



# *Engellaria* (Caryophyllaceae), a new North American genus segregated from *Stellaria*

## *Engellaria* (Caryophyllaceae), un nuevo género norteamericano segregado de *Stellaria*

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### Abstract:

**Background and Aims:** *Stellaria* traditionally comprises 150-200 species, mainly distributed in the temperate regions of Eurasia and North America. Molecular studies demonstrated that *Stellaria* is polyphyletic and includes about 120 species. The genus has a high phenotypic variability which has led to nomenclatural disorders, making the identification of the various species difficult. A note is presented about a taxon currently accepted under the genus *Stellaria* -*Stellaria obtusa*- which should be recognized as a separate genus, here proposed as *Engellaria* gen. nov.

**Methods:** This study is based on examination of specimens of American and European herbaria and analysis of relevant literature.

**Key results:** Available molecular data show that *Stellaria obtusa* is not included in the *Stellaria s.s.* clade, but instead is basal to another clade comprising the genera *Honckenya*, *Schiedea*, and *Wilhelmsia*. *Stellaria obtusa* was, therefore, compared with these three groups and with morphologically similar apetalous members of *Stellaria s.s.* (*S. crispa*, *S. media*, *S. pallida*, and *S. irrigua*). The results obtained lead to the recognition of *S. obtusa* as a separate new North American monotypic genus. A diagnostic key of the apetalous members belonging to the American Caryophyllaceae genera is proposed. Finally, the names *Stellaria obtusa* and *S. washingtoniana* (= *S. obtusa*) are lectotypified based on specimens deposited, respectively, at UC (isoelectotypes at GH, NY, and YU) and GH (isoelectotypes at BM, CAN, CAS, CS, DOV, F, GH, K, MIN, MSC, NY, US, and VT). For the name *Alsine viridula* (= *S. obtusa*) the holotype was found at US (isotypes at CAS, F, GH, NY, OSC, RM, and UC).

**Conclusions:** *Stellaria obtusa* does not belong to the genus *Stellaria*. The present study shows that the combined use of morphological data and phylogenetic analyses helped to clarify the taxonomic position of difficult plant groups, as in *Stellaria*.

**Key words:** *Engellaria obtusa*, molecular data, morphology.

### Resumen:

**Antecedentes y Objetivos:** *Stellaria* tradicionalmente incluye 150-200 especies principalmente distribuidas en las regiones templadas de Eurasia y América del Norte. Estudios moleculares mostraron que *Stellaria* es polifilética e incluye aproximadamente 120 especies. El género tiene una alta variabilidad fenotípica que ha llevado a desórdenes nomenclaturales lo que dificulta la identificación de las diversas especies. Se presenta una nota sobre un taxón actualmente aceptado bajo el género *Stellaria* -*Stellaria obtusa*- que debe reconocerse como un género separado, aquí propuesto como *Engellaria* gen. nov.

**Métodos:** El trabajo está basado en la revisión de especímenes de herbarios americanos y europeos y en el análisis de la literatura.

**Resultados clave:** Datos moleculares disponibles muestran que *Stellaria obtusa* no está incluida en el clado *Stellaria s.s.*, pero que es basal a otro clado que comprende los géneros *Honckenya*, *Schiedea* y *Wilhelmsia*. *Stellaria obtusa*, por lo tanto, fue comparada con estos tres grupos y con los miembros apétalos morfológicamente similares de *Stellaria s.s.* (*S. crispa*, *S. media*, *S. pallida* y *S. irrigua*). Los resultados obtenidos conducen al reconocimiento de *S. obtusa* como un nuevo género monotípico norteamericano separado. Se propone una clave diagnóstica de los miembros apétalos pertenecientes a los géneros americanos de Caryophyllaceae. Finalmente, los nombres *Stellaria obtusa* y *Stellaria washingtoniana* (= *S. obtusa*) se lectotipifican basado en especímenes depositados, respectivamente, en UC (isoelectotipos en GH, NY y YU) y GH (isoelectotipos en BM, CAN, CAS, CS, DOV, F, GH, K, MIN, MSC, NY, US y VT), respectivamente. Para el nombre *Alsine viridula* (= *S. obtusa*) el holotipo se encontró en USA (isotipos en CAS, F, GH, NY, OSC, RM y UC).

**Conclusiones:** *Stellaria obtusa* no pertenece al género *Stellaria*. El presente estudio muestra cómo el uso combinado de datos morfológicos y análisis filogenéticos ayudó a aclarar la posición taxonómica de grupos de plantas difíciles, como *Stellaria*.

**Palabras clave:** datos moleculares, *Engellaria obtusa*, morfología.

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## Introduction

*Stellaria* L. (Caryophyllaceae) is a genus traditionally comprising 150-200 species distributed in the temperate regions of Eurasia and North America and at the higher altitudes of tropical areas (Hernández-Ledesma et al., 2015; Tikhomirov, 2016), being most diverse in the mountains of central Asia (Sharples and Tripp, 2019). Based on recent molecular studies (Greenberg and Donoghue, 2011; Sharples and Tripp, 2019), it was shown that various species are not included in the *Stellaria sensu stricto* clade. In light of this new view, *Stellaria* s.s. should be reduced to about 120 species (Morton, 2005) to 112 (Sharples, 2019). The genus is taxonomically problematic because of its high phenotypic variability which has led to nomenclatural disorders making the identification of the various species difficult. A worldwide revision of *Stellaria* is still lacking. Taxonomic studies of *Stellaria* were mostly part of comprehensive floras: Clapham et al., 1952 (for the British Isles), Chater and Heywood, 1993 (for Europe), Wu and Ke, 1996 and Shilong and Rabeler, 2001 (for China) or Morton, 2005 (for North America). In addition, few molecular papers have been published (e.g., Greenberg and Donoghue, 2011; Sharples and Tripp, 2019; Sharples, 2019).

As part of my ongoing studies on Caryophyllaceae (e.g., Iamónico 2013, 2014, 2015, 2018; Iamónico and Domina, 2015), I here present a note about a taxon currently accepted under the genus *Stellaria* - *Stellaria obtusa* Engelm. - which, however, should be removed and recognized as a separate genus, which I name *Engellaria* gen. nov. (see the taxonomic treatment).

## Material and Methods

The present research is based both on the analysis of the relevant literature and examination of specimens preserved at BM, CAN, CAS, CS, DOV, F, GH, HFLA, K, MIN, MO, MSC, NEBC, NY, OSC, RM, UC, US, VT, and YU (herbarium acronyms according to Thiers, 2021 (continuously updated)).

The distribution map was based on data from herbarium specimens and the following online sources: Hartman and Rabeler (2012), and EOL, 2020 (continuously updated). The following characters, which are relevant for the studied taxa according to literature (mainly Morton and Rabeler, 1989) and personal experience, were measured

on the examined specimens (or images; see “Additional examined material”) using a millimeter ruler and an optical stereoscope Olympus SZ40 (Schönwalde-Glien, Germany): length and width of the leaves (the width was measured at the widest part of the blade), size of the seeds (both longest and shortest diameter), ratio length/width of the leaf blades, and fruit dehiscence/indehiscence.

## Results and Discussion

### Phylogenetic data from the literature

Greenberg and Donoghue (2011: 1642-1643) demonstrated that *Stellaria* is polyphyletic, highlighting that several taxa are not included in the *Stellaria sensu stricto* clade, but they are instead related to other genera, i.e. *Geocarpon* Mack., *Honckenya* Ehrh., *Lepyrodiclis* Fenzl ex Endl., *Minuartia* Loefl., *Schiedea* Cham. & Schldl., and *Wilhelmsia* Rchb. The non-*Stellaria* species *sensu* Greenberg and Donoghue (2011: 1642, Fig. 2) occur, in their cladogram, in two different and not closely related clades, i.e., clade no. 10 (which corresponds to the tribes Scleranthae Bertch. & J. Presl (see Reveal, 2011 for the correct citation of this name) and Sagineae J. Presl as recognized by Harbaugh et al. (2010)) and clade no. 15 (which corresponds to the tribe Alsineae as recognized by Harbaugh et al. (2010)). Among these divergent species, *Stellaria obtusa* appears to be least related to the rest of the *Stellaria* members, being part of the tribe Scleranthae *sensu* Harbaugh et al. (2010) and sister to a clade comprising the genera *Honckenya*, *Schiedea*, and *Wilhelmsia* (see Greenberg and Donoghue, 2011: 1642, Fig. 2). This latter clade is sister to another well-supported clade (bootstrap value=97) including nine species. Six out of these nine latter species were later recognized as part of the following two other genera: *Mononeuria* Rchb. (*M. cumberlandensis* (Wofford & Kral) Dillenb. & Kadereit (≡ *Arenaria cumberlandensis* Wofford & Kral), *M. glabra* (Michx.) Dillenb. & Kadereit (≡ *Arenaria glabra* Michx.), *M. minima* (Mack.) Dillenb. & Kadereit (≡ *Geocarpon minimum* Mack.), *M. nuttallii* (Torr. & A. Gray) Dillenb. & Kadereit (≡ *Stellaria nuttallii* Torr. & A. Gray), *M. uniflora* (Walter) Dillenb. & Kadereit (≡ *Stellaria uniflora* Walter)) and *Triplateia* Bartl. (*Triplateia moehringioides* (Moç. & Sessé ex DC.) Kuntze (≡ *Hymenella moehringioides* Moç. & Sessé ex DC.)). The other three taxa (*S. minutifolia* Maguire, *S. ovata* Willd.

ex D.F.K. Schltldl, and *S. howardii* Maguire) are still considered as part of the genus *Stellaria* but, according to Dillenberger and Kadereit (2014: 68), they form a clade (no. 4 in Dillenberger and Kadereit, 2014) which is sister to some *Minuartia* members. They need further study and are part of an ongoing study by the author of the present paper (Iamonico, in prep.).

## Morphological data

Comparison of *Stellaria obtusa* with molecularly closely related genera (*Honckenya*, *Schiedea* and *Wilhelmsia*)

*Honckenya* is a monotypic genus native to the coastal areas of temperate and arctic North America, as well as northern Eurasia (Halliday, 1993; Wagner, 2005b; Sánchez Vilas, 2007: 21). The single morphologically variable species *H. peploides* (L.) Ehrh. is comprised of four subspecies, distinguished by habit, stem diameter, internode length, leaf shape and size, and pedicel length (Wagner, 2005b): subsp. *diffusa* (Hornem.) Hultén ex V.V. Petrovsky, subsp. *major* (Hook.) Hultén, subsp. *peploides*, and subsp. *robusta* (Fern.) Hultén (see Kurtto, 2001; Wagner, 2005b). As a whole, *H. peploides* is clearly a different lineage from *Stellaria obtusa*, displaying the following diverging characters between *H. peploides* and *S. obtusa*: size of leaves (up to 46 × 20 mm in *H. peploides* vs. up to 12 × 12 mm in *S. obtusa*), inflorescence (few-flowered inflorescence in *H. peploides* vs. always solitary in *S. obtusa*), sepals (5 in *H. peploides*, usually 4 in *S. obtusa*), petals (present in *H. peploides*, absent in *S. obtusa*), length of sepals (3.5-7 mm in *H. peploides* vs. 1.5-3.5 mm in *S. obtusa*), length and dehiscence of capsule (5-12 mm long opening by 3 valves in *H. peploides* vs. up to 2-3.5 mm opening by 6 valves in *S. obtusa*), and diameter of seeds (2-4 mm in *H. peploides* vs. up to 0.5-0.7 mm in *S. obtusa*).

*Schiedea* is a genus endemic to the Hawaiian Islands (Wagner et al., 2005). All *Schiedea* species are characterized morphologically by having various features which clearly distinguish this genus from *Stellaria obtusa* (Table 1). These features refer to habit (shrubs, subshrubs and vines vs. perennial herbs in *S. obtusa*), leaves (entire to minutely toothed vs. entire in *S. obtusa*), inflorescence architecture (dichasia, monochasia or panicle-like vs. flowers

axillary and solitary in *S. obtusa*), and seed size (diameter: 0.6-1.8 mm in *Schiedea* vs. up to 0.5-0.7 mm in *S. obtusa*).

*Wilhelmsia* is a monotypic genus occurring in arctic northwestern North America (Canada in Northwest Territories and Yukon, and USA in Alaska) and eastern Asia (Russian Far East, Siberia) (Wagner, 2005a). The single species, *W. physodes* (Fisch. ex Ser.) McNeill, differs from *Stellaria obtusa* in several characters, i.e. pubescence (respectively, glandular pubescent vs. glabrous to finely pubescent), leaf size (2-8 × 5-15 mm in *W. physodes* vs. 7-12 × 2-12 mm in *S. obtusa*), petals (present in *W. physodes*, absent in *S. obtusa*), sepal length and colour (4.5-6 mm, often purple in *W. physodes* vs. 1.5-3.5 mm, green in *S. obtusa*), capsule width, colour and dehiscence (7-10 mm, purplish opening by 3 valves in *W. physodes* vs. 1-2 mm, green to pale-green opening by 6 valves in *S. obtusa*), and seed diameter (1.2-1.5 mm in *W. physodes* vs. 0.5-0.7 mm in *S. obtusa*) (Table 1).

Comparison of *Stellaria obtusa* with apetalous *Stellaria* sensu stricto members

*Stellaria obtusa*, an apetalous species, displays a unique morphology among the apetalous *Stellaria* species (*S. crispa* Cham. & Schltldl., *S. dicranoides* (Cham. & Schltldl.) Fenzl (Fenzl's species is here accepted as a member of *Stellaria* according to the treatment by Morton (2005) who, however (see also Harbaugh et al., 2010: 195), reported that *S. dicranoides* is of uncertain generic position and it could be placed under the genus *Arenaria* L.), *S. media* L. s.l., *S. pallida* (Dumort.) Crép., *S. irrigua* Bunge (= *S. umbellata* Turcz. according to Sharples and Tripp, 2019) (Table 2)).

*Stellaria crispa* usually has longer leaves (4-25 mm vs. 7-12 in *S. obtusa*), acute to acuminate sepals with 3 prominent veins (vs. obtuse with obscure veins in *S. obtusa*), styles that are about 1 mm long (vs. <0.5 mm long in *S. obtusa*), and ovoid capsules that are more than 1.5 times as long as wide (vs. globose).

*Stellaria media* is a highly variable species. The forms having flowers without petals differ from *S. obtusa* by the following characters: stems pubescent all around or with 1-2 lines of hairs (vs. stems glabrous (rarely hairy)), larger leaves (10-20 × 5-10 mm vs. 7-12 × 2-12 mm in *S. obtusa*), inflorescences 5- to many-flowered (vs. flowers solitary in *S. obtusa*), sepals pubescent (vs. glabrous), larger seeds

**Table 1:** Morphological comparison between *Engellaria* Iamonico and the related genera *Honckenya* Ehrh., *Schiedea* Cham. & Schltdl., and *Wilhelmsia* Rchb.

	<i>Engellaria</i> Iamonico	<i>Honckenya</i> Ehrh.	<i>Schiedea</i> Cham. & Schltdl.	<i>Wilhelmsia</i> Rchb.
Habit	perennial herbs	perennial herbs	shrubs, subshrubs and vines	perennial herbs
Leaf succulence, size (mm, length × width), and margins	not succulent, 7-12 × 2-12, entire	succulent, 4-46 × 0.5-20, often crenulate	succulent, 10-240 × 1-110, to minutely toothed	not succulent, 5-15 × 2-8, serrulate or toothed at least along the distal half of the blade
Inflorescence	solitary flowers	few-flowered or solitary flowers	dichasia/monochasia or panicle-like	solitary flowers
Petals (number)	absent	mostly 5	absent	5
Sepals length (mm) and colour	1.5-3.5, green	3.5-7, green	2.0-12.0, often purple	4.5-6.0, purplish
Styles (mm)	0.3-0.5	1-2	up to 11	2.5-3
Capsule size (mm, length × width), colour, and dehiscence	2-3.5 × 1-2, pale-green, opening by 6 valves	5-12.0 × 5-10, green to yellowish, opening by 3 valves	1.5-12 × 0.5-6, green (sometimes with apex purple), opening by 4-11 valves	8-10 × 7-10, purplish, opening by 3 valves
Seed diameter (mm)	0.5-0.7	2.0-4.0	0.6-1.8	1.2-1.5

((0.8)1-1.3 mm vs. 0.5-0.7 mm in *S. obtusa*), capsule shape (ovoid-pyriform vs. globose in *S. obtusa*).

*Stellaria pallida* is an annual species (*S. obtusa* is perennial), with stems with 1 line of hairs for each node (vs. glabrous (rarely hairy) in *S. obtusa*), narrower leaves at average (0.9-7 vs. 2-12), 3- to many-flowered inflorescences (vs. flowers solitary in *S. obtusa*), and an ovoid capsule (vs. globose in *S. obtusa*).

*Stellaria irrigua* has ± elliptic or lanceolate leaves, 1-10 × 1-3 mm (vs. ovate, 7-12 × 2-12 mm in *S. obtusa*), 3- to many-flowered inflorescences (vs. flowers solitary in *S. obtusa*), with bracts (vs. bractless), sepals with 3 prominent veins (vs. obscure veins in *S. obtusa*), and conic capsule (vs. globose).

### Taxonomic treatment

Based on the discussion above about molecular data and morphology of *Stellaria obtusa* and the related taxa, I here propose a new monotypic genus in the Caryophyllaceae. See Table 1 for a comparison with the similar genera.

***Engellaria* Iamonico gen. nov.**

TYPE: *Engellaria obtusa* (Engelm.) Iamonico (basonym: *Stellaria obtusa* Engelm.).

*Engellaria* includes perennial herbs which display entire leaves, solitary flowers, usually 4 sepals (rarely 5), green, 1.5-3.5 mm long, petals absent, styles 0.3-0.5 mm long, capsule dehiscent by 6 valves, pale-green, 2-3.5 mm long, 1-2 mm wide, seeds 0.5-0.7 mm in diameter.

Distribution: see the description of *Engellaria obtusa*.

Etymology: my first idea was to dedicate the new genus to George Engelmann (1809-1884), an American physician and botanist who first described *Stellaria obtusa*, the single member of *Engellaria*. However, the name *Engelmannia* (derived from the surname Engelmann) has been published four times (*Engelmannia* A. Gray ex Nutt. (in 1840), *Engelmannia* Klotzsch (in 1841), *Engelmannia* Torr. & A. Gray (in 1842), *Engelmannia* Pfeiff. (in 1845)) and

**Table 2:** Morphological comparison between *Engellaria obtusa* (Engelm.) Iamonico, and the apetalous members of *Stellaria* L. Concerning *S. media* (L.) Vill. the description refers to the apetalous forms.

	<i>Engellaria obtusa</i> (Engelm.) Iamonico	<i>Stellaria crispera</i> Cham. & Schltldl.	<i>Stellaria</i> <i>dicranoides</i> (Cham. & Schltldl.) Fenzl	<i>Stellaria irrigua</i> Bunge	<i>Stellaria media</i> (L.) Vill.	<i>Stellaria pallida</i> (Dumort.) Crép.
Habit	perennial, creeping	perennial, forming mats	perennial, forming cushions	perennial, erect or forming clumps	annual/biennial, prostrate to ascending	annual, prostrate
Stem	glabrous (rarely hairy)	glabrous	glabrous	glabrous	pubescent all around or with 1-2 lines of trichomes	one line of hairs below each node
Leaf shape and size (length × width, mm)	ovate, 7.0-12.0 × 2.0-12.0	broadly elliptic to ovate, 4.0-25.0 × 2.0-15.0	oblanceolate to obovate, 3.0-5.0 × 1.0-1.5	elliptic or lanceolate, 1.0- 10.0 × 1.0-3.0	ovate to broadly elliptic, 10.0- 20.0 × 5.0-10.0	ovate to elliptic, 3.0-15.0 × 1.0- 7.0
Inflorescence	flowers solitary	flowers solitary	inflorescence few-flowered or flowers solitary	inflorescence usually few- flowered	inflorescence 5- to many-flowered	inflorescence 3- to many-flowered
Sepal	obtuse, glabrous, with obscure veins	acute to acuminate, glabrous, with 3 prominent veins	acute, glabrous, with 1 prominent vein	obtuse, glabrous, with 3 prominent veins	obtuse, pubescent, with obscure veins	acute, pubescent, with obscure veins
Styles (mm)	<0.5	~ 1.0	~ 1.0	~ 0.25	0.5-1.0	0.2-0.5
Capsules	globose (length ~ width)	ovoid (length >1.5 times width)	ovoid (length ~ 1.5 times width)	conic (length ~ 1.5 times width)	ovoid-pyriform (length ~ 1.5 times width)	ovoid (length ~ 1.5 times width)
Seeds (mm)	0.5-0.7	0.7-1.0	1.0-1.1	0.5-0.7	(0.8)1.0-1.3	0.5-0.9

my proposal would be illegitimate (later homonym according to the Art. 53.1 of the ICN, see [Turland et al., 2018](#); note that also the Klotzsch's, Torrey & Gray's and Pfeiffer are homonyms and therefore illegitimate). So, with the aim to maintain "Engelmann" in the generic epithet, I created a name which results from a merge of "Engelmann" (Engel-) and "Stellaria" (-laria).

Proposed vernacular name: Engelmann's starwort.

Species richness: a monotypic genus comprising the species *Engellaria obtusa* (Engelm.) Iamonico.

Chorology: see *Engellaria obtusa*.

Inclusion of *Engellaria* in the diagnostic key of Caryophyllaceae sensu [Rabeler and Hartman \(2005\)](#): on the basis of the generic diagnosis above and the description of *Engellaria obtusa* (below), I here propose a subkey for the apetalous members belonging to the American Caryophyllaceae genera characterized by having leaves without stipules, sepals free, and fruits a capsule (steps 25-29 of the diagnostic key from [Rabeler and Hartman \(2005\)](#)):



- 1a. Capsule cylindrical with 8 or 10 valves; sepals usually 4-5 ..... 2
- 1b. Capsule ovoid or globose with up to usually 6 valves; sepals usually 4-6 ..... 3
- 2a. Capsule valves usually 8; styles usually 4 ..... *Moenchia* Ehrh.
- 2b. Capsule valves usually 10; styles usually 5 ..... *Cerastium* L.
- 3a. Sepals 4(-5) ..... 4
- 3b. Sepals 5(-6) ..... 5
- 4a. Capsule valves 4-5; styles 4-5 ..... *Sagina* L.
- 4b. Capsule valves 6; styles 3(-4) ..... *Engellaria* Iamonico
- 5a. Capsule valves or teeth 2 times the number of styles .. 6
- 5b. Capsule valves or teeth usually equal in number of styles ..... 7
- 6a. Styles 3(5); capsule valves (3, 4) 6 (8, 10); seeds usually yellowish to brown, smooth or tuberculate when shiny ..... *Stellaria* L.
- 6b. Styles 3; capsule valves 6; seeds dark brown or black, always shiny, smooth or obscurely tuberculate ..... *Arenaria* L.
- 7a. Stamens 5 ..... *Mononeuria* Rchb.
- 7b. Stamens 10 ..... *Sabulina* Rchb.

***Engellaria obtusa*** (Engelm.) Iamonico, comb. nov. Fig. 1.

≡ *Stellaria obtusa* Engelm., Bot. Gaz. 7(1): 5. 1882. TYPE: UNITED STATES OF AMERICA. Colorado, Anthracite Ck (Creek), Colorado, 1881, *T. S. Brandege* s.n. (lectotype designated here: UC120055! (image available at UC, 2021a); isolectotypes: GH00037991!, GH00037990! (image available at HUH, 2021a), NY00353081! (image available at NYBG, 2021a), YU001676! (image available at YU, 2021)).

≡ *Alsine obtusa* (Engelm.) Rose, Contr. U.S. Natl. Herb. 3(9): 569. 1896.

= *Stellaria washingtoniana* B.L. Rob., Bot. Gaz. 25(3): 166-167. 1898. TYPE: UNITED STATES OF AMERICA, Alderwood, Upper Valley of the Nesqually, 18.VI.1895, *O. D. Allen* 157 (lectotype designated by Holmgren and Holmgren, 2012 GH00037993! (image of the lectotype available at HUH, 2021b); isolectotypes: BM000884641! (NMH, 2021), CAN171422, CAS5630! (CAS, 2021a), CS106217! (CS, 2021), DOV0008406! (DOV, 2021), F0053353F! (F, 2021a),

FV0053354F! (F, 2021b), GH00037994!, plant on the left (HUH, 2021c), K000723568! (K, 2021), MIN1002528! (JSTOR, 2021a), MO2196020! (TROPICOS, 2021), MSC0092930! (JSTOR, 2021b), NY353086! (NYBG, 2021b), RM0002200! (RM, 2021a), US00611211!, and US00103238! (both at US, 2021a), VT053289! (JSTOR, 2021c)).

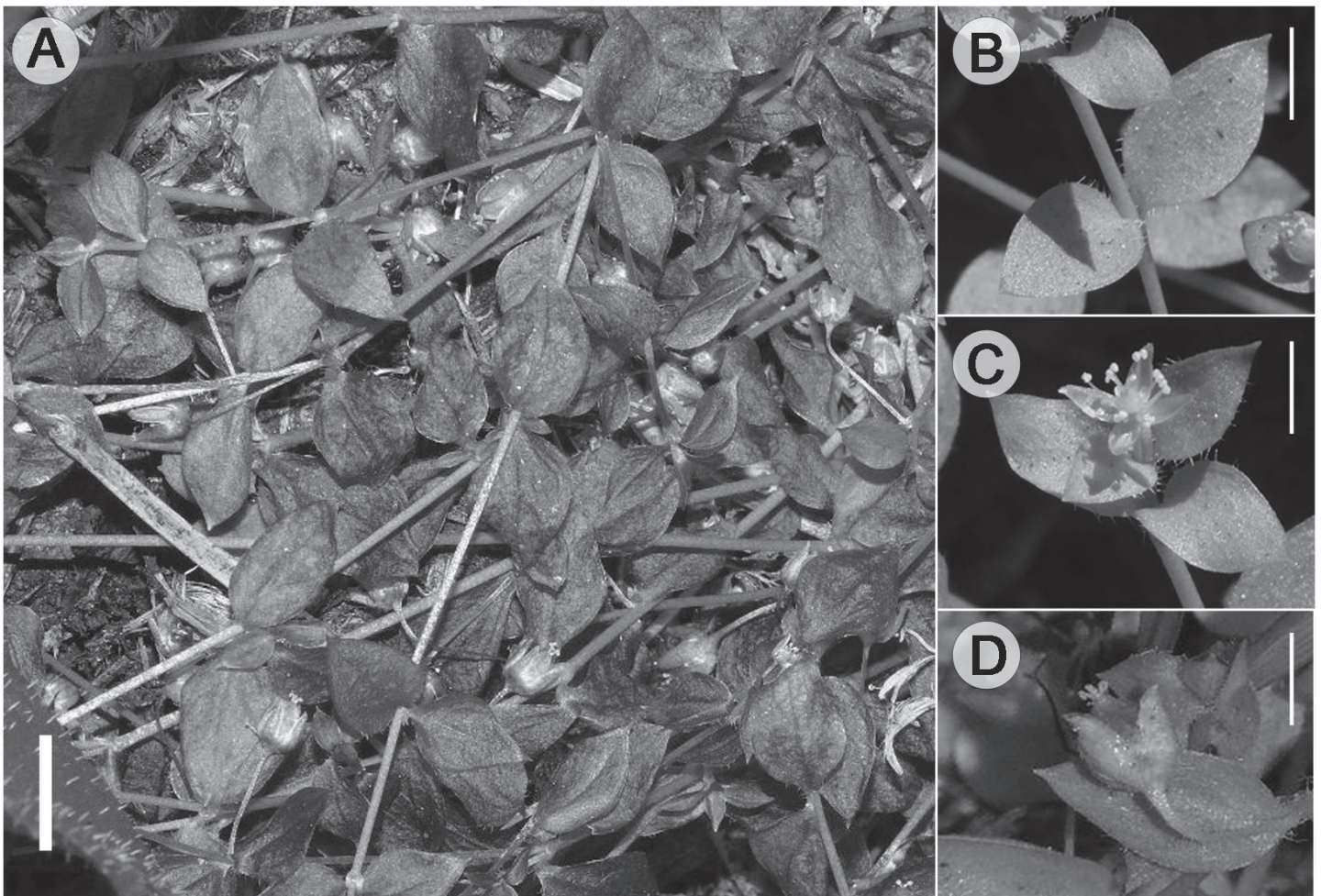
≡ *Alsine washingtoniana* (B.L. Rob.) A. Haller, Cat. N. Amer. Pl. (ed. 2): 4. 1900.

= *Alsine viridula* Piper, Contr. U.S. Natl. Herb. 16(5): 207. 1913. TYPE: UNITED STATES OF AMERICA. Idaho, ridges south from Wiessners Peak (Mount Wiessner), 1700 m, 28.VII.1896, *J. B. Leiberg* 1396 (holotype: US00103237! (image available at US, 2021b); isotypes: CAS0000308! (CAS, 2021b), F281494! (F, 2021c), GH00037575! (HUH, 2021d), NY342333! (NYBG, 2021c), OSC04665! (OSC, 2021), RM0002118! (RM, 2021b), UC154382! (UC, 2021b)).

≡ *Stellaria viridula* (Piper) St. John in St. John & Warren, Prelim. List Pl. Kaniku Nat. For. 1: 6. 1925.

= *Alsine obtusa* (Engelm.) Howell, Fl. N. W. Amer. 1: 83. 1897, nom. inval. (isonym, Art. 6.3 Note 2 of the ICN, Turland et al., 2018).

Perennial herbs, rhizomatous (rhizome usually white), creeping (hemicryptophytes); stems prostrate, often matted (not forming cushions), branched, (3-)5-20(-25) cm long, with internodes as long as or longer than the leaves, usually glabrous; leaves sessile or shortly petiolate with blades ovate (7-9(-12) × 2-12 mm (sizes are given as length × width through the text)), glabrous (ciliate near the base), shiny, margins entire and ciliate in the proximal part, base rounded or cuneate, apex acute; flowers solitary, axillary, without bracts, 1.5-2 mm in diameter; pedicels spreading (in fruiting stage), 3-12 mm long, glabrous; sepals usually 4 (rarely 5), with 3(-5), green with obscure dark-green veins, ovate-lanceolate, 1-1.2(-1.5) × 1.5-3.5 mm, glabrous, apex obtuse, margins scarious, narrow (3-4 times narrower than the width of the blade); stamens 8(-10); petals absent; styles usually 3, 0.3-0.5 mm long; ovary 1-loculed at maturity (rarely 3-loculed in young individuals); ovules numerous; capsules pale-green, globose, 2-3.5 × 1-2 mm, about 2 times the length of the sepals, opening by 6 valves; seeds grayish-black or dark-brown, elliptic, 0.5-0.7 mm in diameter, finely reticulate.



**Figure 1:** *Engellaria obtusa* (Engelm.) iamónico from Western Cascades mountains Oregon, United States of America: A. habit (scale bar=1 cm); B. details of leaves (scale bar=5 mm); C. flower (scale bar=5 mm); D. fruit (scale bar=2.5 mm). Photos by T. Harvey.

Vernacular names: blunt-sepaed starwort (E-Flora BC, 2020), Engelmann's starwort (here proposed), Rocky Mountain starwort (Morton, 2005; Hartman and Rabeler, 2012), Rocky Mountain chickweed (Hassler, 2020).

Habitat: moist areas in woods, shaded edges of creeks, slopes; altitude: 300-3400 m a.s.l.

Chorology (Fig. 2): endemic to western North America in Canada (British Columbia, Alberta), and USA (California, Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming).

Chromosome number:  $2n=26, 52, c. 65, c. 78$  (Hartman, 1971; Morton and Rabeler, 1989).

Conservation status: I prefer not carrying out the IUCN assessment of *Engellaria obtusa*, since I think that further distribution data are needed. As a consequence, this species is to be considered as DD (Data Deficient) according to the IUCN criteria (IUCN, 2016).

Typification of *Stellaria obtusa*: Engelmann (1882: 5) validly published the name *Stellaria obtusa* with a diagnosis (in English), the provenance ("Western Colorado on the tributaries of Gunnison River, alt. 9000 to 10,000 feet"), the habitat ("in damp grounds") and the collector ("T. S. Brandegee").

I found pertinent specimens at GH (barcodes 00037990, and 00037991), NY (barcode 00353081), UC (barcode 120055), and YU (barcode 001076), but no sheets



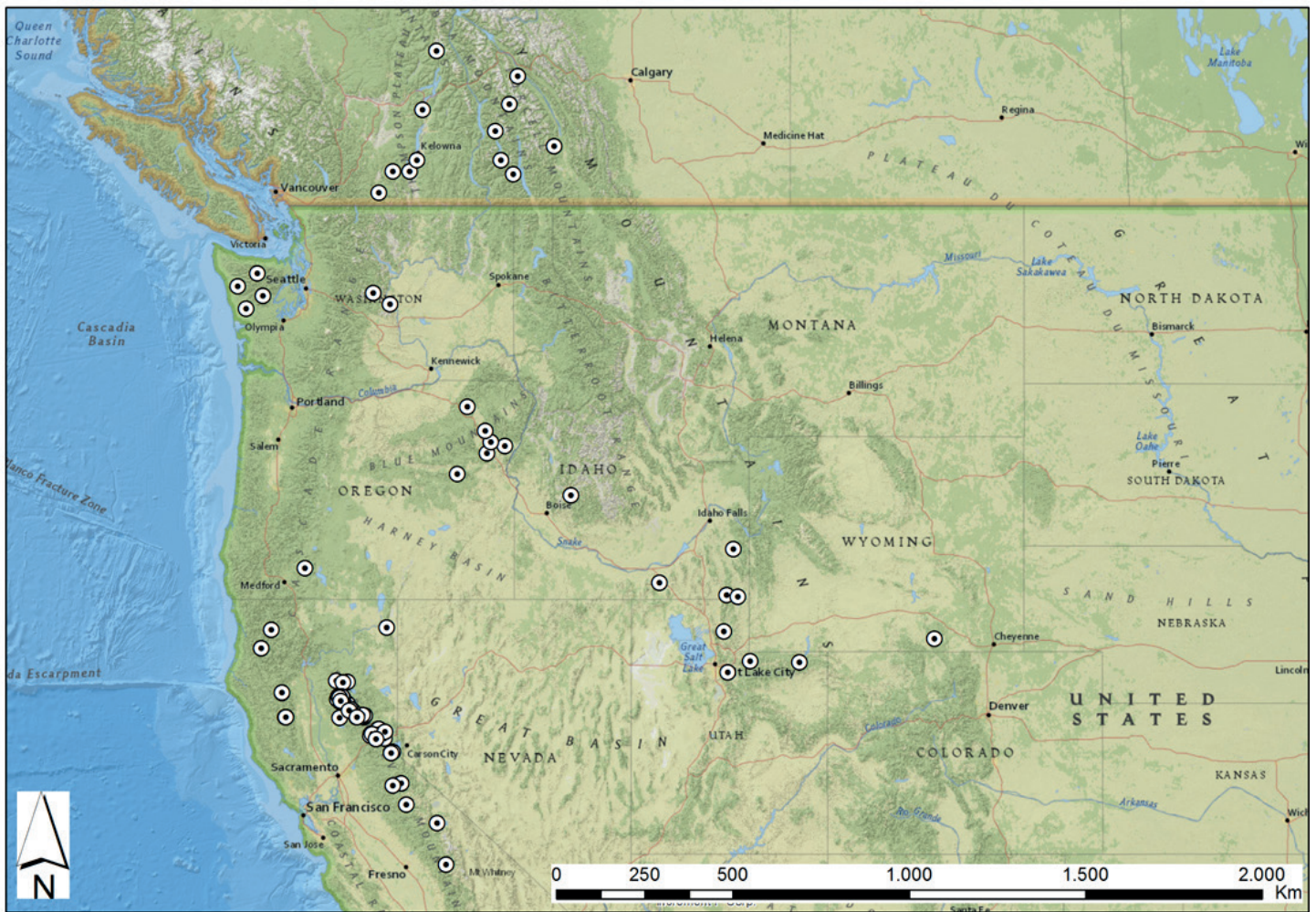


Figure 2: Distribution map of *Engellaria obtusa* (Engelm.) Iamónico.

at MO (where Engelmann would have written the description of *S. obtusa*) were traced. Therefore, this strengthens the case for selecting a lectotype from material at another herbarium. All five specimens are part of T. S. Brandegees collection and were collected by him in 1881 in “Anthracite Ck, Colorado” (as reported on the original labels). Anthracite Creek (= Ck) is a river in Gunnison County. The data on the labels match Engelmann’s protologue of *Stellaria obtusa*, the plants were collected before 1882 (year of collection 1881) and the morphology matches Engelmann’s diagnosis. The GH, NY, UC, and YU specimens are part of the original material used by Engelmann (1882: 5) to propose the new species. Since the UC specimen appears to be the best preserved, I here designated it as the lectotype of the name *Stellaria obtusa*, whereas the GH, NY, and YU

specimens are isoelectotypes (Arts. 9.3 and 9.4 of the ICN, Turland et al., 2018). The abovementioned specimens bear recently printed labels. The UC specimen mentions “NEOTYPE of: *Stellaria obtusa* Engelm. Bot. Gaz. (Crawfordsville) 7: 5. 1882. = *Stellaria obtusa* Engelm. Det.: Richard K. Rabeler 1986 Michigan State University Herbarium (MSC)”. The GH and NY ones bear “ISONEOTYPE of: *Stellaria obtusa* Engelm. Bot. Gaz. (Crawfordsville) 7: 5. 1882. = *Stellaria obtusa* Engelm. Det.: Richard K. Rabeler 1986 Michigan State University Herbarium (MSC)”, and the YU bears “ISOTYPE A DUPLICATE OF THE HOLOTYPE *Stellaria obtusa* Engelm. Bot. Gaz. 7: 5. 1882”. No published paper, in which a neotypification by R. K. Rabeler was proposed, was traced and, as a consequence, the statements occurring on the printed labels of GH, NY, and UC specimens cannot be considered



as an effective typification. Moreover, since original material exists, a lectotypification is required (Arts. 9.3 and 9.4 of the ICN, see [Turland et al., 2018](#)), whereas a neotypification is appropriate “if no original material exists” (see Art. 9.8 of the ICN). The “isotype” indication on the YU specimens cannot be retained neither, since the holotype was not cited by [Engelmann \(1882: 5\)](#) (see Art. 9.1 of the ICN, [Turland et al., 2018](#), and the considerations given by [McNeill, 2014](#)).

Note on the type of *Alsine viridula*: *Alsine viridula* was validly published by [Piper \(1913: 207\)](#) through a detailed diagnosis followed by data regarding the provenance, habitat, collector, date of collection, and herbarium (“Type in the U.S. National Herbarium, no. 249940, collected on ridges south from Wiessner Peak, Idaho, July 28, 1895, by J. B. Leiberger (no. 1396). Growing in springy places in canyons, altitude 1700 meters. Also collected along rivulets in woods, altitude 1400 meters, in the Blue Mountains, Columbia County, Washington, July 1896, C. V. Piper, no. 2328”).

I located eight relevant specimens at CAS (barcode 0000308), F (barcode 281494), GH (barcode 00037575), NY (barcode 342333), OSC (barcode 04665), RM (barcode 0002118), UC (barcode 154382), and US (barcode 00103237). All these specimens bear the following original label: “PLANTS OF NORTHERN IDAHO. REGION OF THE COEUR D’ALENE MOUNTAINS. Spring places in canyons Ridges south from Wiessner’s Peak alt. 1700 m No. 1396 John B. Leiberger collector, July 28, 1895”. The information on this label matches information reported by [Piper \(1913: 207\)](#) in the protologue. Moreover, the morphology of the exsiccata also matches Piper’s diagnosis. According to the considerations by [McNeill \(2014\)](#); [Piper’s \(1913\)](#) statement “Type in the U.S. National Herbarium, no. 249940” clearly indicates the author had the intention to identify the US specimen as the holotype. As a consequence, all other seven specimens found are isotypes (Arts. 9.1 and 9.5 of the ICN, [Turland et al., 2018](#)).

According to the current concept of *Stellaria* ([Morton, 2005](#); [Sharples and Tripp, 2019](#)), all the specimens of original material found are identifiable as *Engellaria obtusa* and, as a consequence, *Alsine viridula* can be synonymized with it.

Additional examined material: names of plants are given in alphabetical order. Specimens, under each species, are given in alphabetical order of the names of the countries and chronological order of the dates of collection.

*Engellaria obtusa*: UNITED STATES OF AMERICA. Colorado, Rio Blanco Co., Flat-Tops Wilderness, Marvine Creek, trail between trailhead and Slide Lake, locally abundant along the edge of trails, in aspen forest with abundant tall herbs, 11.VI.1988, *W. A. Webere 17890* (NY03328683). Idaho, Caribou Co., Grays Range, Gravel Creek Campground, 22 airline miles, north-northeast of Soda Springs, 6700 ft, 19.VII.1971, *N. H. Holmgren 5518* (NY00482982). Cassia Co., Mt. Independence, vicinity of Independence Lake, *Picea engelmannii*, *Abies lasiocarpa*, *Pinus flexilis* forest, 09.VIII.2008, *J. F. Smith 7732* (NY01264791). Franklin Co., moist soil under willows in headwaters of Logan River, 2 miles north of Utah state line, 8000 feet, 15.VII.1958, *L. C. Anderson 1348* (NY00482990); Franklin Co., Wasatch Range, Bear River Range, along Beaver Creek on the south side of the Egan Basin Road, 11.7 km (7.3 miles) north of U.S. Highway 89, among willows in moist ground, 8100 ft, 21.VII.2010, *N. H. Holmgren 16267* (NY01207811). Washington, Lake Cushman, deep woods, in clayey ground, VIII.1895, *C. V. Piper 2238* (GH00283957, syntype of the name *Stellaria washingtoniana*).

*Honckenya peploides*: CANADA. Baffin Island, 1978, *P. Wood s.n.* (BM001050332). UNITED KINGDOM. England, Mablethorpe, 12.VI.1893, *F. A. Lees s.n.* (BM013414807). Humberston, Marine sand, 02.VI.1905, *E. A. Woodruffe-Pea-cock s.n.* (BM013414808). UNITED STATES OF AMERICA. Massachusetts Plymouth, Plymouth, 24.VIII.1935, *C. Darling s.n.* (GH00698566). New Hampshire Rye, Rye, 10.III.1959, *S. K. Harris 21019* (NEBC00698555). New York, Suffolk Co., 28.VIII.1920, *W. C. Ferguson s.n.* (NY3266682).

*Stellaria crispa*: CANADA. British Columbia, Gordon Head, Victoria, woods, 6.VIII.1921, *F. W. Hunnewell 7705* (GH01755808). Hoheae Island Kyuquot, sea level, 29.VI.1958, *J. W. Eastham 129* (GH01755809). UNITED STATES OF AMERICA. Idaho, about Lake Waha, Nez Perces

Co., 2000-3500 feet, 25.VI.1896, A. A. and E. G. Heller 3367 (P05437041); 12 miles west of Salmon, under alders and birches along small creek entering on south side of Salmon River, 12.VII.1945, J. H. Christ and W. W. Ward 14685 (NY03317726); South Fork of the Boise River, road from Featherville, W of Mann Creek, seep, slope along road, 24.VI.2009, J. F. Smith 8131 (NY03317710). Washington, Mount Adams, 15.VIII.1882, T. Howell s.n. (P05437044).

*Stellaria dicranoides*: UNITED STATES OF AMERICA. Alaska, Cape Lisburne. W. Eskimoland, 1849, B. C. Seeman s.n. (K000723558); Healy, 1922, J. P. Anderson 1626 (NY03317779); Mt. Distin, 04.VII.1938, J. P. Anderson s.n. (GH01755881); Mt. Austin, 04.VII.1938, J. P. Anderson 3771 (NY03317778); vicinity of the Upper Kurupa River Valley, about 3000 ft, 02.VI.1952, A. R. Hodgdon 8106 (GH01755882); Mt. Copper, NW slope to summit of Mt. Eielson, 10.VII.1956, L. A. Viereck 1194 (GH00293224).

*Stellaria media*: CAMEROON. Northwest Region Bui Elak Summit of Mount Oku, 10.VI.1996, S. Cable 3083 (K000337575). FRANCE. 78 Yvelines, Poigny-la-Forêt, env. de Rambouillet, Poigny, 13.X.1055, P. Jovet s.n. (P02599326). GERMANY. Bayern, Lkr. Garmisch-Partenkirchen, S Bad Kohlgrub, TK 8332/3, Bergwiesen, Fichtenwaldrand, 1484 m, 31.VII.2001, R. Willing and E. Willing 14599D (B-10-0070647). ITALY. Lazio, Rome Province, Appia Antica Regional Park, "Acquedotti" Park, walkways, 03.V.2020, D. Iamonico s.n. (HFLA). UNITED KINGDOM. Kew Gardens, Birdcage Walk, Kew Green, in grass at the base of a lime tree (zone 118), 23.VI.2008, T. A. Cope RBG115 (K000914072). UNITED STATES OF AMERICA. Wisconsin, Grant Co., along railroad, at Walnut Street, 28.IV.2012, M. Nee 59060 (NY03328371).

*Stellaria pallida*: ITALY. Lazio, Rome Province, Appia Antica Regional Park, "Acquedotti" Park, walkways, 03.V.2020, D. Iamonico s.n. (HFLA). MALAWI. Southern Region, Zomba District, Zomba Plateau, near Ku Chave Inn, 1530 m, weed on Hotel rock garden, 14.III.1970, R. K. Brummit 9178 (P05138272). POLAND. Silesiaca, Breslau, an der Chaussee nach Hundsfeld, 14.VI.1993, C. G. Baenitz s.n. (US03610250). UNITED KINGDOM. Kew Gardens, Birdcage Walk, Kew Green, in grass at the base of a lime tree (zone

118), 10.IV.2013, T. A. Cope RBG564 (K000914610). UNITED STATES OF AMERICA. Florida, Nassau Co., along base of walls of Fort Clinch, Fort Clinch State Park, 29.III.1982, D. S. and H. B. Correll 53453 (NY03328715). Ohio, Wyandot Co., 4.5 km NE of Upper Sandusky, Indian Mill, small park opposite the Mill, flood plain of Sandusky River, 06.V.2012, M. Nee 59115 (NY03328714).

*Stellaria irrigua* (= *S. umbellata*): RUSSIA. Aksu et Sarchan, 1841, G. S. Karelin and I. P. Kirilov 1305 (K000723680); In muscosis rupium summarum alpium Alatau ad fontes fluviorum Aksu et Sarchan, 1842, G. S. Karelin and I. P. Kirilov 1305 (K001327006). UNITED STATES OF AMERICA. California, 7 miles north of ft Bidwell, Warner mts., 8.VII.1955, R. J. Wetherby 1618 (NY00453086). Montana, Glacier National Park, open rocky slope, along the trail from Many Glacier Hotel to Piegan Pass, 11.VIII.1919, P. C. Standley 17485 (US03607539). Utah, Wasatch Co. Uinta Mountains, 18.VIII.1998, N. H. Holmgren 13411 (NY01192094). Wyoming, Gunnison Co., Northern Gunnison Basin, West Elk Wilderness, along North Smith Fork Creek, ca 12 air mi ENE of Crawford, 28.V.1998, K. J. Taylor 7464 (GH01845069).

*Wilhelmsiaphysodes*: NORTHAMERICA. 1849 (HOOKE-RIANUM HERBARIUM 1867), s. coll. s.n. (K000742026). CANADA. Edmund's Island at Rampant House on the Yukon - Alaska border, scattered in Aspen woods, 06.VII.1951, C. C. Loan 551 (GH01624268); Yukon, Ogilvie Mts., river flats along Dempster Rd. Mile 57, 2500-4200 ft, 09.VII.1966, R.T. Polsid 162 (GH01624269); Nisling River Valley, 2700 ft, sand and gravel river bar, 23.VII.1980, W. J. Cody and J. H. Ginns 28277 (NY03329338). RUSSIA. Magadan, regio Tschukotschi, alluvium, 05.VIII.1966, V. Petrovsky 5625 (P06673352). UNITED STATES OF AMERICA. Alaska, railroad embankment, Cantwell, 18.VIII.1939, A. Nelson and R. A. Nelson 4207 (NY03329354).

## Author contributions

DI conceived and designed the study, reviewed the collections, wrote the manuscript, edited the revised version and approved the final manuscript.

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## Literature cited

- CAS. 2021a. Botany Collection Database, California Academy of Sciences. [https://researcharchive.calacademy.org/research/botany/coll\\_db/index.asp?xAction=getrec&close=true&CollectionObjectID=94338](https://researcharchive.calacademy.org/research/botany/coll_db/index.asp?xAction=getrec&close=true&CollectionObjectID=94338) (consulted January, 2021).
- CAS. 2021b. Botany Collection Database, California Academy of Sciences. [https://researcharchive.calacademy.org/research/botany/coll\\_db/index.asp?xAction=getrec&close=true&CollectionObjectID=254304](https://researcharchive.calacademy.org/research/botany/coll_db/index.asp?xAction=getrec&close=true&CollectionObjectID=254304) (consulted January, 2021).
- Chater, A. O. and V. H. Heywood. 1993. *Stellaria* L. In: Tutin, T. G., N. A. Burges, A. O. Chater, J. R. Edmondson, D. M. Moore, D. H. Valentine, S. M. Walters and D. A. Webb (eds.). *Flora Europaea*. Ed. 2. Vol. 1. Cambridge University Press. Cambridge, UK. Pp. 161-164.
- Clapham, A. R., T. G. Tutin and E. F. Warburg. 1952. *Flora of the British Isles*. Cambridge University Press. Cambridge, UK. 1264 pp.
- CS. 2021. Rocky Mountain Herbarium, University of Wyoming. <http://rmh.uwyo.edu/gmapviewer.php?Image=CS106217> (consulted January, 2021).
- Dillenberger, M. S. and J. W. Kadereit. 2014. Maximum polyphyly: Multiple origins and delimitation with plesiomorphic characters require a new circumscription of *Minuartia* (Caryophyllaceae). *Taxon* 63(1): 64-88. DOI: <https://doi.org/10.12705/631.5>
- DOV. 2021. Claude E. Phillips Herbarium. Delaware State University. <http://mam.ansp.org/image/DOV/Fullsize/0008/DOV0008406.jpg> (consulted January, 2021).
- E-Flora BC. 2020. *Stellaria obtusa* Engelm. Electronic Atlas of the Flora of British Columbia. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia. Vancouver, Canada. <http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Stellaria+obtusa> (consulted January, 2021).
- Engelmann, G. 1882. Some additions to the North American Flora. *Botanical Gazette* 7(1): 5-6.
- EOL. 2020 (continuously updated). Rocky Mountain chickweed, *Stellaria obtusa* Engelm. - Encyclopedia of Life. Smithsonian National Museum of Natural History. Washington, D.C. USA. <https://eol.org/pages/587675/maps> (consulted January, 2021).
- F. 2021a. Botanical Collections, The Field Museum. <https://fm-digital-assets.fieldmuseum.org/53/893/V0053353F.jpg> (consulted January, 2021).
- F. 2021b. Botanical Collections, The Field Museum. <https://fm-digital-assets.fieldmuseum.org/53/894/V0053354F.jpg> (consulted January, 2021).
- F. 2021c. Botanical Collections, The Field Museum. <https://fm-digital-assets.fieldmuseum.org/41/789/V0044059F.jpg> (consulted January, 2021).
- Greenberg, A. K. and M. J. Donoghue. 2011. Molecular systematics and character evolution in Caryophyllaceae. *Taxon* 60(6): 1637-1652. DOI: <https://doi.org/10.1002/tax.606009>
- Halliday, G. 1993. *Honckenya* Ehrh. In: Tutin, T. G., N. A. Burges, A. O. Charter, J. R. Edmondson, V. H. Heywood, D. M. Moore, D. H. Valentine, S. M. Walters and D. A. Webb (eds.). *Flora Europaea* (Psilotaceae to Platanaceae) Ed. 2, Vol. 1. Cambridge University Press. Cambridge, UK. p. 160.
- Harbaugh, D. T., M. Nepokroeff, R. K. Rabeler, J. McNeill, E. A. Zimmer and W. L. Wagner. 2010. A new lineage-based tribal classification of the family Caryophyllaceae. *International Journal of Plant Sciences* 171(2): 185-198. DOI: <https://doi.org/10.1086/648993>
- Hartman, R. L. 1971. Chromosome numbers in Caryophyllaceae from Wyoming and adjacent states. *Bulletin of the Torrey Botanical Club* 98(5): 276-280. DOI: <https://doi.org/10.2307/2483628>
- Hartman, R. L. and R. K. Rabeler. 2012. *Stellaria obtusa* Engelm. In: Jepson Flora Project (eds.). Jepson eFlora. [http://ucjeps.berkeley.edu/eflora/eflora\\_display.php?tid=45504](http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=45504) (consulted November, 2020).
- Hassler, M. 2020. *Stellaria obtusa* Engelm. - World Plants: Synonymic Checklists of the Vascular Plants of the World (version Nov 2018). In: Roskov, Y., G. Ower, T. Orrell, D. Nicolson, N. Bailly, P. M. Kirk, T. Bourgoin, R. E. DeWalt, W. Decock, E. Nieukerken van, J. Zarucchi and L. Penev (eds.). *Species 2000 & ITIS Catalogue of Life, 2019 Annual Checklist*. Leiden, The Netherlands. <http://www.catalogueoflife.org/col/details/species/id/10527d86159dc8c39e6683458d299d5e> (consulted November, 2020).
- Hernández-Ledesma, P., G. Walter, W. G. Berendsohn, T. Borsch, S. von Mering, H. Akhiani, S. Arias, I. Castañeda-Noa, U. Egli, R. Eriksson, H. Flores-Olvera, S. Fuentes-Bazán, G. Kadereit, C.



- Klak, N. Korotkova, R. Nyffeler, G. Ocampo, H. Ochoterena, B. Oxelman, R. K. Rabaler, A. Sanchez, B. O. Schlumpberger and P. Uotila. 2015. A taxonomic backbone for the global synthesis of species diversity in the angiosperm order Caryophyllales. *Willdenowia* 45(3): 281-383. DOI: <https://doi.org/10.3372/wi.45.45301>
- Holmgren, N. H. and P. K. Holmgren. 2012. Caryophyllaceae. In: Holmgren, N. H., P. K. Holmgren and A. Cronquist (eds.). *Intermountain Flora 2, part A*. New York Botanical Garden Press. New York, USA. Pp. 387-470.
- HUH. 2021a. Harvard University Herbaria and Libraries. <https://s3.amazonaws.com/huhwebimages/EF1C995087294CA/type/full/37990.jpg> (consulted January, 2021).
- HUH. 2021b. Harvard University Herbaria and Libraries. <https://s3.amazonaws.com/huhwebimages/DF3EB5E3BBD145D/type/full/37993.jpg> (consulted January, 2021).
- HUH. 2021c. Harvard University Herbaria & Libraries. <https://s3.amazonaws.com/huhwebimages/8B991A386CDC4FD/type/full/37994.jpg> (consulted January, 2021).
- HUH. 2021d. Harvard University Herbaria and Libraries. <https://s3.amazonaws.com/huhwebimages/60E70669D03A47A/type/full/37575.jpg> (consulted January, 2021).
- Iamónico, D. 2013. Taxonomical and chorological study on the Central Mediterranean Basin endemic *Arenaria bertolonii* Fiori & Paol. (Caryophyllaceae). *Plant Biosystems* 147(4): 923-930. DOI: <https://doi.org/10.1080/11263504.2012.753956>
- Iamónico, 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>
- Iamónico, D. 2015. *Augustea* (Polycarpaeae, Caryophyllaceae), a new genus from South America. *Phytotaxa* 236(1): 71-78. DOI: <https://doi.org/10.11646/phytotaxa.236.1.6>
- Iamónico, D. 2018. A conspectus of *Silene* sect. *Lasiocalycinae* (Caryophyllaceae). *Phyton* 57(1-2): 113-127. DOI: <https://doi.org/10.12905/0380.phyton57-2018-0113>
- Iamónico, D. and G. Domina. 2015. Nomenclatural notes on the *Polycarpon tetraphyllum* aggregate (Caryophyllaceae). *Plant Biosystems* 149(4): 720-727. DOI: <https://doi.org/10.1080/11263504.2015.1057260>
- IUCN. 2016. The International Union for Conservation of Nature Red List of threatened species. <http://www.iucnredlist.org> (consulted January, 2021).
- JSTOR. 2021a. JSTOR Global Plants. [https://plants.jstor.org/stable/10.5555/al.ap.specimen.min1002528?searchUri=filter%3Dname%26so%3Dps\\_group\\_by\\_genus\\_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529](https://plants.jstor.org/stable/10.5555/al.ap.specimen.min1002528?searchUri=filter%3Dname%26so%3Dps_group_by_genus_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529) (consulted January, 2021).
- JSTOR. 2021b. JSTOR Global Plants. [https://plants.jstor.org/stable/10.5555/al.ap.specimen.msc0092930?searchUri=filter%3Dname%26so%3Dps\\_group\\_by\\_genus\\_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529](https://plants.jstor.org/stable/10.5555/al.ap.specimen.msc0092930?searchUri=filter%3Dname%26so%3Dps_group_by_genus_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529) (consulted January, 2021).
- JSTOR. 2021c. JSTOR Global Plants. [https://plants.jstor.org/stable/10.5555/al.ap.specimen.uvmvt053289?searchUri=filter%3Dname%26so%3Dps\\_group\\_by\\_genus\\_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529](https://plants.jstor.org/stable/10.5555/al.ap.specimen.uvmvt053289?searchUri=filter%3Dname%26so%3Dps_group_by_genus_species%2Basic%26Query%3D%2528Stellaria%2Bwashingtoniana%2529) (consulted January, 2021).
- K. 2021. Royal Botanic Gardens, Kew. <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000723568> (consulted January, 2021).
- Kurtto, A. 2001. *Honckenya* Ehrh. In: Jonsell, B. (ed.). *Flora nordica 2, Chenopodiaceae to Fumariaceae*. Bergius Foundation, Royal Academy of Sciences. Stockholm, Sweden. Pp. 106-109.
- McNeill, J. 2014. Holotype specimens and type citations: General issues. *Taxon* 63(5): 1112-1113. DOI: <https://doi.org/10.12705/635.7>
- Morton, J. K. 2005. *Stellaria* L. *Flora of North America North of Mexico* 5: 96-114.
- Morton, J. K. and R. K. Rabaler. 1989. Biosystematic studies on the *Stellaria calycantha* (Caryophyllaceae). I. Cytology and cytogeography. *Canadian Journal of Botany* 67(1): 121-127. DOI: <https://doi.org/10.1139/b89-018>
- NMH. 2021. Natural History Museum, Data Portal. <https://data.nhm.ac.uk/dataset/collection-specimens/resource/05ff2255-c38a-40c9-b657-4ccb55ab2feb/record/4994306> (consulted January, 2021).
- NYBG. 2021a. New York Botanical Garden. C. V. Starr Virtual Herbarium. <http://sweetgum.nybg.org/science/vh/specimen-details/?irn=65872> (consulted January, 2021).
- NYBG. 2021b. New York Botanical Garden. C. V. Starr Virtual Herbarium. <http://sweetgum.nybg.org/science/vh/specimen-details/?irn=509194> (consulted January, 2021).
- NYBG. 2021c. New York Botanical Garden. C. V. Starr Virtual Herbarium. <http://sweetgum.nybg.org/science/vh/specimen-details/?irn=381453> (consulted January, 2021).

- OSC. 2021. The Oregon State University Herbarium, Type Specimens Collection. <https://oregondigital.org/sets/herbarium/oregondigital:df65w4504> (consulted January, 2021).
- Piper, C. V. 1913. New or noteworthy species of Pacific coast plants. Contribution from the United States National Herbarium 16(5): 207-210.
- Rabeler, R. K. and R. L. Hartman. 2005. Caryophyllaceae (family description and key to genera). Flora of North America North of Mexico 5: 3-8.
- Reveal, J. L. 2011. New ordinal names established by changes to the botanical code. Phytotaxa 30(1): 42-44. DOI: <https://doi.org/10.11646/phytotaxa.30.1.2>
- RM. 2021a. Rocky Mountain Herbarium - University of Wyoming. <http://rmh.uwyo.edu/gmapviewer.php?Image=RM0002200> (consulted January, 2021).
- RM. 2021b. Rocky Mountain Herbarium - University of Wyoming. [http://rmh.uwyo.edu/gmapviewer.php?Count=2&Image1=RM0002118&Image2=RM0002118\\_a&Show=1](http://rmh.uwyo.edu/gmapviewer.php?Count=2&Image1=RM0002118&Image2=RM0002118_a&Show=1) (consulted January, 2021).
- Sánchez Vilas, J. 2007. Sexual dimorphism in ecological and physiological traits in the subdioecious dune plant *Honckenya peploides* (L.) Ehrh. Ph.D. thesis. Universidad de Santiago de Compostela. Santiago de Compostela, Spain. 234 pp.
- Sharples, M. T. 2019. Taxonomic observations within *Stellaria* (Caryophyllaceae): Insights from Ecology, Geography, Morphology, and Phylogeny Suggest Widespread Parallelism in Starworts and Erode Previous Infrageneric Classifications. Systematic Botany 44(4): 877-886. DOI: <https://doi.org/10.1600/036364419X15710776741459>
- Sharples, M. T. and E. A. Tripp. 2019. RAD sequencing rejects a long-distance disjunction in *Stellaria* (Caryophyllaceae) and yields support for a new southern Rocky Mountains endemic. Taxon 68(2): 280-296. DOI: <https://doi.org/10.1002/tax.12059>
- Shilong, C. and R. K. Rabeler. 2001. *Stellaria*. Flora of China 6: 11-29.
- Thiers, B. 2021 (continuously updated). Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> (consulted January, 2021).
- Tikhomirov, V. N. 2016. (2427) Proposal to conserve the name *Stellaria* (Caryophyllaceae) with a conserved type. Taxon 65(2): 389-390. DOI: <https://doi.org/10.12705/652.21>
- TROPICOS. 2021. Tropicos.org, Missouri Botanical Garden. <http://www.tropicos.org/Image/100130277> (consulted January, 2021).
- 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 and 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. Koeltz Botanical Books. Glashütten, Germany. DOI: <https://doi.org/10.12705/Code.2018>
- UC. 2021a. The University and Jepson Herbaria, University of California, Berkeley. <https://webapps.cspace.berkeley.edu/ucjeps/imageserver/blobs/79f9235a-df5d-4df3-a6fd/derivatives/OriginalJpeg/content> (consulted January, 2021).
- UC. 2021b. The University and Jepson Herbaria, University of California, University Herbarium, Berkeley. <https://webapps.cspace.berkeley.edu/ucjeps/publicsearch/publicsearch/> (consulted January, 2021).
- US. 2021a. Smithsonian National Museum of Natural History. <https://collections.nmnh.si.edu/search/botany/> (consulted January, 2021).
- US. 2021b. Smithsonian National Museum of Natural History. <http://n2t.net/ark:/65665/m3754b9ab9-ea51-4dd7-a2be-7c15f4a83f84> (consulted January, 2021).
- YU. 2021. Yale Peabody Museum of Natural History. <https://collections.peabody.yale.edu/search/Record/YU.001076> (consulted January, 2021).
- Wagner, W. L. 2005a. *Wilhelmsia* Rchb. Flora of North America North of Mexico 5: 136-137.
- Wagner, W. L. 2005b. *Honckenya* Ehrh. Flora of North America North of Mexico 5: 137-140.
- Wagner, W. L., S. G. Weller and A. K. Sakai. 2005. Monograph of *Schiedea* (Caryophyllaceae-Alsinoideae). Systematic Botany Monographs 72: 1-169.
- Wu, C. Y. and P. Ke. 1996. *Stellaria* L. In: Tang, C. L., P. Ke, D. Q. Lu, C. L. H. Zhou and Y. Wu (eds.). Flora Reipublicae Popularis Sinicae 26. Science Press. Beijing, China. Pp. 93-158.