material. In contrast, Moreira-Muñoz et al. (2016) stated that the leaves of the Philippi type material are indeed denticulate and recognized it as an accepted species distinct from *W. pygmaea*. Against such background, we herein present a clarification of the taxonomic entity and position of *W. denticulata* and place it in the synonymy of *W. cochlearis* Griseb.

Material and methods

This contribution is the result of an intensive review of the published bibliography and the revision of specimens kept at CONC, LIL, and SGO. Additionally, photographs of specimens from other institutions were studied: BA, CORD, GOET, K, LP, UPS, US, and W; herbarium acronyms follow Thiers (2018).

Results

A detailed study of the original material of *W. brachypappa* Phil. kept at SGO let us conclude that the leaf margin is minutely denticulate, as pointed out by Moreira-Muñoz et al. (2016). Moreover, and in disagreement with Ariza-Espinar (2007) and Freire and Ariza-Espinar (2014), *W. denticulata* does not correspond to the same taxonomic entity as *W. pygmaea*. This latter species has linear, entire leaves and arachnoid indumentum on the leaf insertion point. In contrast, *W. denticulata* has narrowly spatulate, denticulate-margined leaves and the leaf insertion point glabrous (Table I). Blake (1924), who knew *W. brachypappa* only from the description, presumed a close relationship between *W. denticulata* and *W. cochlearis*, which purportedly differed by the number and shape of the involucre bracts (14–16 and acute in *W. denticulata* vs. 8–12 and obtuse in *W. cochlearis*). Regarding the involucre bract apex, it has to be noted that the information

TABLE I. DIAGNOSTIC CHARACTERS FOR *WERNERIA COCHLEARIS* AND SIMILAR SPECIES.

Species	Leaf shape	Leaf length (mm)	Leaf apex	Leaf margin	Involucre size (mm)	Number of involucre bracts
<i>W. aretioides</i>	spatulate	3–8	rounded	denticulate	5–6 × 3.1–5	8–9
<i>W. cochlearis</i>	narrowly spatulate to spatulate	9.4–22	obtuse to rounded	denticulate	9–12 × 9.6–13	(8–)12–13(–17)
<i>W. glaberrima</i>	linear	31–85	acute	denticulate	12–15 × 9–11	9–12(–14)
<i>W. orbignyana</i>	linear to narrowly spatulate	17–92	3–7-toothed to minutely tridentate (rarely obtuse)	denticulate	13.6–30 × 7.4–13	11–13
<i>W. pygmaea</i>	linear	7–80	acute to obtuse	entire	7–13.2 × 6–10.4	(8–)11–13(–14)

provided by Blake contradicts Philippi's protologue, in which the bracts were described in as being somewhat obtuse. Our own study of the type material confirms the description given in the protologue.

We find that variation in these characters is continuous between the type of *W. denticulata* and specimens of *W. cochlearis*, the number of involucre bracts ranging from eight to 17 and the shape of the leaf ranging from narrowly spatulate to spatulate. Failing to identify other diagnostic characters to discriminate more than a single species, we place *W. denticulata* in the synonymy of *W. cochlearis*. Moreover, our decision results in a geographically cohesive distributional area because the type locality of *W. denticulata* appears to be centered in the known range of *W. cochlearis*.

According to the protologue, the type material of *W. brachypappa* (SGO, LP) was collected "cerca de las salitreras de Antofagasta, en el desierto de Atacama" [near the nitrate deposits of Antofagasta, in the Atacama Desert]. This locality has been erroneously ascribed to Chile (Blake, 1924; Muñoz, 1960; Ariza-Espinar, 2007; Moreira-Muñoz et al., 2016; JSTOR Global Plants, 2018), likely due to a confusion with the former Chilean province of Antofagasta (currently known as Antofagasta Region). As suggested by Cabrera (1948), it actually corresponds to Antofagasta de la Sierra, in Catamarca, Argentina. In the publication "Viage al desierto de Atacama", Philippi (1860) depicted his voyage through the Atacama Desert during the austral summer of 1853–1854. The itinerary and the map included at the end of the book make clear that "Antofagasta" should be interpreted as the current

village of Antofagasta de la Sierra in Catamarca Province of Argentina. Philippi (1860) detailed that "Antofagasta" was a Bolivian small village with four or six families living there and with a large swamp, located near Antofaya [Antofalla], Colorados [cerro], and Calalasti [portezuelo de Calalaste]. Philippi travelled with the German-born surveyor Guillermo Döll (also written as Doell), who later revisited "Antofagasta" and made some collections. According to labels on those specimens, their provenance is "salitreras de Antofagasta". Although they were collected in 1872, about 18 years after the first voyage, it is reasonable to assume that references to "Antofagasta" made during both expeditions refer to the same locality, i.e., the current Antofagasta de la Sierra. Pinpointing the collection locality is also quite important because Döll's material was used by Philippi to describe several other new species, namely, *Chaetanthera crispa* Phil., *Haplopappus doellianus* Phil., *Hoffmannseggia doellii* Phil., *Polyclados abietinus* Phil., and *Solanum pulchellum* Phil.

Our taxonomic conclusion has some implications for the respective treatments of *Werneria* for Argentina and Chile. In Argentina, the name *W. denticulata* should be treated as a synonym of *W. cochlearis* instead of under *W. pygmaea*. In Chile, the widely accepted name *W. denticulata* should be placed in the synonymy of *W. cochlearis*, a species name not recorded for Chile until now.

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 [designated by Cabrera 1948: 60]: GOET 374; isolectotypes: CORD barcode 00006520, F s.n., K barcode 000527749, US barcode 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.* (first-step lectotype [designated by Cabrera, 1948: 58]; second-step lectotype, **here designated**: SGO barcode 000006428; isolectotypes: LP barcode 010363, SGO barcode 000006429).

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, **here designated**: SGO barcode 000006435; isolectotype: SGO barcode 000006442).

Perennial herb 1–2 cm tall, rosetiform, rather caespitose. Rhizome ca. 3 cm long, ca. 0.4 cm wide, glabrous. Leaves 9.4–22 mm long, 2–4.8 mm wide, progressively broadened toward apex to clearly spatulate, conduplicate on dry specimens, obtuse to rounded at apex, attenuated in pseudopetiole at base, denticulate, glabrous. Capitulum radiate, solitary, terminal, sessile; involucre 9–12 mm long, 9.6–13 mm wide, cupuliform. Involutral bracts (8–)12–13(–17) in number, 5.1–6.5 mm long, 2.1–2.3 mm wide at base, acute to obtuse at apex, smooth, glabrous. Ray florets ca. 13, conspicuously surpassing the involucre, whitish. Disc florets ca. 50, 5-lobed, whitish. Anthers auriculate; filament collar balusterform. Style branches truncate with a crown of sweeping hairs. Achenes glabrous (mature ones not studied); pappus barbellate, whitish to rose-colored.

Distribution and habitat.—Northwestern Argentina, through the provinces of La Rioja, Catamarca, Tucumán, Salta, and Jujuy, and one locality in Chile (NE Antofagasta Region). This species thrives in the Andean highlands at elevations of 3900–5000 m (Fig. 1).

Phenology.—Flowering mainly from January to April.

Additional specimens examined. ARGENTINA. **Catamarca:** Andalgalá, c. Aconquija, 12 Apr 1917, *P. Jørgensen 75* (US); Andalgalá, río Potrero sup., Abra Grande, [27°22'N, 66°17'S], 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'N, 67°13'S], 1 Feb 1952, *H. Sleumer & F. Vervoort 2631* (LIL, US); Santa María, Sierra del Aconquija, laguna del Tesoro, [27°1'N, 65°57'S], 3 Mar 1924, *S. Venturi 6346* (US); Santa María, Sierra del Aconquija, [27°2'N, 65°58'S], 19 Jan 1925, *S. Venturi 6632* (US); valle del Cajón, 22 Jan 1914, [without collector or collection no.] (LIL). **Jujuy:** Est. Volcán, [23°54'N, 65°27'S], Feb 1920, *L. Castellón 7023* (LIL); Tumbaya, cerro de Chañi, [23°51'N, 65°35'S], 1 Feb 1929, *S. Venturi 9258* (US). **La Rioja:** Famatina, Sierra de Famatina, Los Bayos, [28°59'N, 67°44'S], 26 Apr 1951, *B. Sparre 8821* (LIL). **Salta:** Incachuli, pr. San Antonio de los Cobres, [24°16'N, 66°26'S], 30 Oct 1901, *R. E. Fries 709* (UPS, US, W); sierra del Cajón, Feb 1914, *D. Rodríguez 1375* (BA, CONC); Caldera, subida al Nevado del Castillo por Mal Paso, [24°23'N, 65°42'S], 15 Mar 1952, *H. Sleumer & F. Vervoort 2920* (US). **Tucumán:** cumbres Calchaquies, entre lagunas de Huacahuasi y c. Calchaquies, [26°40'N, 65°43'S], Feb 1914, *L. Castellón 3537* (LIL); Tafí, 1906, *L. Castellón 8223* (LIL); Tafí, cumbres Calchaquies, 7 Jan 1908, *L. Castellón 8225* (LIL); cumbres Calchaquies, Callejones, 15 Feb 1915, *L. Castellón s.n.* (LIL); Tafí del Valle, cumbres Calchaquies, lag. Huaca Huasi, [26°39'N, 65°44'S], 19 Mar 2009, *S. Cuello 360* (LIL); Tafí del Valle, cerro Sinuosa, lagunas de Huaca Huasi, cumbres Calchaquies, [26°39'N, 65°44'S], 19 Mar 2009, *C. I. Sosa s.n.* (LIL); Tafí, cumbres Calchaquies, El Alazán, 23 Mar 1951, *B. Sparre 8582* (LIL, W); Tafí, Calchaquies, cerro Negrito, [26°44'N, 65°42'S], 8 Feb 1952, *B. Sparre 9432* (LIL); Tafí, Calchaquies, Los Callejones, 14 Feb 1952, *B. Sparre 9580* (LIL); Tafí, Calchaquies, quebrada Isabel, 8 Mar 1952, *B. Sparre 9668* (LIL); Tafí, lagunas del Negrito, [26°39'N, 65°44'S], 6 Apr 1926, [without collector] 4238 (LIL).

Werneria cochlearis is a variable species, especially with respect to leaf shape. The type material has clearly spatulate leaves whereas other collections display leaves only slightly broadened at the apex (e.g., *Fries 709*). The capitula are quite large (involucre 9–12 mm long, 9.6–13 mm wide) and they have (8–)12–13(–17) involutral bracts. This species keys out in the group of *W. aretioides* Wedd., *W. glaberrima* Phil., and *W. orbignyana* Wedd., all of them with denticulate leaf margins (see Table 1 for the characters compared hereinafter). From *W. aretioides*, it can be easily distinguished by the length of the involucre (9–12 mm long vs. 5–6 mm long in *W. aretioides*), the number of involutral bracts ((8–)12–13(–17) vs. 8–9), and the leaf length (9.4–22 mm vs. 3–8 mm). From *W. glaberrima*, it differs in having the leaf apex obtuse to rounded (vs. acute) and the involutral bracts 5.1–6.5 mm long and acute to obtuse (vs. 7.1–10.4 mm long and plainly acute). Moreover, the leaves are shorter, narrowly spatulate to spatulate (vs. linear), and usually lie on the ground (vs. erect). With respect to *W. orbignyana*, *W. cochlearis* can usually be distinguished by the features listed in Table 1; moreover, the distributional areas of the two species do not overlap.

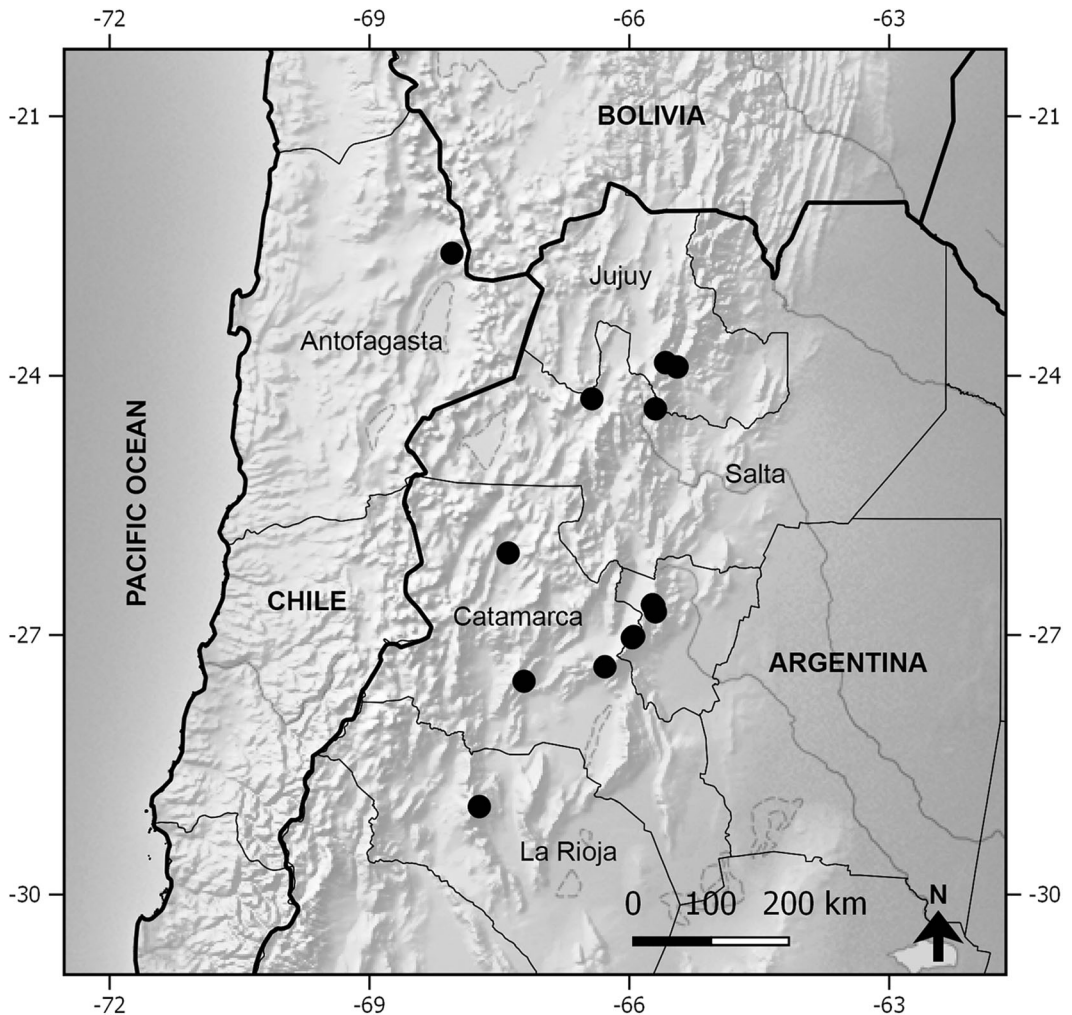


FIG. 1. Distribution map of *Werneria cochlearis*.

However, *W. orbignyana*, which is distributed from northern Peru to central western Bolivia and northernmost Chile, displays considerable variation across its range, especially in leaf morphology. Some small specimens of this species with leaves that are almost linear or barely broadened toward the apex are difficult to separate from *W. cochlearis* because they do not display the 3–7-toothed leaf apex that characterizes the former species, or the teeth are very inconspicuous. Specimens of such ambiguous forms are known from Arequipa, Moquegua, and Tacna in southwestern Peru, Arica-Parinacota in Chile, and from Oruro in Bolivia.

Cabrera (1948) inadvertently lectotypified the name *W. cochlearis* on the specimen at

GOET when he designated the duplicate at CORD as “isotype” (see Turland et al., 2018, Art. 9.10 and 9.19). On this basis, the later typification made by Freire and Ariza-Espinar (2014) is superfluous.

It is interesting to note that the type material of *W. pygmaea* var. *rhodopappa* Phil. is labeled in Philippi’s handwriting as “*W. pygmaea* var. *iodopappa*” instead of “*rhodopappa*”. However, the locality on the specimen label perfectly matches the protologue information, and both epithets refer to the rose-colored pappus. It is also noteworthy that the name *W. pygmaea* var. *iodopappa* was previously published by Weddell (1856) for a separate taxonomic entity.

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