

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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I. THE UNITY OF THE GENUS ARENARIA.

It seems wisest to maintain the genus *Arenaria* in its broad sense, although the great majority of European authors and some in America distinguish from *Arenaria* proper (with the valves of the capsule notched or cleft at apex, and seeds numerous and reniform) the following genera which occur in boreal America: *Alsine* Wahlenb. or *Minuartia* L. similar to *Arenaria* but with uncleft valves; *Ammodenia* Gmel. or *Honkenya* Ehrh., with unusually developed disk, globose capsule, and few obovoid seeds; *Moehringia* L., with well developed disk and with the seeds strophiolate; and *Merckia* Fisch., with 3-5 celled ovary and inflated capsule.

Although in a limited area, like Europe or like northeastern America, the lines usually indicated for the separation of these genera are fairly definite, an examination of species from a broad range of territory at once shows that no two of the traditional characters are concomitant throughout a long series of species.

In order to test the value of these genera it is well to tabulate the characters depended upon by those who maintain the segregated genera as distinct from *Arenaria*; and even in this it is difficult to find authors in entire agreement. Thus, some authors state that the seeds of the monotypic *Ammodenia* or *Honkenya* are "numerous," others "few," while Pax, in Engler's *Naturlichen Pflanzenfamilien*, retains under *Alsine* with "Discusschuppen meist kurz" *Ammodenia*

	Habit and foliage	Inflorescence	Disk	Ovary and capsule	Seeds
ARENARIA L.	Annual or perennial: mainly tufted: leaves not fleshy	Terminal, rarely axillary.	Perigynous or subhypogynous.	Ovary 1-celled, many-ovuled; capsule dehiscent at tip into 3 cleft or notched valves.	Numerous, reniform or compressed, with the hilum marginal, estrophiolate.
MINUARTIA L. = ALSINE Wahlenb., not L	As above.	As above.	Obscurely perigynous, more or less glandular-lobed.	As above, but valves of capsule entire.	As above.
AMMODENIA Gmel. = HONKENYA Ehrh.	Succulent perennial with fleshy leaves.	Flowers axillary or in leafy cymes.	Well developed, with 10 glandular lobes.	Ovary more or less completely 3- or 5-celled (1-celled according to Pax); capsule fleshy or bladdery, with 3 or 5 entire valves.	Few, pyriform or obovoid, with the hilum obliquely basal, estrophiolate.
MOEHRINGIA L.	Flaccid herbs with spreading usually flat leaves.	Terminal, often becoming lateral by prolongation of axillary branches, or axillary.	Well developed, nearly hypogynous.	Ovary 1-celled (but in <i>M. lateriflora</i> distinctly 2, 3, or 4-celled); valves of capsule twice as many as the style.	Seeds reniform, lustrous, estrophiolate.
MERCKIA Fischer	Similar to <i>Ammodenia</i> but less fleshy.	As <i>Ammodenia</i> .	Obscure or very narrow.	Ovary 3-5-celled; capsule bladdery, membranaceous.	Seeds lustrous, estrophiolate.

which is separated by others because it has "a conspicuous 10-lobed and glandular slightly perigynous disk." Again Pax defines *Alsine* (including *Ammodenia*) as having a 1-celled ovary, while *Merckia* is distinguished by its 3-5-celled ovary; yet Gray, in his *Genera*, described (correctly) the ovary of *Ammodenia* as 3-5-celled. The tabulation on the opposite page, however, presents the significant characters most relied upon in the separation of these five genera.

When these so-called differential characters are checked by examining species from remote areas of the world we get the following results.

Most species of *Arenaria* (in the strict sense) and of *Minuartia* have a tufted habit, with terminal inflorescences and numerous reniform seeds. But the common *A. lanuginosa* (Michx.) Rohrb. of South America, Mexico and the southern United States has elongated stems with broad leaves and axillary pedicels, thus in habit strongly simulating the European *Moehringia trinervia* (L.) Clairv. The latter plant, on account of its habit and its lustrous strophiolate seeds, is unquestionably a species of *Moehringia*. Yet the seeds of *Arenaria lanuginosa*, a plant which in habit belongs to *Moehringia*, are quite like those of *M. trinervia* in form and lustre, but they lack the strophiole; i. e. only by its lack of a strophiole does *Arenaria lanuginosa* find a place in *Arenaria*, not in the habitally similar *Moehringia*.

Between *Arenaria* proper and *Minuartia* the only distinction is in the valves of the capsule, cleft in *Arenaria*, entire in *Minuartia*, the species of these so-called genera otherwise so closely simulating one another as to be often nearly inseparable. Thus, *Arenaria paludicola* Robinson, which has the entire valves of *Minuartia*, is habitally close to *A. lanuginosa*, a true *Arenaria*, and to species of *Moehringia*. Furthermore, it is by no means easy to determine whether some of our American species belong with *Arenaria* or with *Minuartia*, some species having the valves so slightly cleft that in their capsules they lie between the most characteristic species of the two groups. Thus *A. sajanensis* and the species related to it (and discussed below, pp. 12-17) have emarginate valves as does *A. laricifolia* of Europe, beautifully illustrated by Reichenbach (Ic. Fl. Germ. v. t. 292, fig. 4933) with notched valves, although these plants are universally placed in the so-called genus which is distinguished by having entire valves!

From all the segregate-genera *Ammodenia* is supposed to be separated by the highly developed glandular-lobed disk, by its bladdery capsule and by the few pyriform seeds with nearly basal hilum, and, of course, by its succulent stems. Yet Pax correctly states that *Merckia* has the habit of this plant, Pax separating *Merckia* because it has the ovary and fruit "mehr oder weniger vollkommen 3-5 fächerig" and because of its obsolete disk. *Ammodenia* is left by Pax in *Alsine* or *Minuartia*, a genus distinguished by 1-celled ovary and the entire valves of the capsule, and he states under *Merckia* that that monotypic genus perhaps belongs also with *Alsine*. Nevertheless, *Ammodenia*, as already pointed out by Asa Gray, has the ovary "more or less completely three-five-celled, the dissepiments soon breaking away from the walls and adhering to the more persistent columella;"¹ i. e., the supposed ovary-difference between *Ammodenia* and *Merckia* is not constant. Furthermore, the seed of *Merckia* is exactly intermediate in outline between the seed of *Ammodenia* and the most typical seeds of *Arenaria* and *Minuartia*, i. e., it is suborbicular to obovate-orbicular, with the hilum nearly basal. The development or obsolescence of the stamineal disk is certainly not constant in the group, for, although *Merckia physodes* as a species is readily distinguished from *Ammodenia peploides* by its obscure disk, it should be noted that some species referred to true *Arenaria* and to *Minuartia* (*Alsine*) have highly developed disks, while the disk of *Moehringia* is well developed. The American *Arenaria macradenia* Wats., for example, is the best kind of *Arenaria* in its cespitose habit, acicular leaves, terminal inflorescence, capsule and seeds, but its stamineal disk and glands are quite as conspicuous as in *Ammodenia*. *Ammodenia* is supposed to be distinguished from *Arenaria*, furthermore, by its few obovoid seeds in contrast with the many reniform seeds of the latter genus; yet *Arenaria Hookeri* Nutt., a characteristic cespitose species with acicular leaves and terminal cymes, has but 3 seeds to a capsule, these obovoid and with a basal hilum as in *Ammodenia*.

Moehringia is distinguished by its habit, well-developed disk, 1-celled ovary, capsule-valves as in *Arenaria*, and reniform, lustrous, strophiolate seeds. But as already pointed out *Moehringia* is exactly simulated by species of *Arenaria* which differ merely in having the

¹ Gray, Gen. ii. 31 (1849).

seeds estrophiolate, and it does not require great experience with the seeds of *Moehringia* to assure any investigator that the strophiole is readily deciduous and therefore likely not to be found at all on the ripe seeds. The American *Moehringia lateriflora* (L.) Fenzl is a member of this genus in habit, disk, and seeds, but unfortunately for the constancy of the genus, as long ago pointed out by Asa Gray, the ovary is "plainly divided in *M. lateriflora* into as many cells as there are styles by manifest dissepiments: STYLES 3....sometimes 2 or 4."¹ In other words, although a *Moehringia* in everything else, *M. lateriflora* is a *Merckia* in its 3-celled ovary!

It would be easy to point out in our North American flora many other species which in one character or another break down the differences which have been relied upon to separate as genera *Arenaria*, *Minuartia*, *Ammodenia*, *Moehringia* and *Merckia*, but the above notes should suffice to demonstrate that these are not true genera but are, rather, freely confluent subgenera of the single genus *Arenaria*.

In organizing the material of *Arenaria* in the Gray Herbarium it has been found necessary to make the following nomenclatorial changes.

ARENARIA arenarioides (Crantz), n. comb. *Stellaria Arenaria* L. Sp. Pl. 1196 (1753). *Cerastium arenarioides* Crantz, Inst. ii. 402 (1766). *Ar. cerastioides* Poir. Voy. Barb. ii. 166 (1789). *Ar. spathulata* Desf. Fl. Atlant. i. 358 (1798).

ARENARIA bryophylla, n. nom. *Ar. musciformis* Edgew. & Hook. f. in Hook. f. Fl. Brit. Ind. i. 237 (1872), not Triana & Planch. Ann. Sci. Nat. ser. 4, xvii. 150 (1862).

Edgeworth & Hooker ascribe their *A. musciformis* to Wallich, Cat. no. 6401 as does also *Index Kewensis*; but Wallich's no. 6401 is a *Buddleia* and at best the names in Wallich's Catalogue are *nomina nuda*.

ARENARIA Funkii (Jord.), n. comb. *Alsine Funkii* Jord. Pugill. 36 (1852).

ARENARIA cymifera (Rouy & Fouc.), n. comb. *Alsine cymifera* Rouy & Fouc. Fl. Fr. iii. 275 (1896).

ARENARIA iberica, n. nom. *Minuartia dichotoma* L. Sp. Pl. 89 (1753), not *Ar. dichotoma* Krock, Fl. Sil. ii. pt. 1, 55 (1793).

ARENARIA caucasica (Boiss.), n. comb. *Alsine caucasica* Boiss. Diagn. ser. 2, fasc. 1, 87 (1853), not *Ar. caucasica* Adams ex Ledeb.

¹ Gray, Gen. ii. 35 (1849).

Fl. Ross. i. 354 (1842), the latter merely a name published in synonymy. *Minuartia montana* L. Sp. Pl. 90 (1753), not *Ar. montana* L. Amoen. Acad. iv. 272 (1759). *M. campestris* DC. Prodr. iii. 380 (1828), not L. Sp. Pl. 89 (1753) nor *Ar. campestris* All. Fl. Ped. ii. 114 (1785).

ARENARIA anatolica (Boiss), n. comb. *Alsine anatolica* Boiss. Diagn. ser. 1, fasc. 8, 97 (1849).

ARENARIA Thevenaei (Reut.), n. comb. *Alsine Thevenaei* Reut. Exs. 1855 (name only); Loret, Bull. Soc. Bot. Fr. x. 381 (1863). *Al. verna*, var. *Thevenaei* Loret, l. c. (1863).

ARENARIA attica (Boiss. & Sprun.), n. comb. *Alsine attica* Boiss. & Sprun. Diagn. ser. 1, fasc. 5, 84 (1844).

ARENARIA sphagnoides (Froel.), n. comb. *Sabulina sphagnoides* Froel. in Reichenb. Fl. Germ. Exc. 790 (1832).

ARENARIA aizoides (Boiss.), n. comb. *Alsine aizoides* Boiss. Diagn. ser. 1, fasc. 1, 47 (1842).

ARENARIA decipiens (Fenzl), n. comb. *Alsine decipiens* Fenzl, Pugill. Pl. Nov. Syr. 12 (1842).

ARENARIA dianthifolia (Boiss.), n. comb. *Alsine dianthifolia* Boiss. Diagn. ser. 1, fasc. 8, 99 (1849).

ARENARIA intermedia (Boiss.), n. comb. *Alsine intermedia* Boiss. Fl. Orient. i. 685 (1867).

ARENARIA leucocephala (Boiss.), n. comb. *Alsine leucocephala* Boiss. Diagn. ser. 1, fasc. 1, 45 (1842).

ARENARIA pulvinaris (Boiss.), n. comb. *Alsine pulvinaris* Boiss. Diagn. ser. 1, fasc. 1, 46 (1842), fasc. 5, 84 (1844).

ARENARIA makmelensis, n. nom. *Alsine libanotica* Boiss. Diagn. ser. 1, fasc. 8, 98 (1849), not *Ar. libanotica* Kotschy in Boiss. Fl. Orient. i. 699 (1867). Known only from the alpine region of Makmel, Lebanon, at 2590 m.

ARENARIA rimarum (Boiss. & Balansa), n. comb. *Alsine rimarum* Boiss. & Balansa in Boiss. Fl. Orient. i. 678 (1867).

ARENARIA Schimperii (Hochst.), n. comb. *Alsine Schimperii* Hochst. in A. Rich. Tent. Fl. Abyss. i. 47 (1847).

ARENARIA stellata (Clarke), n. comb. *Cherleria stellata* Clarke, Trav. iv. 211 (1816). *Alsine parnassica* Boiss. & Sprun. Diagn. ser. 1, fasc. 1, 46 (1842).

ARENARIA diversifolia (Dolliner), n. comb. *Moehringia diversifolia* Dolliner ex Koch, Flora, xxii. 2 (1839).

ARENARIA Grisebachii (Janka), n. comb. *Moehringia Grisebachii* Janka, Oesterr. Bot. Zeitschr. xxiii. 194 (1873).

ARENARIA Jankae (Griseb.), n. comb. *Moehringia Jankae* Griseb. ex Janka, Oesterr. Bot. Zeitschr. xxiii. 195 (1873).

ARENARIA dasyphylla (Bruno), n. comb. *Moehringia dasyphylla* Bruno in Balbis, Misc. Bot. in Mém. Acad. Turin Sc. Phys. i. 391 (1804).

ARENARIA DASYPHYLLA, var. *sedoides* (Cumino), n. comb. *Moeh-*

ringia muscosa β . *sedoides* Cumino in Balb. Mém. Acad. Turin Sc. Phys. i. 391 (1804).

ARENARIA **Tommasinii** (Marches.), n. comb. *Moehringia Tommasinii* Marches. Bull. Adr. Soc. Sc. Nat. Trieste, v. 327 (1880).

ARENARIA **glaucovirens** (Bertol.), n. comb. *Moehringia glaucovirens* Bertol. Fl. Ital. vi. 626 (1844).

ARENARIA POLYGONOIDES Wulf., var. **obtusa** (All.), n. comb. *A. obtusa* All. Fl. Pedem. ii. 114, t. 64, fig. 4 (1785). *Moehringia ciliata* (Scop.) Dalla Torre, var. *obtusa* (All.) Gürke, Pl. Eur. ii. 280 (1899).

ARENARIA **papulosa** (Bertol.), n. comb. *Moehringia papulosa* Bertol. Fl. Ital. iv. 363 (1839).

ARENARIA **platysperma** (Maxim.), n. comb. *Moehringia platysperma* Maxim. Bull. Acad. Petrop. xviii. 373 (1873).

ARENARIA **Cossoniana**, n. nom. *Moehringia stellarioides* Coss. Bull. Soc. Bot. Fr. ix. 170 (1862), not *Ar. stellarioides* Willd. in Schlecht. Ges. Naturf. Fr. Berl. Mag. vii. 209 (1813).

II. THE TYPE OF THE GENUS ALSINE.

As published by Linnaeus *Alsine* consisted of two species as follows:

ALSINE.

- media*. 1. ALSINE petalis bipartitis, foliis ovato-cordatis. *Fl. lapp.* 186. *Fl. succ.* 369. *Hort. cliff.* 173. *Gron. virg.* 161. *Roy. lugdb.* 449.
Alsine media. *Bauh. pin.* 250.
Alsine minor. *Dod. pempt.* 29.
Habitat in Europae cultis. ☉
- segetalis*. 2. ALSINE petalis integris, foliis subulatis.
Spergula foliis filiformibus unum latus spectantibus, stipulis membranaceis vaginantibus, pedunculis umbellatis. *Guett. stamp.* 299. *Dalib. paris.* 133.
Alsine segetalis, gramineis foliis unum latus spectantibus. *Vaill. paris.* 8. t. 3. f. 3.
Habitat Parisiis. ☉¹

By many scholarly European botanists, Hiern,² Britton & Rendle,³ Schinz & Thellung,⁴ Briquet,⁵ and others, *A. segetalis* is taken with-

¹ L. Sp. Pl. i. 272 (1753).

² Hiern, Journ. Bot. xxxvii. 317, 318 (1899).

³ Britton & Rendle, List Brit. Seed-Pl. 6 (1907).

⁴ Schinz & Thellung, Bull. Herb. Boiss. sér. 2, vii. 402, 404 (1907).

⁵ Briq. Fl. Corse, i. 529 (1910).



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