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NOTES ON SOME CARYOPHYLLACEAE FOR THE FLORA OF ARGENTINA

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Abstract. Iamonico, D. 2022. Notes on some Caryophyllaceae for the Flora of Argentina. *Darwiniana*, nueva serie 10(1): 116-133.

As part of the ongoing study of some genera of Caryophyllaceae and the preparation of their treatments for the new edition of the Flora of Argentina, notes about some members of this family are presented. Two species (*Petrorhagia prolifera* and *Scleranthus polycarpos*) are reported for the first time for the Flora of Argentina. Sixteen names are here lectotypified: *Arenaria achalensis*, *A. alsinoides*, *A. andicola*, *A. bisculca*, *A. lanuginosa* var. *diffusa*, *A. lanuginosa* var. *ensifolia*, *A. lanuginosa* var. *megalantha*, *A. palustris*, *A. patagonica*, *A. serpens* var. *robusta*, *A. serpens* var. *humilior*, *Philippiella patagonica*, *Sagina apetala* var. *melanopotamica*, *S. apetala* var. *paludosa*, *Spergula humifusa*, and *Spergulastrum lanuginosum*; one neotype is also designated for *Saponaria hispanica*. One nomenclatural change (*Arenaria serpens* var. *humilior* comb. nov.) is proposed.

Keywords. *Arenaria*; *Petrorhagia*; *Philippiella*; *Sagina*; *Saponaria*; *Scleranthus*; typification; *Vaccaria*.

Resumen. Iamonico, D. 2022. Notas sobre algunas Caryophyllaceae para la flora argentina. *Darwiniana*, nueva serie 10(1): 116-133.

Como parte del estudio en curso de algunos géneros de Caryophyllaceae, y la preparación de sus tratamientos para la nueva edición de Flora Argentina, se presentan notas sobre algunos miembros de esta familia. Dos especies (*Petrorhagia prolifera* y *Scleranthus polycarpos*) se citan por vez primera para la flora argentina. Se designan lectotipos para 16 nombres: *Arenaria achalensis*, *A. alsinoides*, *A. andicola*, *A. bisculca*, *A. lanuginosa* var. *diffusa*, *A. lanuginosa* var. *ensifolia*, *A. lanuginosa* var. *megalantha*, *A. palustris*, *A. patagonica*, *A. serpens* var. *robusta*, *A. serpens* var. *humilior*, *Philippiella patagonica*, *Sagina apetala* var. *melanopotamica*, *S. apetala* var. *paludosa*, *Spergula humifusa*, y *Spergulastrum lanuginosum*. Adicionalmente, un neotipo es designado para *Saponaria hispanica*. Se propone un cambio nomenclatural (*Arenaria serpens* var. *humilior* comb. nov.).

Palabras clave. *Arenaria*; *Petrorhagia*; *Philippiella*; *Sagina*; *Saponaria*; *Scleranthus*; tipificación; *Vaccaria*.

INTRODUCTION

As part of the ongoing study of some genera of Caryophyllaceae (e.g., Iamonico, 2014; 2015a; 2015b; 2016a; 2016b; 2018; 2019; 2021; Iamonico et al., 2015) and the preparation of their treatments for the new edition of the Flora of Argentina (Iamonico in prep.), notes on the occurrence of new taxa in the country and the nomenclature of several names belonging to *Arenaria* L., *Petrorhagia* (Ser. ex DC.) Link, *Philippiella* Speg., *Sagina* L., and *Scleranthus* L. are presented.

MATERIAL AND METHODS

This work is based on analysis of relevant literature (including protologues), and examination of specimens preserved in the herbaria CORD, GOET, HAL, LINN, LP, P, RO,

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and SI (Thiers, 2022 [continuously updated]), or viewed through images available at JSTOR Global Plants (https://plants.jstor.org/).

The Articles of the *International Code of Nomenclature for algae, fungi, and plants* cited throughout the text (e.g. "Art. 52.1") follow the current edition, i.e. the *Shenzhen Code*, hereafter abbreviated as ICN (Turland et al., 2018).

RESULTS AND DISCUSSION

NEW RECORDS FOR THE FLORA OF ARGENTINA

Petrorhagia

Petrorhagia (Ser.) Link is a genus of ca. 30 species native to the Mediterranean region, Europe, northern Africa, and southwest Asia, whereas some species occur as aliens in North and South America and South Africa (Hernández-Ledesma et al., 2015). The Flora of Argentina currently includes one species of *Petrorhagia*, *P. nanteuilii* (Burnat) P.W. Ball & Heywood which occurs in Buenos Aires, La Pampa, Neuquén, and Río Negro (Zuloaga et al., 2019). A specimen housed at SI (barcode SI170867; Fig. 1), collected at "Cerro Curamalal Grande" (Buenos Aires Province), based on leaf sheaths length, number of flowers per inflorescence, apex of petals, and seeds surface, is identified as *P. prolifera* (L.) P.W. Ball & Heywood, a species previously cited for South America only in Chile (Zuloaga et al., 2008, 2019).

A diagnostic key of these two species follows:

Leaf sheaths (2-)3-4 mm, (1-)1.5-3 times longer than wide; inflorescence usually with 4-6 flowers (almost never less); petals apex emarginate to bifid; seed coat tuberculate ..... *Petrorhagia nanteuilii*

Leaf sheaths 1-3 mm, up to 1 times longer than wide; inflorescence usually with 1-2 flowers (almost never up to 4); petals apex truncated or emarginate; seed coat never tuberculate ..... *Petrorhagia prolifera*

Specimen examined of *Petrorhagia prolifera*

ARGENTINA. **Buenos Aires**. Pdo. Saavedra: Saavedra, pie del Cerro Curamalal Grande, 16-XI-1982, *Villamil 2578* (SI 170867).

Scleranthus

The genus *Scleranthus* L. includes approximately 12 species native to Eurasia and Australasia; some taxa are introduced in North and South America, South Africa, and east Asia (Hernández-Ledesma et al., 2015). According to Zuloaga et al. (2008, 2019), the Flora of Argentina includes one species of *Scleranthus*, *S. annuus* L., introduced in Buenos Aires, Chubut, Córdoba, La Pampa, Neuquén, and Río Negro. Among the specimens examined at SI, two of them [barcodes SI1054496 (Fig. 2) and SI105633] are here identified as *S. polycarpos* L. (a taxon recognized at species rank according to Marhold, 2011), based on the length of the fruit, the position of the sepals, and the length of internodes. Therefore, *S. polycarpos* is a casual alien species in Argentina, occurring in Buenos Aires and Chubut Provinces.

A diagnostic key of the two *Scleranthus* species occurring in Argentina follows:

Ripe fruit (3.2-)4(-5.3) mm long; sepals erect or divergent; internodes about 10 mm long, usually longer than the leaves ..... *Scleranthus annuus*

Ripe fruit 2.2-3.0(-3.8) mm long; sepals convergent or erect; internodes < 5 mm long, usually shorter than the leaves ..... *Scleranthus polycarpos*

Specimens examined of *Scleranthus polycarpos*

ARGENTINA. **Buenos Aires**. Pdo. Tornquist: Villa Ventana, junto al arroyo, 10-XI-1980, *Villamil 1873* (SI105633). **Chubut.** Dpto. Cushamen: a orillas del Río Leleque en la playa de cantos rodados, *s.d.*, *Soriano 2388* (SI105496).

TYPIFICATION OF NAMES IN THE ARGENTINEAN FLORA

Arenaria achalensis Griseb., Abh. Königl. Ges. Wiss. Göttingen 24: 26. 1879. TYPE: Argentina. *Corral de Ceballos*, *Sierra de Achala de Córdoba*, 16-III-1876, *G. H. E. W. Hieronymus 506* (lectotype here designated GOET000560!; isolectotype CORD00005781!).

Grisebach described *Arenaria achalensis* from plants occurring in "S. [Sierra] Achala", which is a wide area located in Sierras de Córdoba (central-Argentina).

Fig. 1. Specimen of *Petrorhagia prolifera* (SI170867!). Reproduced with permission of the Herbarium SI. Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Fig. 2. Specimen of *Scleranthus polycarpos* (SI1054496). Reproduced with permission of the Herbarium SI. Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Nine specimens collected by G. Hieronymus in Sierra Achala during 1876-1877 were traced. According to Stafleu & Cowan (1979), Hieronymus's collection is mainly deposited at CORD where four of the nine mentioned specimens are housed (barcodes CORD00005778, CORD00005779, CORD00005780, and CORD00005781). These four specimens are marked with different collection numbers: 785, 523, 524, and 506, respectively. Also, the dates are different, i.e. "*30.I.1877*" (CORD00005778), "*15.III.1876*" (CORD00005779 and CORD00005780), and "*16.III.1876*" (CORD00005781). Among the remaining five Hieronymus' specimens found, four are deposited at GOET and are duplicates of the CORD specimens (GOET000559, collection number of 524, date "*15.III.1876*"; GOET000560, 506, "*16.III.1876*"; GOET000561, 785, "*30.I.1877*"; GOET000562, 523, "*15.III.1876*"). The ninth specimen is housed at LP (LP000988) and it is Hieronymus' collection no. 785, dated "*30.I.1877*". All these specimens are considered as syntypes and, among them, GOET000560 is here designated as lectotype, since it is a well preserved and full specimen, with many leaves, flowers, and fruit, in coincidence with the protologue of the species. The lectotype corresponds to the current concept of the species (e.g. Volponi, 1985: 346).

Arenaria bisulca (Bartl.) Fenzl & Rohrb., Linnaea 37: 248. 1872 ≡ *Cherleria bisulca* Bartl., Reliq. Haenk. 2(1): 12. 1831. TYPE: Peru, *collibus Cordilleraeis*, 1822, *T. Haenke s.n*. (lectotype here designated GOET000563!; possible isolectotype HAL0117886!).

When describing taxa based on Haenke's collections, Bartling (1831) provided a short diagnosis for this species ("C. [Cherleria] foliis imbricatis rigidis lanceolatis mucronatis ciliatis subtus bisulcis, floribus solitariis terminalibus sessilibus, petalis calyce dublo brevioribus"), a detailed description, and the provenance ("*Habitat in Peruviae vallibus Cordilleranum*"). Two specimens collected by Haenke, and considered as original material, were traced, one at GOET (barcode GOET000563), the other one at HAL (barcode HAL0117886). The specimen at GOET bears an original label including both the year of collection ("*1822*") and the locality ("*Peruviae collibus Cordilleraeis*"), whereas the labels on HAL0117886 only states "*Cherleria bisulca. Bartl.* | *Häenke*". The specimen at GOET better matches Bartling's diagnosis and description, and it is designated here as the lectotype of the name. *Cherleria bisculca* is currently accepted under the genus *Arenaria*, as *A. bisulca* (Bartl.) Fenzl & Rohrb. (Volponi, 1985: 333).

Arenaria lanuginosa (Michx.) Rohrb., Fl. Bras. [Martius] 14(2): 274. 1872 ≡ *Spergulastrum lanuginosum* Michx., Fl. Bor.-Amer. 1: 275. 1803. TYPE: Americae septentrionalis, *s.d.*, *A. Michaux s.n.* (lectotype here designated, P01902803!).

= *Arenaria alsinoides* Willd. ex D.F.K. Schltdl., Mag. Neuesten Entdeck. Gesammten Naturk. Ges. Naturf. Freunde Berlin 7: 201. 1816. TYPE: Colombia. Santa Fé de Bogotá, *A. J. A. Bonpland & F. W. H. A. Humboldt s. n.* (lectotype here designated B-W08735-10!).

Michaux (1803: 275) described the genus *Spergulastrum* listing three new North American species: *S. lanuginosum*, *S. lanceolatum*, and *S. gramineum*. Concerning *S. lanuginosum*, a short diagnosis ("caulibus tenuissima densaque lanigne vestiti: foliis latiuscule lanceolatis, in petiolum angustatis: floribus apetalis") and the provenance ("in borealibus Americae septentrionalis") were given. Michaux's collections from North America are preserved at P according to Stafleu & Cowan (1981). One specimen (barcode P01902803) was found and it bears four parts of the same plant collected by Michaux in "*America sept.*" (original label). The date of collection is lacking on P specimen. However, it should be noted that F. A. Michaux made his North American collections during 1785-1796 and, therefore, any traced specimen was collected before 1797. Moreover, according to Stafleu & Cowan (1981: 459), Michaux's types are kept at P. As a consequence, P01902803 is part of the original material for *Spergulastrum lanuginosum* (which was published in 1803) and it is here designated as the lectotype.

Regarding *A. alsinoides*, this species was described by Schlechtendal with a short diagnosis ("A. foliis oblongis ciliatis superioribus lanceolatis, caule ramoso eretto pubescente"), the collector ("von Humblodt"), and the provenance ("in Santa Fe de Bogota").

A specimen was traced at B in Willdenow's Herbarium (barcode B-W08735-010) which bears eleven pieces of one plant collected by Bonpland & Humboldt at Santa Fé. This specimen is surely part of the original material since Schlechtendal's (1816) work refers to species in Willdenow's collection, as reported in the title of the paper ("Ueber die Stellarien und Arenarien Arten, welche in der Willdenowschen Pflanzensammlung aufbewahrt werden" = About Stellaria and Arenaria species which are kept in Willdenow's plant collection). B-W08735-010 is here designated as the lectotype of the name *Arenaria alsinoides*. Based on the shape and size of leaves (ovate with apex acute-mucronate, 10-15 mm long, 5-6 mm wide), peduncle of flowers (longer than the calyx), and shape of sepals (ovate-lanceolate with acute apex), *Arenaria alsinoides* can be identified with *A. lanuginosa* s. l. Following the circumscription here accepted for this species (four varieties; see below), *Arenaria alsinoides* is a synonym, as previously indicated in other publications, of var. *lanuginosa* which displays leaves lanceolate, 10-20 mm long and 2-6 mm.

Arenaria lanuginosa (Michx.) Rohrb. var. **diffusa** Rohrb., Linnaea 37: 263. 1872. TYPE: Mexico, Pr. Orizaba, IX-1841, *Plantae mexicanae Liebm. Caryophyllaceae N. 16*, *F. M. Liebmann 3672* (lectotype here designated C10024156!). Fig. 3

Arenaria lanuginosa (Michx.) Rohrb. var. **ensifolia** Rohrb., Linnaea 37: 263. 1872. TYPE: Mexico, Chinantla, V-1841, *Caryophyllaceae mex. Liebm. N. 75*, *F. M. Liebmann 3668* (lectotype here designated C10024162!). Fig. 4

Arenaria lanuginosa (Michx.) Rohrb. var. **megalantha** Rohrb., Linnaea 37: 264. 1872. TYPE: Mexico, Sempoaltepec, VI-1842, *Caryophyllaceae mex. Liebm. N. 11*, *F. M. Liebmann 3682* (lectotype here designated C10024159!). Fig. 5

Rohrbach (1872: 263-264) published these three varieties and distinguished them from the typical one on the basis of the habit, shape and size of leaves, and length of petals and sepals. Several syntypes were cited for these varieties, mostly from Liebmann's collections (mainly preserved at C; see Stafleu & Cowan, 1981) from Mexico where the following 12 specimens were traced:

var. *diffusa*: Pr. Orizaba, 1841-43*, No 15* (C10024154); *No. 16* (C10024155, C10024157); IX-1841, *No. 16* (C10024156); Oaxaca: Cerro de Pelado, VIII-1842, *No. 17* (C10024158).

var. *ensifolia*: Chinantla, V-1841, *No. 75* (C10024162); Sempoaltepec, VI-1842, *No. 25* (C10024163); Joya, VII-1841, *No. 23* (C10024164); San Antonio Huatusco, VIII-1841, *No. 24* (C10024165).

var. *megalantha*: Sempoaltepec, VI-1842, *No. 11* (C10024159); *No. 33* (C10024160); Cumbre de Estepa, VI-1842 [year not well legible, probably 1842], *No. 34* (C10024161).

All these 12 specimens are part of the original material, and the selected lectotypes (C10024156 for var. *diffusa*, C10024162 for var. *ensifolia*, and C10024159 for var. *megalantha*) appear better preserved and contain more leaves and flowers, features important in the identification of *Arenaria* taxa (Chater & Halliday, 1993; Hartman et al., 2005; Iamonico, 2017).

Rohrbach (1872: 263-264) recognized two infravarietal taxa for var. *ensifolia* ("Lusus 1" and "Lusus 2") to distinguish, respectively, plants with glabrescent leaves ("Folia subtus pilis pauci adspersa, ceterum glabrescentia") and densely pubescent leaves ("Foli autrinque dense hirsuta"). However, according to the *Shenzhen Code* 1) "Lusus" is not a recognized rank and 2) no formal name was given by Rohrbach (1872) for these two subvarietal taxa; therefore, they are not validly published.

Rohrbach's varieties can be referred to *Arenaria lanuginosa* according to the current concept (Volponi 1985: 332-333, 344), since the original material display leaves ovate to linear, sepals more than 4 mm long, and petals longer than the calyx. The differences among the varieties mainly regard the shape and size of the leaves, as follows:

var. *diffusa*: leaves ovate-spathulate, 3-6 mm long, 1-4 mm wide, acuminate.

var. *ensifolia*: leaves linear, those of the main stem 15-20 mm long and 0.5-1.0 mm wide, acute-mucronate.

var. *megalantha*: leaves subcircular to ovate, 3-8 mm long and 3-6 mm wide, obtuse-mucronate.

Fig. 3. Lectotype of *Arenaria lanuginosa* var. *diffusa* (C10024156!). Reproduced with permission of the Natural History Museum of Denmark. Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Fig. 4. Lectotype of *Arenaria lanuginosa* var. *ensifolia* (C10024162!). Reproduced with permission of the Natural History Museum of Denmark. Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

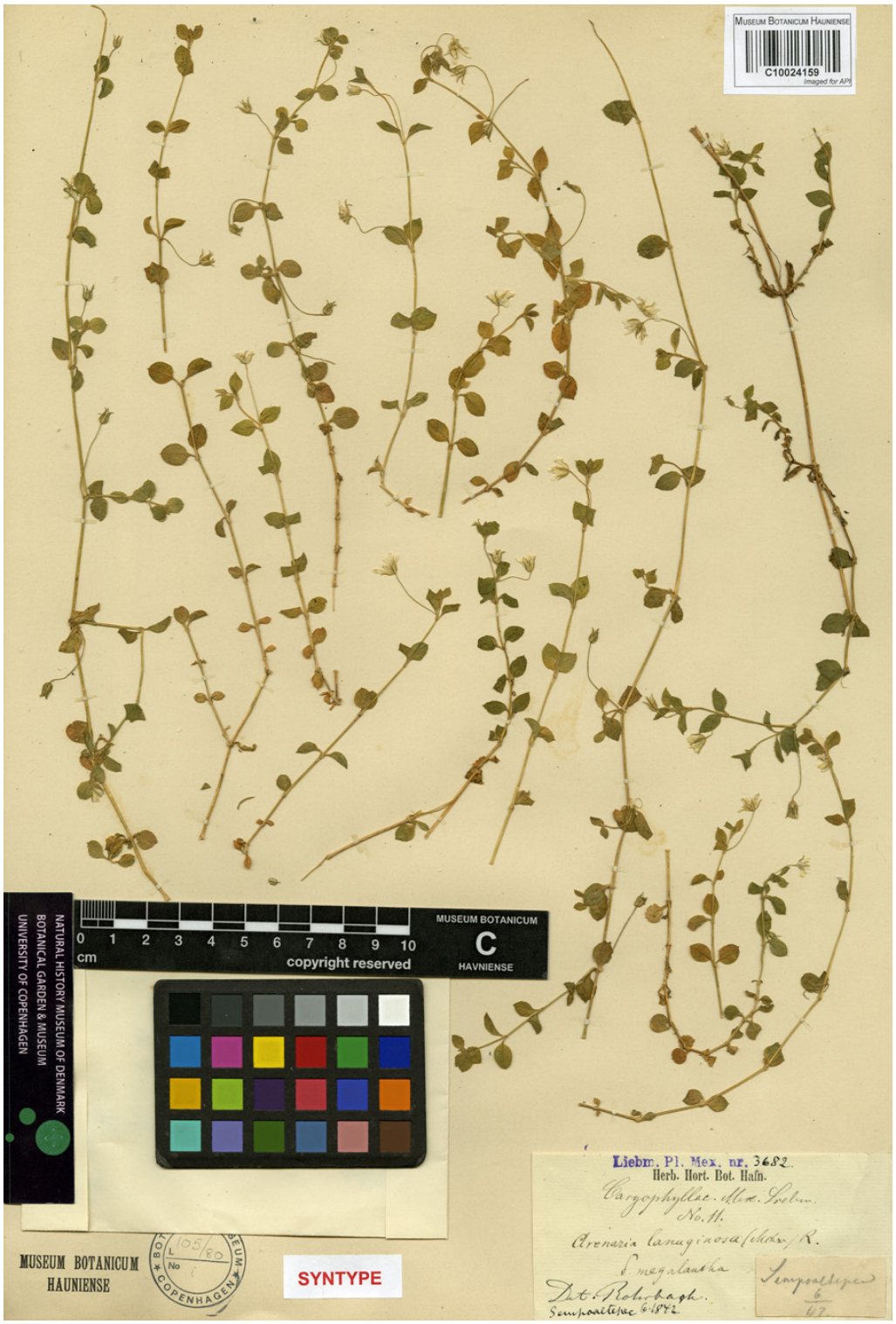

Fig. 5. Lectotype of *Arenaria lanuginosa* var. *megalantha* (C10024159!). Reproduced with permission of the Natural History Museum of Denmark. Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Williams (1898: 377-380) recognized *Arenaria lanuginosa* and *A. megalantha* (Rohrb.) Williams as different species, whereas Volponi (1985: 344, 346) did not consider any infraspecific taxa for *A. lanuginosa,* suggesting that future taxonomic studies would be required. Preliminary observations suggest considering Rohrbach's varieties as distinct species based on the above mentioned leaf characteristics. However, further specimens should be examined to verify if these characters are constant or related to geographical distribution and habitat. Therefore, the variety rank, as originally proposed by Rohrbach (1872), is here maintained.

Arenaria lanuginosa var. *lanuginosa* displays leaves lanceolate, 10-20 mm long and 2-6 mm wide, according to the morphology of the neotype (P01902803).

Arenaria serpens Kunth, Nov. Gen. Sp. [H.B.K.] 6: 32. 1823. TYPE: Ecuador, Chimborazo, s.d., *F.W.H.A. Humboldt & A.J.A. Bonpland 3194* (lectotype here designated, P 00274228!; isolectotype, P 00335800!).

= *Arenaria andicola* Gillies ex Hook. & Arn., Bot. Misc. 3: 148. 1833. *Arenaria serpylloides* Gay var. *andicola* (Gillies ex Hook. & Arn.) Reiche, Anales Univ. Chile 91: 340. 1895. TYPE: Chile, El Peñón y el valle del Fray Carlos*, s.d., J. Gillies s.n.* (lectotype here designated E 00265080!; isolectotype K 00471602).

= *Arenaria palustris* Gay, Fl. Chil. [Gay] 1: 271. 1845. *Arenaria serpens* Kunth var. *palustris* (Gay) Speg., Anales Soc. Ci. Argent. 47: 175. 1899. TYPE. Chile. [Región de los Lagos], "Prov. Valdivia, in arenosis do margines lacus yanquihue", III-1835, *C. Gay 30* (lectotype here designated P 00335827!).

= *Arenaria patagonica* Phil., Linnaea 28(6): 674. 1856. TYPE: Argentina, playa del Puerto de Nahuelhuapi, s.d., *F. Fonck 36* (lectotype here designated, or perhaps holotype, SGO 000001935!).

= *Arenaria serpens* var. *robusta* Speg., Anales Soc. Ci. Argent. 47: 175. 1899. TYPE: Argentina, Patagonia, *Boron-aik (Rio Chico)*, 1898, *C. Ameghino 19753* (lectotype LP000989!, designated as "holotype" by Volponi (1985: 340), here corrected according to Art. 9.10 of ICN).

Arenaria serpens was published by Kunth (1823: 32), who provided a short diagnosis and a detailed description; the provenance ("Crescit in pratis humidis et frigidis, ad radicem montis Chimborazo, alt 1640 hex. Regno Quitensi") was also given. Kunth's collections are mainly preserved at P (Stafleu & Cowan, 1979: 693), where I traced two specimens bearing plants collected in "Chimborazo", both numbered "3194". Since the specimen P00274228 is clearly better preserved than P00335800, I here designate it as the lectotype of the name. Both specimens correspond to the current concept of the species (see e.g., Pedersen, 1984: 203-204; Volponi, 1985: 338-340, 1998: 30-31).

Arenaria andicola was described by Hooker & Arnott (1833: 148) based on an unpublished manuscript by J. Gillies, as indicated in the protologue. I traced two specimens at E and K that bear plants collected by Gillies at "El Peñón & El Valle del Fray Carlos, Chile" as reported in the original labels. Although the date of collection is lacking in both labels, the material concerned is annotated by Gillies as "*Arenaria andicola n. sp.* [nova specie]". All things considered, I can assume that the above mentioned specimens are part of the original material. Thus, I here designate the specimen at E as lectotype because it is best preserved.

Arenaria palustris was described by Gay (1845: 271), who provided a short diagnosis and a detailed description plus the provenance ("Esta rarísima planta se cría en la orilla de la laguna Yanquihue, en la provincia de Valdivia"). Gay's collections are mainly preserved at P, where I traced three specimens bearing plants from the "HERBIER du CHILI AUSTRAL envoyé per M. GAY". No data about the locality and date of collection were annotated on P00335828 and P00335829. This means that I am not able to ascertain whether these specimens form part of the original material. On the other hand, P00335827 bears the following label in Gay's handwriting: "*30 Prov. Valdivia | Arenaria | rara | in arenosis de margines lacuus yanquihue martio 1835 | Gay*". I designate it here as a lectotype of the name because the label information match that reported in the protologue and the collection date precedes the publication of the species.

Arenaria patagonica was published by Philippi (1856: 674), who provided a diagnosis, a comparison with *Arenaria palustris*, and the provenance ("Ad lacum Nahuehuapi Patagoniae leg. cl. Fonk."). There is a specimen at SGO (barcode SGO000001935) which bears plants collected at "Playa del Puerto de Nahuelhuapi" (label on the right of the sheet). According to Taylor & Muñoz-Schick (1994: 747, Figure 1) and Muñoz-Schick et al. (2012: 131, Figure 4C) the top annotations of this label ("*No. 36 | Playa del Puerto de Nahuelhuapi*") are in Fonck's handwriting. Franz Adolf Fonck was one of the many botanists who sent Chilean exsiccata to R. A. Philippi (see Taylor & Muñoz-Schick, 1994: 746). Even when a single specimen was found at SGO in agreement with the diagnosis and the locality cited in the protologue, it is not possible to ascertain how many specimens Philippi used for his description. Thus, the specimen at SGO is here designated as the lectotype of the name (Art. 9.3 and 9.4 of ICN; see also McNeill, 2014), since mention of a single collection does not automatically make it the holotype. The morphology of the lectotype (SGO000001935) corresponds to the current concept of *Arenaria serpens* (Volponi, 1985: 338-340).

Var. *robusta* was published by Spegazzini (1899: 175) to distinguish forms of *A. serpens* with different habit, height, and leaves (shape and size). The provenance, date of collection, and collector were reported: "In salsi prope *Boron-aik* secus Rio Chico, Jan. 1898 (C. A.)", where "C. A." are the initials of Carlos Ameghino. This citation should be considered as a syntype according to recommendations by McNeill (2014), since no holotype was indicated by Spegazzini in the protologue, and according to Arts. 9.1 and 9.6 of ICN. Volponi (1985: 340) cited a specimen at LP as the holotype of the Spegazzini's name. This specimen (barcode LP000989) includes one plant collected by C. Ameghino at "Boron-aik (Rio Chico)" (original handwritten annotation) in 1898. It is clearly part of the original material for *Arenaria serpens* var. *robusta* and matches the Spegazzini's diagnosis. According to Art. 9.10 of the ICN, Volponi's holotype indication should be corrected to be a lectotype.

Arenaria serpens Kunth var. **humilior** (Ces.) Iamonico, **comb. nov**. ≡ *Arenaria palustris* Gay var. *humilior* Ces., *Ill. piante Strobel*: 4. 1871. TYPE: Chile, Planchon, *s.d.*, *F. Hohenacker 870* [lectotype here designated RO! (Fig. 6); isolectotype P04989452!).

Cesati (1871: 4) proposed this variety to separate forms of *Arenaria palustris* Phil. with shorter and wider flowers ("floribus brevioribus latioribusque"). He actually referred to plants observed (but not formally described) by Stroebel (1866: 363) who stated "Lasciata la Plaza de Armas ... scorgonsi alla sinistra ossia a nord-ovest ... tre laghetti ... dall'ultimo dei quali esce il Rio Malo [as "Molo"] ... In onta alle acque diacciate, anzi in grazia della umidità ... spuntavano fra i sassi, graziosi bianchi fiorellini …" (= Leaving the Plaza de Armas ... three little lake can see to the left, that is to the north-west ... from the last of which [lakes] flows the Rio Malo ... In spite of the frozen waters, and thanks to the humidity ... graceful white flowers appeared among the stones). Cesati's Herbarium and types are mainly preserved at RO where one specimen bearing the following original label could be traced: "*Prof. Philippi pl. chilens.* [Plantae Chilenses] *Ed. Dr. Hohenacker | 870. Arenaria palustris Naud.-Phil. et Griseb. | Ad litus lacus Ranco ~~Sept. m.~~ Jan m.*". Cesati (1871: 5) cited both Philippi and Hohenacker stating "... questa specie offertaci nella sua forma tipica dalla pianta distributita dall'Hohenacker nelle Centurie del Philippi sotto il N° 870 …" (= this species in its typic form and distributed by Hohenacker in the Philippi's Centuiras). No names under *Arenaria* were published by Philippi (1858a, 1858b, 1859) and numbered with 870 in his Centurias. Rudolph Friedrich Hohenacker (1798-1874) was a Swiss-German missionary and botanist who edited many series of exsiccates between 1841 and 1874, containing plants collected by himself from South America (Chile included), Europe, and Asia (Stafleu & Cowan, 1979). According to Stafleu & Cowan (1983), *Plantae Chilenses* is an irregular series of exsiccatae distributed by R. F. Hohenacker, which were mainly deposited at B (now mainly destroyed during World War II) (see also Hohenacker, 1854: 268, 1858: 342).

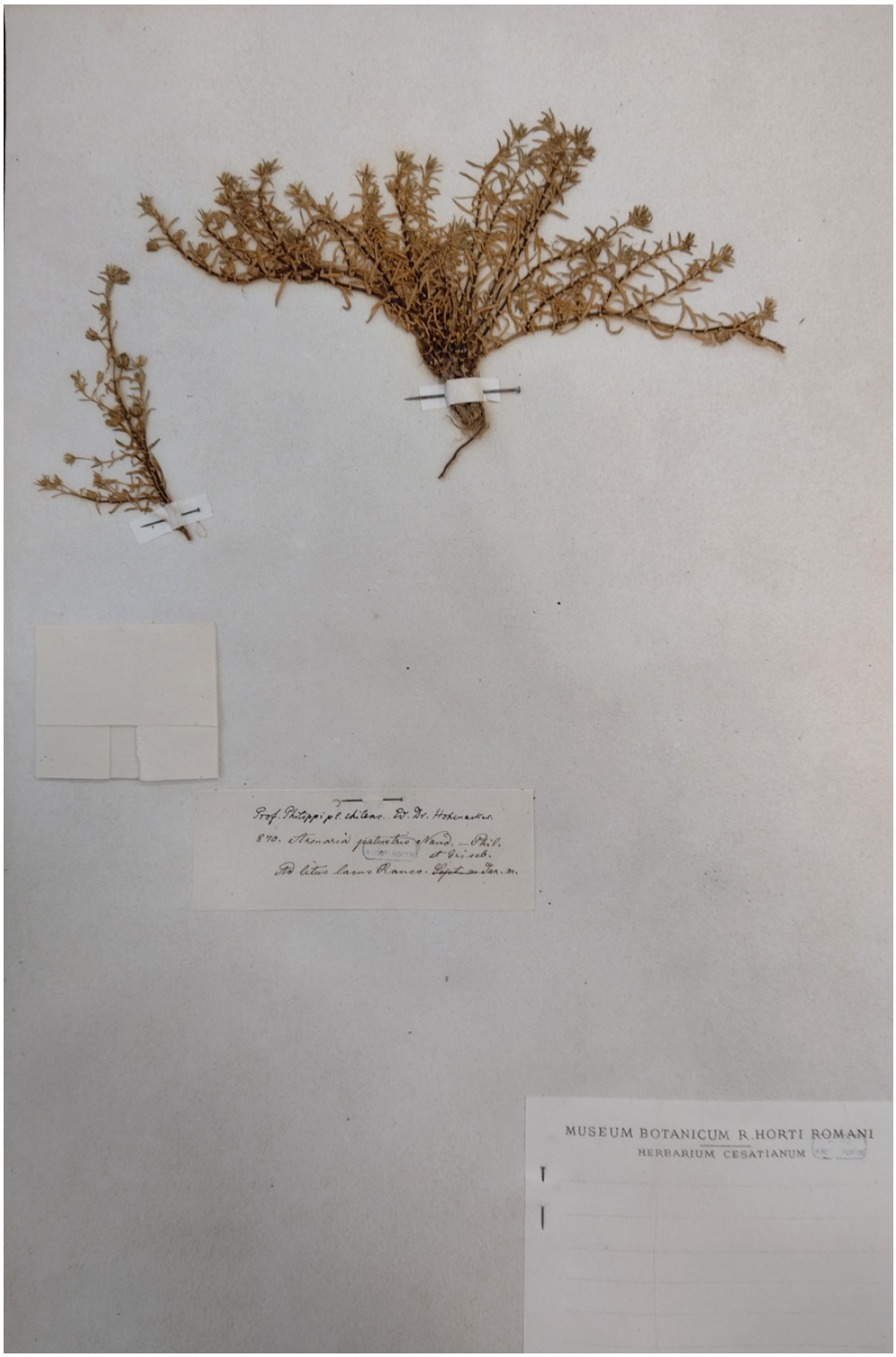

Fig. 6. Lectotype of *Arenaria palustris* var. *humilior* (RO!). Reproduced with permission of the Herbarium RO (University of Rome Sapienza). Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Based on the examination of labels referred to *Plantae Chilensis* [specimens examined at FI, G, P, PI, and WU (see https://www.jacq.org/#home)], the label on the specimen at RO is original and part of Philippi's series. Therefore, it is part of the original material used by Cesati to describe his *Arenaria palustris* var. *humilior* and it is here designated as the lectotype. Another specimen bearing the same label was found at P (barcode P04989452), an isolectotype.

Cesati's variety has been synonymized with *Arenaria serpens* Kunth by Volponi (1985) or with *A. digyna* Willd. ex D.K.F. Schltdl. by The Plant List (2013a). Based on personal observations, *A. digyna* displays leaves with apex acute, internodes about 1 mm long, and sepals ≤ 2 mm long, whereas the type of var. *humilior* has leaves obtuse, internodes 3-4 mm long, and sepals 3-4 mm long. As a consequence, the two taxa are different and cannot be synonymized. *Arenaria serpens* appears to be very similar to *Arenaria palustris* var. *humilior*, except by the ratio of the petals/tepals length which is > 1 in *A. serpens* and = 1 in var. *humilior*. Therefore, a new combination is made to validate *A. serpens* Kunth var. *humilior.*

Arenaria pleurantha Phil. is an endemic Chilean species occurring only in *locus classicus*, i.e. the Rio Palena regions Los Lagos and Aysén, Central-South Chile (Zuloaga et al., 2008, 2019), several hundred kilometers away from Planchon (*locus classicus* of *A. palustris* var. *humilior*); synonymization of these two names should be avoided for the moment. Based on the comparison among the types of *A. pleurantha* [SGO000001938 (lecto-) and K000471612 and SGO000001939 (isolecto-)] and *A. palustris* var. *humilior* [RO (lecto-) and P04989452 (isolecto-)], both taxa differ in leaves shape and size, 3-4 mm long, 1-2 mm wide in *A. pleurantha* (vs. linear-lanceolate, 8-10 mm long, up to 1 mm wide in *A. serpens* var. *humilior*).

Gypsophila vaccaria (L.) Sm., Fl. Graec. Prodr. 1(2): 279. 1809 ≡ *Saponaria vaccaria* L., Sp. Pl. 1: 409. 1753 ≡ *Lychnis vaccaria* (L.) Scop., Fl. Carniol. (ed. 2) 1: 303. 1771 ≡ *Silene vaccaria* (L.) Krause, Deutschl. Fl. (Sturm), ed. 2 5: 120. 1901. TYPE: Herb. Clifford: 166, *Saponaria* 2 (lectotype BM000628472!, designated by B. L. Burtt & P. Lewis 1952: 342).

= *Saponaria hispanica* Mill., Gard. Dict. ed. 8, Errat. 1768 ≡ *Vaccaria hispanica* (Mill.) Rauschert, Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg, Math.-Naturwiss. Reihe 14: 496. 1965. TYPE: Italy, Lazio region, Rome Province, Isola Farnese, Vaccareccia, medicaio, 01-VI-2004, *E. Lattanzi s.n.* (neotype here designated RO! [two sheets bearing parts of a single individual]). Fig. 7.

Miller (1768: *Saponaria no. 4*) published the fourth *Saponaria* name as "SAPONARIA (*amplicimus*)" in the 8th edition of his *The Gardeners Dictionary*, correcting it as "*Hispanica*" in the last page of the volume (Errata). The protologue includes a short diagnosis ("calycibus pyramidatis quinquangularibus, foliis ovato-lanceolatis, semiamplexicaulibus") and the provenance ("The fourth sort grows naturally in Spain"). Miller's herbarium and types are preserved at BM and LINN-Sloane (Stafleu & Cowan, 1981) where, however, no specimen useful for the lectotypification purpose was located. Moreover, no drawing of this species is included in the two volumes of *Figures of the most Beautiful, Useful, and Uncommon plants* (Miller, 1755, 1760) described in the Gardeners Dictionary and no exsiccata occur in the Smith collection at LINN where Joseph Banks gave him some of Miller's specimens in 1786 (J. Wajer pers. comm.). No further specimens which can be considered as part of the original material were found and, therefore, a neotypification should be proposed (Art. 9.8 of ICN). I here designate a well preserved specimen chosen among the Lattanzi's collection at RO. The neotype includes many flowers, whose features (especially those concerning the calyx) are important in the identification of the species which is now recognized, under the genus *Gypsophila*, as *G. vaccaria* (L.) Sm.

Philippiella patagonica Speg., Revista Fac. Agron. Univ. Nac. La Plata 3: 566. 1897. TYPE: Argentina, Santa Cruz, Río Gallegos, VIII-1882, *C. Spegazzini s.n.* (lectotype here designated LP003080!; isolectotypes K000486387!, NY99342591!).

Spegazzini published the genus *Philippiella* honouring Rodulfo Amando Philippi, a german-chilean naturalist. Only one species, *P. patagonica* Speg., was listed and it is therefore the type of the genus.

[1] The italian term "medicaio" refer to meadows with *Medicago sativa* L. dominant.

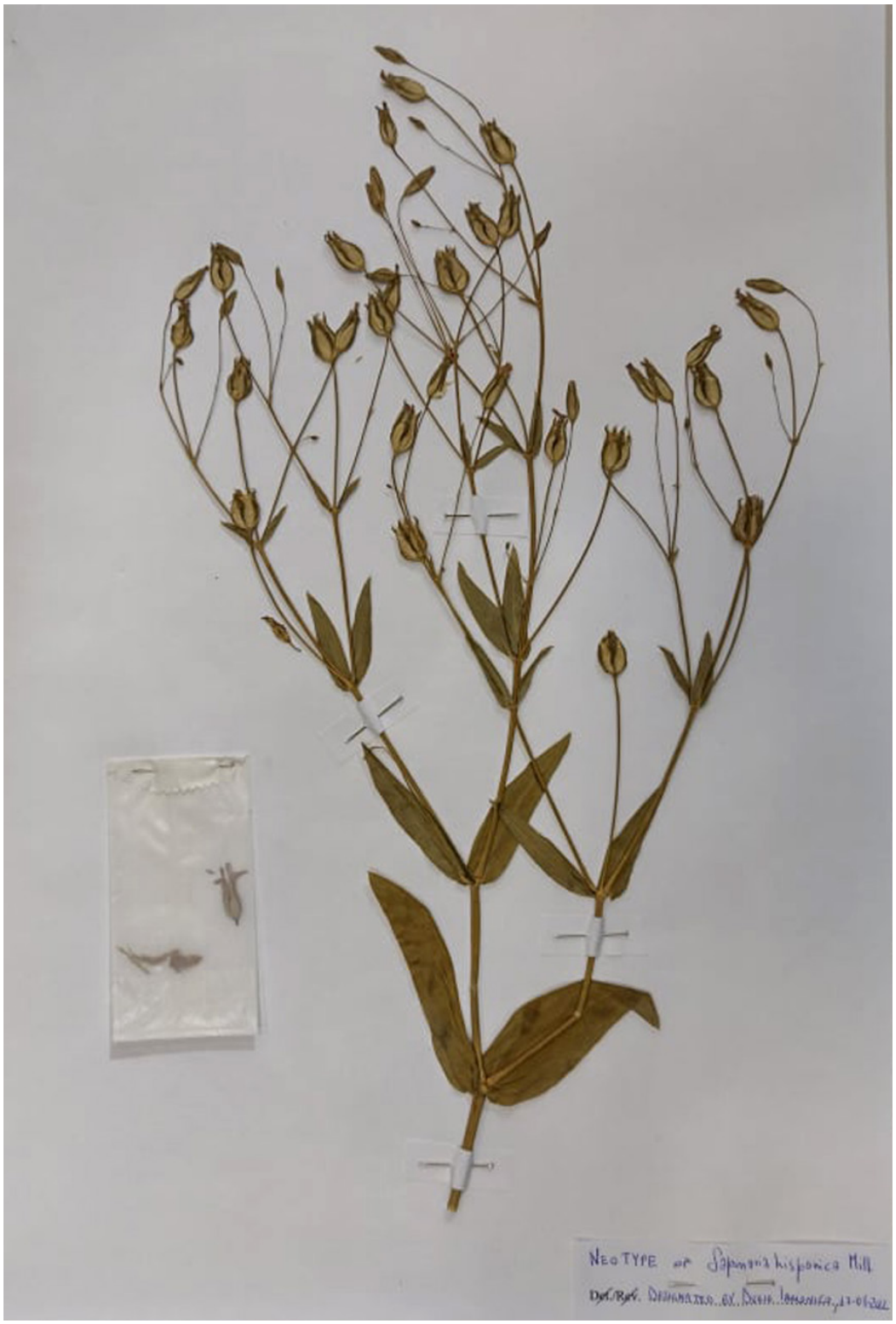

Fig. 7. Neotype of *Saponaria hispanica* (RO! [second sheet]). Reproduced with permission of the Herbarium RO (University of Rome Sapienza). Color version at http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1008/1249

Both a diagnosis and a detailed description were given for *P. patagonica*, as well as the provenance ("*Hab.* In pratis glareoso-sabulosis ad ostia *Rio Gallegos*, Aug. [August] 1882 (C. S.) [Carlo Spegazzini]". Spegazzini's herbarium and types are deposited at LP and LPS, with additional material at various other herbaria (Stafleu & Cowan, 1985). Three specimens of *P. patagonica,* collected by C. Spegazzini in 1882 at Rio Gallegos, where traced: LP003080, K000486387, and NY99342591. These three specimens are part of the original material of *Philippiella patagonica* and a lectotypification is necessary since no holotype was indicated by Spegazzini in the protologue. Since LP003080 bears better preserved plants is here designate as the lectotype of the name; K000486387 and NY00342591 are considered as isolectotypes. These three specimens match the protologue and correspond to the current concept of the species (Pedersen, 1984).

Sagina humifusa (Cambess.) Fenzl ex Rohrbach, Fl. Bras. [Martius] 14(2): 262. 1872 ≡ *Spergula humifusa* Cambess., in A. Saint-Hilaire et al., Fl. Bras. Merid. (quarto ed.) 2(15): 173. 1829. TYPE: Brazil. Rio Grande do Sul, Estancia do Velho Terras, 1816-1821, *A. Saint-Hilaire 1880* [lectotype here designated P01902837!; isolectotype P01902839!).

When publishing *Spergula humifusa*, Cambessèdes (1829: 173) provided a diagnosis and a description of the species, as well as the provenance ("Nascitur in pascuis prope praedium vulgò *Estancia do Velho Terras* haud longè ab urbe *Rio Grande de S. Pedro do Sul*"). Four specimens were found at MPU and P (barcodes MPU012056, P01902837, P01902838, and P01902839). All the plants on these sheets were collected by A. de Saint-Hilaire in Brazil. MPU012056 lacks both the original locality and date of collection, whereas P01902838 lacks only the date of collection; therefore, it is not possible to sure that these two specimens were collected before 1829 and constitute original material (Art. 9.4 of ICN). The other two specimens (P01902837 and P01902839) include both the precise locality (Rio Grande do Sul) and the date of collection ("1816-21" on P01902837, "de 1816 à 1821" on P01902839) and can be considered for lectotypification purposes (Art. 9.3 of ICN). Since P01902837 includes more plants than P01902839 (11 *vs*. 2), is here designate as the lectotype of *Spergula humifusa*; P01902839 is considered a duplicate of P01902837 and, therefore, an isolectotype. These two specimens match Cambessèdes's protologue and correspond to the current concept of the species which is now recognized under the genus *Sagina*.

Sagina procumbens L., Sp. Pl. 1: 128. 1753. TYPE: [Icon] tab. 5, fig. 3 "*Alsine pusilla graminea, flore tetrapetalo*" in Séguier (1745: 421) [lectotype designated by Jonsell & Jarvis in Jarvis et al. (1993: 83)].

= *Sagina apetala* var. *melanopotamica* Speg., Anales Mus. Nac. Buenos Aires 7 (ser. 2, t. 4): 242. 1902. TYPE: Argentina. Río Negro. Alrededores de Carmen de Patagones, II-1898, *C. Spegazzini 20201* (lectotype here designated LP003085!).

= *Sagina apetala* var. *paludosa* Speg., Anales Mus. Nac. Buenos Aires 7 (ser. 2, t. 4): 242. 1902. TYPE: Argentina, Río Negro. Alrededores de Carmen de Patagones, II-1898, *C. Spegazzini 20201* (lectotype here designated LP003084!).

Sagina apetala var. *melanopotamica* and var. *paludosa* were published by Spegazzini (1902: 242) to distinguish forms of *Sagina apetala* Ard. due to the different habits, size and shape of leaves, arrangement of flowers, shape of sepals, fruit/calyx ratio, and seed coats. The provenance of the varieties ("Abunde in dunis ad ostia Rio Negro" for var. *melanopotamica* and "In inundatis ubique prope Carmen de Patagones" for var. *paludosa*) were also given. There are two specimens at LP (barcode LP003084 and LP003085) which are part of the original material for these names (the date of collection is February 1898, the collector is C. Spegazzini). Both sheets bear two recent labels by C. R. Volponi and T. M. Pedersen who stated that they are the types of the varieties.

The localities indicated on the labels correspond to the provenances cited by Spegazzini (1902: 242) for his two varieties. According to Volponi (2012), Spegazzini originally identified the plants as var. *melanopotamica* (LP003085) and var. *paludosa* (LP003084), then corrected them as *S. procumbens*, and finally reidentified as *S. apetala*. Volponi (2012) stated that the specimen LP003085 is the holotype of

S. apetala var. *melanopotamica*, whereas LP003084 is the holotype of *S. apetala* var. *paludosa* (as also indicated in the Volponi's printed labels on the bottom-center of both sheets). Two recent labels by T. M. Pedersen also indicated LP003085 and LP003084 as the types of var. *melanopotamica* and var. *paludosa* ("*Typus Sagina apetala var. melanopotamicae Speg.*" and "*Typus Sagina apetala var. paludosa Speg.*"). Since Spegazzini (1902: 242) did not indicated any holotype (Art. 9.1 of ICN; see also the considerations given by McNeill, 2014) for these taxa, these specimens at LP are eligible as lectotypes of *S. apetala* var. *melanopotamica* and *S. apetala* var. *paludosa*. After an examination of the specimens LP003085 and LP003084, they match the original descriptions of var. *melanopotamica* and var. *paludosa* respectively, and are here designated as lectotypes. However, there is an incongruence between the label and the typical locality on the protologue for var. *melanopotamica*: Alrededores de Carmen de Patagones (label), which contrasts the protologue, "Abunde in dunis ad ostia Rio Negro".

The identity of these two varieties it is currently under debate. For example, POWO (2022) synonymized var. *melanopotamica* and var. *paludosa* with *Sagina apetala*, whereas The Plant List (2013b) cited them under *S. procumbens* L. Based on the lectotypes of both taxa, and the descriptions given by Spegazzini (1902: 242), the following crucial characters can be mentioned:

var. *paludosa*: Plant perennial, glabrous, stem not filiform and enlarged ("sat crassis" in the description), leaves (both lower and upper) aristate ("acutato-aristulatis"), mostly more than 10 mm long (up to 15 mm) and seed yellow ("seminibus fulvis").

var. *melanopotamica*: Plant perennial, glabrous, stem filiform ("gracillimis" in the description), leaves (both lower and upper) sligthly fleshy ("parum carnosis"), mucronate ("apice subaristulatis") and up to 10 mm long, fruit longer than the calyx, and seed ochraceous ("seminibus ochraceis").

The morphological characters of both varieties match with the current concept of *Sagina procumbens* (e.g., Crow, 1978: 42, 44, 73-74; Pignatti, 2017: 134-135). Therefore, both *S. apetala* var. *paludosa* and var. *melanopotamica* are here considered as synonyms of *S. procumbens*

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BIBLIOGRAPHY

Bartling, F. G. 1831. Paronychieae St. Hil. *Reliquiae Haenkeanae* 2(1): 5-20.

Burtt, B. L. & P. Lewis. 1952. On the flora of Kuwait: II. *Kew Bulletin* 7: 333-352.

Cesati, V. 1871. *Illustrazione di alcune piante raccolte dal Signor Prof. Strobel sul versante orientale delle Ande Cilene dal Passo del Planchon sino a Mendoza attraverso la Pampa del sud*. Napoli: Posta del Fibreno.

Chater, A. O. & G. Halliday. 1993. *Arenaria* L. In: Tutin T. G.; N. A. Burges, A. O. Chater, J. R. Edmondson, V. H. Heywood, D. M. Moore, D. H. Valentine, S. M. Walters & D. A. Webb (eds.), *Flora Europaea 2nd ed.*, vol. 1. pp. 140-148. Cambridge: Cambridge University Press.

Crow, G. E. 1978. A taxonomic revision of *Sagina* (Caryophyllaceae) in North America. *Rhodora* 80: 1-91.

Gay, C. 1845. *Historia fisica y politica de Chile segun documentos adquiridos en esta republica durante dozce años de residencia en ella y publicada bajo los auspicios del supremo gobierno. Botanica*, vol. 1. Paris: Museo de historia natural de Santiago.

Hartman, R. L.; R. K. Rabeler & F. Utech. 2005. *Arenaria* L. In: Flora of North America Editorial Committee (eds.), *Flora of North America North Mexico (Magnoliophyta*: *Caryophyllidae, part 2)*, vol. 4, pp. 51-56. Oxford: Oxford University Press.

Hernández-Ledesma, P.; W. G. Berendsohn, T. Borsch, S. von Mering, H. Akhani, S. Arias, I. Castañeda-Noa, U. Eggli, R. Eriksson, H. Flores-Olvera, S. Fuentes-Bazán, G. Kadereit, C. Klak, N. Korotkova, R. Nyffeler, G. Ocampo, H. Ochoterena, B. Oxelman, R. K. Rabeler, A. Sanchez, B. O. Schlumpberger & P. Uotila. 2015. A taxonomic backbone for the global synthesis of species diversity in the angiosperm order Caryophyllales. *Willdenowia* 45: 281-383. DOI: https://doi.org/10.3372/wi.45.45301

Hohenacker, R. F. 1854. Dr. R. A. Philippi pl. chilenses, Sectio II. Bonplandia 2: 268.

Hohenacker, R. F. 1858. Derkäuflicher pflanzensammlungen. Bonplandia 6: 341-342.

Hooker, W. J. & G. A. W. Arnott. 1833. Contributions towards a Flora of South America and the Islands of the Pacific. *Botanical Miscellany* 3: 129-212.

Iamonico, D. 2014. *Arenaria tenuifolia* versus *Arenaria hybrida* (Caryophyllaceae): nomenclatural study and taxonomic implications. *Phytotaxa* 173(3): 235-240. DOI: https://doi.org/10.11646/phytotaxa.173.3.6

Iamonico, D. 2015a. *Augustea* (Polycarpaeae, Caryophyllaceae), a new genus from South America. *Phytotaxa* 236(1): 71-78. DOI: https://doi.org/10.11646/phytotaxa.236.1.6

Iamonico, D. 2015b. A new nomenclatural change in *Polycarpon* (Caryophyllaceae): *P. tetraphyllum* subsp. *sauvagei comb. & stat. nov.*, an endemic taxon from Morocco. *Phytotaxa* 197(3): 225-226. DOI: https://doi.org/10.11646/phytotaxa.197.3.7

Iamonico, D. 2016a. Nomenclatural notes on four Linnaean names in *Arenaria* (Caryophyllaceae). *Taxon* 65(3): 610-616. DOI: https://doi.org/10.12705/653

Iamonico, D. 2016b. A new name in *Sagina*, *Sagina alexandrae* (Caryophyllaceae)**.** *Phytotaxa* 282(2): 164-165. DOI: https://doi.org/10.11646/phytotaxa.282.2.8

Iamonico D. 2017. *Arenaria* L. In: Pignatti, S. (Ed.) *Flora d'Italia*, vol. 2. pp. 86-92. Milano: Edagricole.

Iamonico, D. 2018. A conspectus of *Silene* sect. *Lasiocalycinae* (*Caryophyllaceae*). *Phyton (Horn, Austria)* 57(1-2): 113-127. DOI: https://doi.org/10.12905/0380.phyton57-2018-0113

Iamonico, D. 2019. Taxonomical, chorological and ecological notes on the Eastern Alps endemic *Arenaria huteri* (*Caryophyllaceae-Alsinoideae*). *Phyton (Horn, Austria)* 59(1): 11-19. DOI: https://doi.org/10.12905/0380.phyton59(1)-2019-0011

Iamonico, D. 2021. *Engellaria* (Caryophyllaceae), a new North American genus segregated from *Stellaria*. *Acta Botanica Mexicana* 128: e1846. DOI: https://doi.org/10.21829/abm128.2021.1846

Iamonico, D.; P. P. Ferrer-Gallego & M. B. Crespo. 2015. (2401) Proposal to conserve the name *Dianthus crassipes* against *D. ferrugineus* (*Caryophyllaceae*). *Taxon* 64(6): 1322-1323. DOI: https://doi.org/10.12705/646.23

Jarvis, C. E.; F. R. Barrie, D. M. Allan & J. L. Reveal (eds.). 1993. A List of Linnaean Generic Names and their Types. *Regnum Vegetabile* 127: 1-100.

Kunth, K. S. 1823. *Nova Genera et Species Plantarum*, vol. 6. Paris: Librarie del Gide Fils.

Marhold, K. 2011. *Scleranthus* L. In: Euro+Med Plantbase. http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=100858&PTRefFk=7200000 [accessed January 2022].

McNeill, J. 2014. Holotype specimens and type citations: General issues. *Taxon* 63(5): 1112-1113.

Michaux, A. 1803. Flora boreali-Americana, sistens caracteres plantarum quas in America septentrionali collegit et detexit. Andreas Michaux, vol. 1. Parisiis et Argentorati: apud fratres Levrault.

Miller, P. 1755. *Figures of the most Beautiful, Useful, and Uncommon plants described in the Gardeners dictionary* [...], vol. 1. London: printed for the author.

Miller, P. 1760. *Figures of the most Beautiful, Useful, and Uncommon plants described in the Gardeners dictionary* [...], vol. 2. London: printed for the author.

Miller, P. 1768. *The Gardeners Dictionary*, vol. 3. London: printed for the author.

Muñoz-Schick, M.;, V. Morales & A. Moreira Muñoz. 2012. La colección de tipos de plantas vasculares del Herbario Nacional de Chile (SGO). Análisis histórico, temporal y espacial. *Gayana Botánica* 69(1): 123-135.

Pedersen, T. M. 1984. Caryophyllaceae Juss. In: M.N. Correa (ed.), Flora Patagónica. *Colección científica del Instituto Nacional de Tecnología Agropecuaria* 8(4a): 196-276.

Philippi, R. A. 1856. Plantarum Novarum Chilensium. Centuria altera. *Linnaea: Ein Journal für die Botanik in ihrem ganzen Umfange* 28(12): 661-704.

Philippi, R. A. 1858a. Plantarum novarum Chilensium: centuria prima. *Linnaea* 28: 609-767.

Philippi, R. A. 1858b. Plantarum novarum Chilensium: centuria secunda, tertia. *Linnaea* 28: 661-704, 705-752.

Philippi, R. A. 1859. Plantarum novarum Chilensium: centuria quarta, quinta, sexta. *Linnaea* 29: 1-47, 48-95, 96-110.

Pignatti, S. (ed.). 2017. *Flora d'Italia 2nd Ed.* Milano: Edagricole.

POWO 2022. Plants of the World Online. *Sagina apetala* Ard. Facilitated by the Royal Botanic Gardens, Kew. https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:156411-1 [Accessed January 2022].

Rohrbach, P. 1872. Beiträge zur Systematik der Caryophyllinen. Linnaea 37(3): 183-310.

Schlechtendal, D. F. C. von 1816. XIX. Ueber die Stellarien und Arenarien Arten, welche in der Willdenowschen Pflanzensammlung aufbewahrt werden. Der Gesellschaft Naturforschender Freunde zu Berlin Magazin für die neuesten Entdeckungen in der gesammten Naturkunde 7(3): 190-213.

Spegazzini, C. 1899. Nova addenda ad flora patagonicam. *Anales de la Sociedad Científica Argentina* 47: 161-177.

Spegazzini, C. 1902. *Nova addenda ad Floram Patagonicam*. *Anales del Museo Nacional de Buenos Aires ser. 2* 4: 135-308.

Stafleu, F. A. & R. S. Cowan 1979. *Taxonomic Literature*, ed. 2, vol. 2 (H-Le). Bohn: Scheltema & Holtema.

Stafleu, F. A. & R. S. Cowan 1981. *Taxonomic Literature*, ed. 2, vol. 3 (Lh-O). Bohn: Scheltema & Holtema.

Stafleu, F. A. & R. S. Cowan 1983. *Taxonomic Literature*, ed. 2, vol. 4 (P-Sak). Bohn: Scheltema & Holtema.

Stafleu, F. A. & R. S. Cowan 1985. *Taxonomic Literature*, ed. 2, vol. 5 (Sal-Ste). Bohn: Scheltema & Holtema.

Stroebel, P. 1866. *Gita dal Passo del Planchon, nelle Ande Meridionali, a San Rafaele, nella Pampa del sud*. *Atti della Società italiana di scienze naturali* 9: 342-414.

Taylor, C. M. & M. Muñoz-Schick. 1994. The Botanical Works of Philippi, Father and Son, in Chile. *Annals of the Missouri Botanical Garden* 81(4): 743-748.

Thiers, B. 2022 [continuously update]. Index Herbariorum: A global directory of public herbaria and associated staff. - New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/ih/ [Accessed January 2022].

Turland, N. J.; J. H. Wiersema, F. R. Barrie, W. Greuter, D. L. Hawksworth, P. S. Herendeen, S. Knapp, W.-H. Kusber, D.-Z. Li, K. Marhold, T. W. May, J. McNeill, A. M. Monro, J. Prado, M. J. Price & G. F. Smith (eds.). 2018. International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress, Shenzhen, China, July 2017. *Regnum Vegetabile* 159: 1-254. DOI: https://doi.org/10.12705/Code.2018

Volponi, C. R. 1985. Sinopsis de las especies argentinas de *Arenaria* (Caryophyllaceae). *Darwiniana* 26(1-4): 331-351.

Volponi, C. R. 2012. Type material of Caryophyllaceae (Caryophyllales) in the herbarium of the Museo de La Plata, Argentina, a critical review. *Kurtziana* 37(2): 23-33.

Williams, F. N. 1898. A revision of the genus *Arenaria*, Linn. *Journal of the Linnean Society, Botany.* 33: 326-437.

Zuloaga, F. O.; O. Morrone & M. J. Belgrano (eds.). 2008. Catálogo de las plantas vasculares del Cono Sur. *Monographs in Systematic Botany from the Missouri Botanical Garden* 107(1-3): i-xcvi, 1-3348.

Zuloaga, F. O.; M. J. Belgrano & C. A. Zanotti. 2019. Actualización del Catálogo de las Plantas Vasculares del Cono Sur. *Darwiniana, nueva serie* 7(2): 208-278. DOI: https://doi.org/10.14522/darwiniana.2019.72.861