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TIPIFICATION OF NAMES LINKED TO *PHACELIA* (HYDROPHYLLACEAE) FOR FLORA ARGENTINA

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Abstract. Mirra, F. B.; N. O'Leary & P. Moroni. 2021. Typification of names linked to *Phacelia* (Hydrophyllaceae) for Flora Argentina. *Darwiniana*, nueva serie 9(1): 209-216.

During the preparation of the treatment of the genus *Phacelia* for the Flora Argentina project, several names were found in need of typification. In this context lectotypes are designated for 17 names: *Aldea pinnata*, *Eutoca frigida*, *E. litoralis*, *E. lomarifolia*, *E. pinnatifida*, *E. pusilla*, *Hydrophyllum magellanicum*, *Phacelia boliviana*, *P. foliosa*, *P. magellanica* fo. *amoena*, *P. magellanica* fo. *plantaginea*, *P. nana*, *P. pinnatifida* var. *elator*, *P. pinnatifida*, *P. sanzinii*, *P. sinuata* and *P. viscosa*.

Keywords. Boraginales; Hydrophyllaceae; nomenclature; Southern Cone.

Resumen. Mirra, F. B.; N. O'Leary & P. Moroni. 2021. Tipificaciones de nombres ligados a *Phacelia* (Hydrophyllaceae) para la Flora Argentina. *Darwiniana*, nueva serie 9(1): 209-216.

Durante la preparación del tratamiento del género *Phacelia* para el proyecto Flora Argentina, se hallaron varios nombres cuya tipificación debió ser resuelta. En este contexto se designan 17 lectotipos para *Aldea pinnata*, *Eutoca frigida*, *E. litoralis*, *E. lomarifolia*, *E. pinnatifida*, *E. pusilla*, *Hydrophyllum magellanicum*, *Phacelia boliviana*, *P. foliosa*, *P. magellanica* fo. *amoena*, *P. magellanica* fo. *plantaginea*, *P. nana*, *P. pinnatifida* var. *elator*, *P. pinnatifida*, *P. sanzinii*, *P. sinuata* y *P. viscosa*.

Palabras clave. Boraginales; Cono Sur; Hydrophyllaceae; nomenclatura.

INTRODUCTION

The close relationship of Hydrophyllaceae R. Br. to traditional Boraginaceae Juss. has been widely acknowledged by several authors (e.g., Jussieu, 1789; Baillon, 1891; Peter, 1893; Svensson, 1925; Chadefaud & Emberger, 1960; Melchior, 1964; Takhtajan, 1980; Cronquist, 1981, 1988). The circumscription of this family of flowering plants was recently amended by Luebert et al. (2016), who excluded the entire tribe Nameae Choisy. With about 207 species (Hofmann et al., 2016), *Phacelia* Juss.

represents one of the largest radiations within Hydrophyllaceae and is a notable element in the Americas (Vasile et al., 2020). As in the case of other Boraginales genera (e.g., *Cryptantha* Lehm. ex G. Don, *Plagiobothrys* Fisch. & C.A. Mey.), *Phacelia* has a distinctive amphitropical distribution restricted to the arid and semiarid regions of western North America and Andean South America (Guilliams et al., 2017; Luebert et al., 2017; Simpson et al., 2017). In South America, 9 *Phacelia* species distributed through south Andean regions are recognized (Ulloa et al., 2017).

In the twentieth century, Deginani (1982) provided a complete treatment of *Phacelia* for Argentina, recognizing 9 species. After this treatment, taxonomic revisions of the family have been provided in regional floristic works covering the provinces of Jujuy (Deginani, 1983), San Juan (Deginani, 2018), and Patagonia (Deginani, 1999a). Catalogues of the genus have also been published for Argentina as a whole (Deginani, 1999b) and for the Southern Cone of the Americas (Zuloaga et al., 2008), the latter indicating 9 species and two varieties of *Phacelia* for Argentina. Despite the taxonomic contributions of the works outlined above, these treatments lack clarification of the nomenclature of some of the studied taxa. In this context, the present article provides nomenclatural clarification of *Phacelia* names related to taxa currently known from Argentina.

MATERIALS AND METHODS

In order to resolve typifications, the protologues of the treated taxa were studied and key literature (e.g., Muñoz-Pizarro, 1960; Deginani, 1982) was consulted to identify possible prior typifications. Type specimens and original material were analysed from images on the JSTOR Global Plants database, from online or through digital images obtained by personal communication with herbarium curators (acronyms following Thiers, 2021). Type material linked to each name was carefully analyzed to confirm if it agrees with the protologue. Furthermore, the calligraphy found on the labels was studied in order to ascertain if it belonged to the author of the species name. In all cases the selection of the lectotypes is in agreement with the current usage of the names as adopted by Deginani (1982).

To proceed with the typifications, the rules of the ICN (Turland et al., 2018) and suggestions proposed by McNeill (2014) were followed. In selecting lectotypes, whenever choosing between syntypes (Art. 9.6 of the ICN), the one that showed the best quality of preservation of the important diagnostic features of the taxon was selected.

RESULTS

Lectotypes are selected herein for seventeen names. Typifications are organized by accepted species names in alphabetical order, for which we also provide full accounts of homotypic and heterotypic synonyms and discussion of the typification. Following the herbaria acronym is the barcode number.

Phacelia cumingii (Benth.) A. Gray, Syn. Fl. N. Amer. 2(1): 169. 1878. *Eutoca cumingii* Benth., Trans. Linn. Soc. London 17: 276. 1835. *Microgenetes cumingii* (Benth.) A.DC., Prodr. [A. P. de Candolle] 9: 293. 1845. TYPE. Chile [Unknown region and locality], Andes Chilenses, 1831, *H. Cuming* 313 (holotype K 000612621! ex “Herb. Benthianum”; isotypes E 00259678!, E 00335062!).

Eutoca frigida Phil., Fl. Atacam.: 37. 1860. *Phacelia cumingii* var. *frigida* (Phil.) Brand, Pflanzenr. IV. 251[Heft 59]: 125. 1913. *Phacelia frigida* (Phil.) Reiche, Anales Univ. Chile 120: 813. 1907. TYPE: Chile, Los Lagos, Río Frío, II-1854, *R. A. Philippi* s.n. (SGO 000003968! lectotype designated here; isoelectotypes HAL 0115724!, SGO 000003966!, SGO 000003967!).

Eutoca pusilla Phil., Linnaea 33: 186. 1864. *Phacelia cumingii* var. *pusilla* (Phil.) Reiche, Fl. Chile 5: 163. 1910. TYPE: Chile [Unknown region], Cordillera de Santiago, Malpaso, XI-1861, *R. A. Philippi* s.n. (SGO 000003981! lectotype designated here; isoelectotypes SGO 000003980!, SGO 000003982!).

Eutoca pinnatifida Phil., Anales Univ. Chile 35: 189. 1870. TYPE: Argentina, Mendoza, “De los lugares elevados de la cordillera”, 1868-69, *P. Ortega* s.n. (SGO 000003979! lectotype designated here; isoelectotype SGO 000003978!).

Eutoca litoralis Phil., Anales Univ. Chile 90: 228. 1895. *Phacelia cumingii* var. *litoralis* (Phil.) Reiche, Fl. Chile 5: 164. 1910. TYPE: Chile, Atacama, Caldera, 1876, *P. Ortega* s.n. (SGO 000003971! lectotype designated here; isoelectotype SGO 000003970!).

Notes. The protologue of *Eutoca frigida* (Philippi, 1860) includes a direct reference to two gatherings made by R. A. Philippi in Río Frío and Sandón, Chile. Four sheets linked to the syntype collected in Río Frío were found, three kept at SGO and one at HAL; it is worth mentioning that all these specimens are annotated, in Philippi's hand, as "Eutoca frigida". Concerning the syntype collected at Sandón, no material was found. The material at HAL and two of the three SGO duplicates seem to be fragments from a more complete sheet. In this context, the specimen SGO 00003968 shows better conservation of the diagnostic features of the taxon since it bears a plant with stems viscidose and narrow oblong leaves, pinnatifid with small segments. Consequently, it is here selected as lectotype of the name.

The protologue of *Eutoca pusilla* (Philippi, 1864) includes a direct reference to a collection R. A. Philippi made in Malpaso, Chile. Three duplicates annotated in Philippi's hand as "Eutoca pusilla Ph." are found at SGO in agreement with the diagnosis cited in the protologue: plants viscid pubescent and leaves bipinnatifid. In this context, the specimen showing the best quality of preservation of the diagnostic features of the taxon is here chosen as lectotype of the name.

Eutoca pinnatifida was described by Philippi (1870) from material collected by P. Ortega in Mendoza, Argentina, as stated on the first page of the *Memorias Científicas* (Philippi, 1870: 159). Two specimens annotated by R. A. Philippi with the identification "Eutoca pinnatifida Ph." and with a label "Iter mendocinum" are found at SGO. These duplicates all bear original labels and agree with the diagnosis cited in the protologue; they bear plants viscid puberulous with petiolate, pinnatifid leaves. Furthermore, both duplicates have a label that reads "or var. *Eu. cumingii*?", in agreement with Philippi's statement in the protologue that this plant is similar to *E. cumingii* and could be a variety of it. In light of above, the most complete specimen is here selected as a lectotype.

In describing *Eutoca litoralis*, Philippi (1895) cited a collection made by P. Ortega in Caldera, Chile. Two specimens of this gathering are found at SGO. These duplicates bear original labels annotated by Philippi with the identification of

"Eutoca litoralis Ph." and agree with the diagnosis cited in the protologue since they bear plants glandulose, with erect densely disposed leaves, blades linear and pinnatifid almost to the central vein. In this context, the most complete specimen is here selected as a lectotype.

Phacelia nana Wedd., *Chlor. Andina* 2: 86. 1857. TYPE: Bolivia, Potosí, "Voisinage de la laguna de Potosí", s.d., *A. D. d'Orbigny 1449* [P 00648953! lectotype designated here (or perhaps holotype)].

Eutoca lomarifolia Phil., *Anales Mus. Nac.*, Santiago de Chile 8: 54. 1891. TYPE: Chile, Atacama, Breas, I-1885, *F. Philippi s.n.* (SGO 000003972! lectotype designated here; islectotype SGO 000003973!).

Notes. In describing *Phacelia nana*, Weddell (1857) cited a collection made by A. D. d'Orbigny in Potosí, Bolivia. Even when a single specimen was found at P in agreement with the diagnosis (it bears plants shorter than 3-4 cm high, much branched with leaves shorter than 2 cm long) and the locality cited in the protologue, it is not possible to ascertain how many specimens Weddell used for his description. Besides, the protologue includes an illustration (plate 58C) of the species concerned. Thus, the sheet at P is here selected as lectotype of the name, since mention of a single collection does not automatically make it the holotype.

The original material of *Eutoca lomarifolia*, as referred to by Philippi (1891) in the protologue of the species, was collected by F. Philippi in Breas, Chile. There are two sheets of apparent original material, which agree with the diagnosis and cited locality, at SGO. Both specimens were studied by R. A. Philippi since they were annotated, in his hand, as "*Eutoca lomariifolia* Ph."; in addition, specimen SGO 000003972 bears a label indicating it belonged to the herbarium of Federico Philippi, plus the location cited in the protologue. In light of the above, the material found at SGO is original and so the most complete specimen from among those available for typification purposes is here selected as lectotype of the name.

Phacelia pinnatifida Wedd., Chlor. Andina 2: 86. 1857. TYPE: Peru, "In rupibus Cordiller. pr. San Antonio", 1854, *W. Lechler 1801* (P 00648954! lectotype designated here; isoelectotypes F 0041234F!, GOET 006991!, K 000612633!).

Phacelia viscosa Phil., Fl. Atacam. 37. 1860. TYPE: Chile, Atacama, "In valle Sandon cum priore legi", II-1854, *R. A. Philippi s.n.* (SGO 000003993! lectotype designated here; isoelectotypes SGO 000003994!, SGO 000003995!).

Phacelia pinnatifida var. *elatior* Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 267. 1879. TYPE: Argentina, Salta, Los Potreros, Nevado del Castillo, 25-III-1873, *P. G. Lorentz & G. Hieronymus 192* (GOET 004433! lectotype designated here; isoelectotypes CORD 00006100!, US 00110552!).

Phacelia foliosa Phil., Anales Mus. Nac. Santiago de Chile 8: 53. 1891. *Phacelia pinnatifida* var. *foliosa* (Phil.) Reiche, Anales Univ. Chile 120: 810. 1907. TYPE: Chile, Antofagasta, Socaire, II-1885, *F. Philippi s.n.* (SGO 000003986! lectotype designated here; isoelectotype SGO 000003987!).

Phacelia boliviana Brand, Pflanzenr. (Engler) IV, 251[Heft 59]: 77. 1913. TYPE: Bolivia, Tarija, 30-I-1904, *K. Fiebrig 3012* (S 12-4420! lectotype designated here; isoelectotypes E 00433725!, GH 00093561!, HBG 517917!, K 000612632!, U 0002502!, US 00110481!).

Notes. In the protologue of *Phacelia pinnatifida* Weddell (1857) mentioned a specimen collected by Lechler that had been recognized as new species "in sched." by Grisebach. However, the author also mentioned a collection by d'Orbigny and a collection by himself. Nevertheless, this last is housed at P and bears a label that indicates it belongs to the variety *robusta*, also described by Weddell (1857) at that same moment. The syntype from d'Orbigny is housed at P and it has a label that indicates it belongs to the type variety, whereas the Lechler syntype is found distributed in several herbaria. In this context, from among the material available for typification purposes, the Lechler syntype is preferred over the d'Orbigny material since it has duplicates at several herbaria

and shows the best quality of preservation of the diagnostic features of the taxon. Thus, the sheet at P is selected as lectotype of the name since Weddell worked at Paris (Stafleu & Cowan, 1988).

Philippi (1860) founded *Phacelia viscosa* based on a collection he made in the Atacama Desert, Chile. In the general collection at SGO there are three duplicates displaying the morphological features described in the protologue. The specimens concerned have petiolated, oblong leaves, sinuate margin and pilose glutinose pubescence, in agreement with the diagnosis found in the protologue. Furthermore, all the specimens bear a label with the locality "Sandon" cited by Philippi (1860). Therefore, the sheet showing the best quality of preservation of the important diagnostic features of the taxon is here selected as lectotype of the name.

Grisebach (1879) described *Phacelia pinnatifida* var. *elatior* based on two collections gathered by P. G. Lorentz and G. H. E. W. Hieronymus in Sierra de Achala (Córdoba) and Nevado del Castillo (Salta), Argentina. Two specimens numbered 24 and 192, annotated "Phacelia pinnatifida var. *elatior* Gr" by Grisebach, were located at GOET where Grisebach's type specimens are mainly housed (Stafleu & Cowan, 1976). This material is linked to collections coming from Nevado del Castillo and is in agreement with the diagnosis cited in the protologue; it bears plants with pinnatipartite to pinnatisected leaves with inciso lobate segments. Duplicates of the collection no. 192 were found at CORD and US, whereas material linked to the collection no. 24 is also kept at CORD. Among the syntypes at GOET, the collection no. 192 is preferred over that numbered 24 because it shows the best quality of preservation of the important diagnostic features of the taxon. Therefore, it is here selected as lectotype of the name.

The original material of *Phacelia foliosa*, as referred to by Philippi (1891) in the protologue of the species, was collected by F. Philippi near Socaire, Chile. There are two sheets of apparent original material at SGO in agreement with the diagnosis: plants glutinose glandulose and densely leafed. In addition, this material was certainly studied by Philippi since it was annotated, in his handwriting, as "Phacelia foliosa Ph."

In this context, the specimen showing the best quality of preservation of the diagnostic features of the taxon is here chosen as lectotype of the name.

In the protologue of *Phacelia boliviana*, Brand (1913) cited the collection *Fiebrig 3012* (B) from Tarija, Bolivia. However, this material could not be found at B, and was surely destroyed during the Allied bombing in 1943 (Hiepkö, 1987; R. Vogt, curator at B, pers. comm.); a photograph from Macbride's Berlin negatives (neg. 14027, F 0BN014027!) is available at F. In the absence of the presumed holotype at B a lectotype can be selected from the available original material (ICN, Art. 9.3). Fortunately, seven duplicates of Fiebrig's collection were located at E, GH, HBG, K, S, U, and US. These sheets agree with the diagnosis found in the protologue since they bear plants much branched, with glandulose viscid pubescence, bipinnatifid leaves, and dense racemes. In this context, the most complete specimen from among those available for typification purposes is here selected as lectotype of the name.

Phacelia sanzinii Hicken, Physis (Buenos Aires) 1: 385. 1914. TYPE: Argentina, Mendoza, Potrerillos, 25-VIII-1913, *R. Sanzin* 33 (SI 001767! lectotype designated here).

Note. Hicken (1914) described *Phacelia sanzinii* based on two syntypes collected by R. Sanzin in Mendoza, Argentina. The first collection was made in Potrerillos, whereas the second one was made in the vicinity of Mendoza city. At herbarium SI, where Hicken worked (Staffeu & Cowan, 1979) a collection from Potrerillos is kept (SI 001768, two sheets), as well as a collection from Puntilla (SI 001767, two sheets). Both specimens bear a label with Hicken's handwriting indicating "*Phacelia sanzinii* Hicken nov spec." and several diagnostic illustrations. The rest of the material found under this name, two specimens from Parque del Oeste housed at SI, bear no original labels. From among the material available for typification purposes, the specimen collected in Potrerillos on 25th August 1913 is preferred over the other syntype since it shows the best quality of preservation of the important diagnostic features mentioned in the protologue. Consequently, it is here selected as lectotype of the name.

Phacelia secunda J.F. Gmel. var. **pinnata** (Vahl) Deginani, Darwiniana 24: 431. 1982. *Heliotropium pinnatum* Vahl, Symb. Bot. 3: 21. 1794. *Phacelia magellanica* fo. *pinnata* (Vahl) Brand, Repert. Spec. Nov. Regni Veg. 4(251): 99. 1913. TYPE. Chile, Magallanes, "Habitat ad Fretum Magellanicum", *P. Commerson* «herb. A. Thouin» (holotype C10012880!; isotypes B -W 03262W-01 0!, LINN-HS252-18!).

Aldea pinnata Ruiz & Pav., Fl. Peruv. 2: 8, pl. CXIV, f. a. 1799. *Phacelia pinnata* (Ruiz & Pav.) J.F. Macbr., Contr. Gray Herb. 49: 37. 1917. *Phacelia secunda* subsp. *pinnata* (Ruiz & Pav.) Constance, Univ. Calif. Publ. Bot. 30(3): 241. 1959. TYPE: Peru, Cheuchín, April s.d., collector not on sheet [presumably *J. Dombey*] (MA 814741! lectotype designated here).

Phacelia magellanica fo. *amoena* Brand, Pflanzenr. (Engler) IV, 251[Heft 59]: 97. 1913. TYPE: Argentina, Santa Cruz, Lago Argentino, 26-I-1905, *Per K. Dusén* 5709 (S 12-4449! lectotype designated here).

Notes. The protologue of *Aldea pinnata* (Ruiz López & Pavón, 1799) consists of a diagnosis "foliis pinnatis superioribus simplicibus" followed by a detailed description, and finally an illustration (icon. CXIV). The provenance of the species was given as "Habitat in arenosis Conceptiones Chile et in Peruvia ad Cheuchin Provinciae Caxatambo vicum". In addition, under an observation item the authors referred to fruit features from Dombey material. At herbarium MA there is an illustration that coincides exactly with the one published in the protologue (MA-AJB04-D-0244), and also three specimens, from the Ruiz and Pavón herbarium, in agreement with the protologue. In addition, a sheet linked to the species name was found at BC, whereas two specimens were found in the general collection at P. In this context, the duplicate MA814741, which bears a label that reads "Cheuchín, Perú, floret April", is here selected as lectotype of the name since it shows the best quality of preservation of the important diagnostic features of the taxon involved. Concerning the additional material found at BC, MA, and P, in the absence of precise localities from where the plants were collected, it is impossible to ascertain definitively whether these specimens are duplicates of the lectotype.

Brand (1913) described *Phacelia magellanica* fo. *amoena* based on six syntypes collected in southern South America: *Bang* 169 (from La Paz, Bolivia), *Malme* 2811 (from Aconcagua, Argentina), *Dusén* 5709 (from Lago Argentino, Argentina), *Mandon* 377 (from Sorata, Bolivia), *Bridges s.n.* (from Chile, without any direct reference to any locality), and *Andersson* 342 (from Magallanes, Chile). No original collections could be traced at B, where Brand worked (Stafleu & Cowan, 1976), but duplicates of all the syntypes cited in the protologue are kept at several worldwide herbaria. From among the material available for typification purposes, the Dusén material is preferred because it is the most complete syntype, and, therefore, a duplicate from this collection is here chosen as lectotype of the name. This syntype agrees with the diagnosis found in the protologue since it bears hirsute plants with long pedicelate basal leaves.

Phacelia secunda J.F. Gmel. var. **secunda**, Syst. Nat., ed. 13[bis]. 2(1): 330. 1791. TYPE: Unknown.

Hydrophyllum magellanicum Lam., Journ. Hist. Nat. 1: 373. 1792. *Phacelia magellanica* (Lam.) Coville, Contr. U.S. Natl. Herb. 4: 159. 1893. *Phacelia magellanica* fo. *genuina* Brand, Pflanzenr. (Engler) 4, Fam. 251: 97. 1913, nom. inval. TYPE: Chile, Strait of Magellan, *P. Commerson* [P 00357248! lectotype designated here (or perhaps holotype); isolectotypes P 00640031!, P 00640032!, P 00680446!].

Phacelia magellanica fo. *plantaginea* Brand, Pflanzenr. (Engler) IV, 251[Heft 59]: 97. 1913. *Phacelia secunda* subsp. *plantaginea* (Brand) Constance, Univ. Calif. Publ. Bot. 30(3): 241. 1959. TYPE: Argentina, Mendoza, slopes above Las Cuevas, 23-I-1904, *G. F. Scott-Elliott* 474 (E 00335070! lectotype designated here).

Notes. In describing *Hydrophyllum magellanicum*, Lamarck (1792) cited a collection made by P. Commerson in the Strait of Magellan. Even when a single specimen was found at P-LA in agreement with the diagnosis (plants tomentose lanose, with pinnate leaves and unequal segments), it is not possible to ascertain how many specimens Lamarck used for his description. Indeed, three other Commerson specimens, in agreement with the locality and the

diagnosis cited in the protologue, were located in the general collection at P. On the other hand, it is worth to note that the protologue includes an illustration of the species concerned. Thus, the sheet held at P-LA is here selected as lectotype of the name.

In the protologue of *Phacelia magellanica* fo. *plantaginea*, Brand (1913) cited three syntypes: the first one was collected by G. F. Scott-Elliott (no. 474) in the Argentinian Andes, whereas the other gatherings were made by G. O. Malme and P. Gussfeldt in Aconcagua and Leñapa, Argentina. No original collections could be traced at B, where Brand worked (Stafleu & Cowan, 1976). A gathering (consisting of three sheets) made by Malme with the number 2811 (number not mentioned by Brand in the protologue) was located at S. Besides, a duplicate of the syntype *Elliott* 474 was found at E. This last is certainly original material since it coincides exactly with the citation in the prologue, and the plant has elliptic or oblong leaves in agreement with the diagnosis. In this context, from among the material available for typification purposes, the Elliot syntype is preferred over the Malme material since it shows the best quality of preservation of the diagnostic features of the taxon. Thus, the sheet housed at E is here selected as lectotype of the name.

Phacelia sinuata Phil., Linnaea 33: 185. 1864. TYPE: Chile, Coquimbo, Cordillera de Doña Ana, 1860, *H. Volckmann s.n.* (SGO 000003992! lectotype designated here; isolectotypes SGO 000003991!, SI 001769!, SI 002110!).

Note. The protologue of *Phacelia sinuata* (Philippi, 1864) includes a direct reference to collections by Herman Volckmann from two localities: Doña Ana and Quebrada Escondida (Coquimbo, Chile). Two specimens linked to the syntype collected in Doña Ana are found at SGO (and fragments from them are housed at SI). These specimens agree with the diagnosis as referred to in the protologue since they contain plants with viscid pubescence and leaves with incise dentate margins. Besides, they bear original labels annotated by Philippi with the identification of “*Phacelia sinuata* Ph. cord de D. Ana, 1860”. In this context, the specimens were certainly studied by Philippi and, thus, one from among them is here chosen as the lectotype of the name.

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