# Two new combinations in *Sabulina* (Caryophyllaceae)

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**Abstract:** Dillenberger, M. S. 2016: Two new combinations in *Sabulina* (Caryophyllaceae). Schlechtendalia **30**: 41–44.

*Sabulina* (Caryophyllaceae) is a northern hemisphere genus, comprising c. 65 species worldwide. The genus was recently re-established based on molecular results, after being included in the genus *Minuartia* for the past century. Two new combinations for the genus *Sabulina* are made. A key to the taxa of the German flora is provided.

**Zusammenfassung:** Dillenberger, M. S. 2016: Zwei neue Kombinationen in *Sabulina* (Caryophyllaceae). Schlechtendalia **30**: 41–44.

*Sabulina* (Caryophyllaceae) ist eine nord-hemisphärische Gattung, die weltweit ca. 65 Arten umfasst. Die Gattung wurde neuerdings aufgrund molekularer Ergebnisse wiedereingeführt, nachdem sie über ein Jahrhundert Teil von *Minuartia* war. Zwei neue Kombinationen für die Gattung *Sabulina* werden gemacht. Ein Schlüssel für die Taxa der deutschen Flora wird zur Verfügung gestellt.

**Key words:** *Minuartia*, *Sabulina tenuifolia*, *Sabulina verna*, taxonomy.

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## Introduction

*Sabulina* Rchb. is a northern temperate genus in the Caryophyllaceae. The genus was first described by Reichenbach (1832), but was later included in *Minuartia* L. as section *Sabulina* (Rchb.) Graebn. (Ascherson & Graebner 1918). Molecular studies of *Minuartia* s.l. showed that *Minuartia* is highly polyphyletic, and as one consequence *Sabulina* was re-established (Dillenberger & Kadereit 2014). Now, *Sabulina* contains c. 65 species worldwide and is mainly distributed in the Northern Hemisphere, with two species in South America. *Sabulina* is highly variable in chromosome number and is morphologically defined by a combination of various characters, including leaf shape, sepal shape, sepal vein number, petal colour and seed shape (see Dillenberger & Kadereit 2014; also Mattfeld 1922 and McNeill 1962). In Germany, *Sabulina* can be distinguished from other species of *Minuartia* s.l. by a combination of linear-subulate leaves (*Facchinia* Rchb. has lanceolate to ovate leaves), petals always present and flowers petiolate (*Cherleria sedoides* L. usually lacks petals and flowers are short petiolate or sessile), and sepals that are completely green or have a narrow scarious margin (*Minuartia* s.s. has white, scarious sepals with 1–2 green lines; Jäger 2011; Dillenberger & Kadereit 2014).

In Germany, five species of *Sabulina* are typically recognized (Jäger 2011; Parolly & Rohwer 2016): *Sabulina austriaca* (Jacq.) Rchb., *S. stricta* (Sw.) Rchb., *S. verna* (L.) Rchb., *S. viscosa* (Schreb.) Rchb. and the type species *S. tenuifolia* (L.) Rchb. (= *S. hybrida* (Vill.) Fourr.). In two of these species, infraspecific taxa are often accepted. Jäger (2011) and Parolly & Rohwer (2016) recognize subspecific taxa in *S. tenuifolia* and *S. verna*. Both species have additional infraspecific taxa in other regions of their distribution range (see Dillenberger & Kadereit 2014). Dillenberger & Kadereit (2014) made most of the necessary combinations for the German flora. But, as they based their work for the central European species on Flora Europaea (Halliday 1993), they did not make new combinations for two taxa that are recognized in the German flora. Here, I provide a list of the German species of *Sabulina* including their subspecific taxa, and introduce the two new combinations that are necessary. Information about important synonyms, types or protologues and a key to the taxa is given.

## Key to the species of *Sabulina* in the German flora

(Based in part on the key to the species of *Minuartia* in Jäger, 2011.)

**1** Sepals longer than petals ..... **2**
**–** Sepals equalling or shorter than petals ..... **4**

**2** Sepals narrowly lanceolate, 2–2.5 mm long, equalling the capsule or longer ..... ***S. viscosa***
**–** Sepals usually ovate-lanceolate, 3–4 mm long, slightly shorter than the capsule (***S. tenuifolia***)

..... **3**

**3** Plant glabrous; sepals ovate-lanceolate with lateral veins curved; capsule ovate-cylindrical ..... ***S. tenuifolia*** subsp. ***tenuifolia***
– Plant glandular pubescent especially in the inflorescence; sepals linear-lanceolate with lateral veins parallel; capsule narrowly cylindrical ..... ***S. tenuifolia*** subsp. ***hybrida***

**4** Leaves veinless or with 1 vein..... ***S***. ***stricta***
– Leaves at least at the base on the abaxial surface with 3 veins ..... **5**

**5** Petals and capsule almost twice as long as the sepals; stems usually with 2 flowers ..... ***S***. ***austriaca***
– Petals and capsule equalling the sepals or slightly longer; stems often with more than 3 flowers (***S. verna***) ..... **6**

**6** Inflorescence axis and pedicels glabrous; petals usually longer than the sepals ..... ***S. verna*** subsp. ***gerardii***
– Inflorescence axis and pedicels glandular pubescent; petals equalling, rarely longer than, the sepals ..... **7**

**7** Plant caespitose; up to 15 cm tall; not woody at the base ..... ***S. verna*** subsp. ***verna***
– Plant pulvinate; 5–10 cm tall; woody at the base; on heavy metal-influenced gravelled areas ..... ***S. verna*** subsp. ***hercynica***

## Taxonomic treatment

***Sabulina austriaca*** (Jacq.) Rchb., Fl. Germ. Excurs. **2**: 787. 1832
≡ *Arenaria austriaca* Jacq., Fl. Austriac. **3**: 39. 1775.
≡ *Alsine austriaca* (Jacq.) Wahlenb., Fl. Lapp. (Wahlenberg): 129. 1812.
≡ *Minuartia austriaca* (Jacq.) Hayek, Fl. Steiermark **1**: 274. 1908.
Protologue: "Crescit in alpibus frequens"

***Sabulina stricta*** (Sw.) Rchb., Fl. Germ. Excurs. **2**: 789. 1832
≡ *Spergula stricta* Sw., Kongl. Vetensk. Acad. Nya Handl., ser. 2, **20**: 235. 1799.
≡ *Alsine stricta* (Sw.) Wahlenb., Fl. Lapp. (Wahlenberg): 127. 1812.
≡ *Minuartia stricta* (Sw.) Hiern, J. Bot. **37**: 320. 1899.
Non *Arenaria stricta* Michx. 1932, non *Sabulina stricta* (Michx.) Small ex Rydb. 1932.
Holotype: *Swartz s.n.* (S no. S10-26111).

***Sabulina tenuifolia*** (L.) Rchb., Fl. Germ. Excurs. **2**: 785. 1832
≡ *Arenaria tenuifolia* L., Sp. Pl. **1**(1): 424. 1753.
≡ *Alsine tenuifolia* (L.) Crantz, Inst. Rei Herb. **2**: 407. 1766.
≡ *Minuartia tenuifolia* (L.) Hiern, J. Bot. **37**: 321. 1899, nom. illeg., non Nees ex Mart. 1814.
≡ *Minuartia hybrida* subsp. *tenuifolia* (L.) Kerguélen, Index Synonym. Fl. France (Coll. Patrim. Nat., 8): XIV. 1993.
Lectotype (designated by Iamonico 2014: 238): EUROPE, Habitat in Helvetia, Gallia, Anglia, Italia (LINN 585.36, see http://linnean-online.org/6136/).

***Sabulina tenuifolia*** (L.) Rchb. subsp. ***tenuifolia***

***Sabulina tenuifolia*** subsp. ***hybrida*** (Vill.) Dillenb., **comb. nov.**
Basionym: *Arenaria hybrida* Vill., Prosp. Hist. Pl. Dauphiné: 48. 1779.
≡ *Alsine hybrida* (Vill.) Jord., Mém. Acad. Natl. Sci. Lyon, Cl. Sci. **1**: 33. 1852.
≡ *Sabulina hybrida* (Vill.) Fourr., Ann. Soc. Linn. Lyon, sér. 2, **16**: 347. 1868.
≡ *Minuartia hybrida* (Vill.) Schischk., Fl. URSS **6**: 488. 1936.
≡ *Minuartia hybrida* (Vill.) Schischk. subsp. *hybrida*.
≡ *Minuartia tenuifolia* subsp. *hybrida* (Vill.) Mattf., Repert. Spec. Nov. Regni Veg. Beih. **15**: 40. 1922.
Lectotype (designated by Iamonico 2014: 238): [Icon] Pl XLVII, *Arenaria hybrida* (Villars, 1789: plant on the top right, see http://bibdigital.rjb.csic.es/ing/Libro.php?Libro=1542&Hojas=)

***Sabulina verna*** (L.) Rchb., Fl. Germ. Excurs. **2**: 788. 1832
≡ *Arenaria verna* L., Mant. Pl.: 72. 1767.
≡ *Alsine verna* (L.) Wahlenb., Fl. Lapp. (Wahlenberg): 129. 1812.
≡ *Minuartia verna* (L.) Hiern, J. Bot. **37**: 320. 1899.
Lectotype (designated by Halliday 1964: 12): Herb. Linn. No. 585.30 (LINN).

> ***Sabulina verna*** (L.) Rchb. subsp. ***verna***
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> ***Sabulina verna*** subsp. ***gerardii*** (Willd.) Dillenb., **comb. nov.**
> Basionym: *Arenaria gerardii* Willd., Sp. Pl. **2**(1): 729. 1799.
> ≡ *Alsine gerardii* (Willd.) Wahlenb., Fl. Carpat. Princ.: 132. 1814.
> ≡ *Sabulina gerardii* (Willd.) Rchb., Fl. Germ. Excurs. **2**: 788. 1832.
> ≡ *Minuartia gerardii* (Willd.) Hayek, Fl. Steiermark **1**: 272. 1908.
> ≡ *Minuartia verna* subsp. *gerardii* (Willd.) Graebn. in Ascherson & Graebner, Syn. Mitteleur. Fl. **5**(1): 747. 1918.
> Protologue: "Habitat in Austriae et Galliae alpibus."
>
> ***Sabulina verna*** subsp. ***hercynica*** (Willk.) Dillenb. & Kadereit, Taxon **63**(1): 88. 2014
> ≡ *Alsine verna* var. *hercynica* Willk., Führer Deut. Pfl. **1**(2): 590. 1863.
> ≡ *Minuartia verna* subsp. *hercynica* (Willk.) O.Schwarz, Mitt. Thüring. Bot. Ges. **1**(1): 98. 1949.
> Protologue: "Auf Sand- u. Kies im Bett der vom Harz herabkommenden Bäche u. Flüsse, auf Schlackenhaufen u. Halden der Harz-Bergwerke."

***Sabulina viscosa*** (Schreb.) Rchb., Fl. Germ. Excurs. **2**: 786. 1832
≡ *Alsine viscosa* Schreb., Spic. Fl. Lips.: 30. 1771.
≡ *Arenaria viscosa* (Schreb.) Fr., Novit. Fl. Suec. Alt.: 120. 1828.
≡ *Minuartia viscosa* (Schreb.) Schinz & Thell., Bull. Herb. Boissier, ser. 2, **7**: 404. 1907.
Protologue: "In colle ad templum S. Theclae"

## Discussion

The recognition of infraspecific taxa in *S. tenuifolia* and *S. verna* has a long tradition (Mattfeld 1922; McNeill 1967; Halliday 1993). These taxa have repeatedly changed their status, ranging from varieties to independent species in different treatments.

There is not much doubt about the distinctiveness of *S. verna* subsp. *gerardii*. It is accepted as subspecies or species by a variety of recent treatments (e.g., Hejný & Slavík 1990; Buttler & Hand 2008; Fischer et al. 2008; Jäger 2011; Parolly & Rohwer 2016; Ewald et al. 2016). In the morphologically difficult *S. verna* group, the correct rank is uncertain for many different taxa (e.g., *S. attica* (Boiss. & Sprun.) Dillenb. & Kadereit, *S. glaucina* (Dvořáková) Dillenb. & Kadereit). In accordance with recent floras of Germany (Jäger 2011; Parolly & Rohwer 2016), *Sabulina verna* subsp. *gerardii* is here recognized as subspecies.

In the case of *S. tenuifolia*, the two subspecies *tenuifolia* and *hybrida* were often treated as synonyms (e.g., Iamonico 2014). But they are distinguishable morphologically and are recognized as independent taxa in several resent treatments (e.g., Buttler & Hand 2008; Jäger 2011; Tison & de Foucault 2014; Parolly & Rohwer 2016; Ewald et al, 2016). Molecular phylogenetic information is not available at this point, so it seems reasonable to follow the treatments of Jäger (2011) and Parolly & Rohwer (2016) and keep these two taxa as subspecies of *S. tenuifolia*.

## Literature

Ascherson, P. & Graebner, P. 1918: Synopsis der Mitteleuropäischen Flora. Vol. 5(1). Leipzig.

Buttler, K. P. & Hand, R. 2008: Liste der Gefäßpflanzen Deutschlands. Kochia, Beiheft **1**: 1–107.

Dillenberger, M. S. & Kadereit, J. W. 2014: Maximum polyphyly: Multiple origins and delimitation with plesiomorphic characters require a new circumscription of *Minuartia* (Caryophyllaceae). Taxon **63**: 64–88. https://doi.org/10.12705/631.5

Ewald, J., Meierott, L., Poschlod, P., Zahlheimer, W., Langensiepen, I. & Raab B. 2016: Checkliste der Gefäßpflanzen Bayerns. http://daten.bayernflora.de/de/checklist_pflanzen.php, accessed 01 Nov 2016.

Fischer, M. A., Oswald, K. & Adler, W. 2008: Exkursionsflora für Österreich, Liechtenstein und Südtirol, ed. 3. Linz.
Halliday, G. 1964: Studies in the *Minuartia verna* complex, I. Feddes Repertorium **69**: 8–14.
Halliday, G. 1993: *Minuartia*. Pp. 152–160 in: Tutin, T. G., Burges, N. A., Chater, A. O., Edmondson, J. R., Heywood, V. H., Moore, D. M., Valentine, D. H., Walters, S. M. & Webb, D. A. (eds.), Flora Europaea, 2nd ed. Vol. 1. Cambridge.
Hejný, S. & Slavík, B. 1990: Květena České republiky (Flora of the Czech Republic). Vol. 2. Praha.
Iamonico, D. 2014: *Arenaria tenuifolia* versus *Arenaria hybrida* (Caryophyllaceae): Nomenclatural study and taxonomic implications. Phytotaxa **173**: 235–240. http://dx.doi.org/10.11646/phytotaxa.173.3.6
Jäger, E. J. 2011: Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband, ed. 20. Heidelberg.
Mattfeld, M. 1922: Geographisch-genetische Untersuchungen über die Gattung *Minuartia* (L.) Hiern. Repertorium specierum novarum regni vegetabilis. Beiheft **15**.
McNeill, J. 1962: Taxonomic studies in the *Alsinoideae*: I. Generic and infra-generic groups. Notes of the Royal Botanic Garden Edinburgh **24**: 79–155.
McNeill, J. 1967: *Minuartia*. Pp. 38–67 in: Davis, P. H., Mill, R. R. & Kit Tan (eds.), Flora of Turkey and the East Aegean Islands. Vol. 2. Edinburgh.
Parolly, G. & Rohwer, J. G. 2016: Schmeil-Fitschen: Die Flora Deutschlands und angrenzender Länder, ed. 96. Wiebelsheim.
Reichenbach, H. G. L. 1832: Flora Germanica Excursoria. Vol. 1(1). Leipzig.
Tison, J.-M. & de Foucault, B. 2014: Flora Gallica: Flore de France. Mèze.

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