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A plant that Linnaeus forgot: taxonomic revision of *Rhodalsine* (Caryophyllaceae)

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Abstract: The mainly Mediterranean genus *Rhodalsine* (Caryophyllaceae) is revised and a single species, *R. geniculata*, is recognized, distributed from the Canary Islands in the west to Somalia in the east. The history of the taxon, which was known already during the 17th century but entirely overlooked by Linnaeus, is outlined. Variation and taxonomy are discussed and illustrations and a distribution map are provided. Many names are placed in synonymy and most of the names are typified, including six lectotypes designated here.

Key words: Caryophyllaceae, Mediterranean region, *Minuartia*, nomenclature, *Rhodalsine*, *Sperguleae*, taxonomy, typification

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Introduction

According to the results presented in several recent phylogenetic studies (for a summary, see Kool & Thulin 2017), there is good evidence for the view that *Minuartia* subg. *Rhodalsine* (J. Gay) Graebn. is a member of the tribe *Sperguleae* and sister to *Spergula* L. and *Spergularia* (Pers.) J. Presl & C. Presl together. This mainly Mediterranean subgenus therefore needs to be removed from the polyphyletic *Minuartia* L. (Dillenberger & Kadereit 2014) and treated as a genus of its own. No comprehensive overview of the group has been presented since Williams (1898), who treated it as the genus *Rhodalsine* J. Gay with two species and several varieties. Since then many other names have been associated with the group and its now fairly complex taxonomy and nomenclature is the subject of the present paper.

The first illustrations of members of *Rhodalsine* were published by Boccone (1674), as “*Alsine maritima longius radicata*, *Herniariae foliis*”, from Sicily. Two forms were described and illustrated, one main form with leaves of the same shape and size as *Herniaria* L., and one more narrow-leaved form called “*Alsine maritima altera angustis foliis*”. Material from Sicily is preserved in the Boccone herbarium in P (Bonnet 1883).

Despite Boccone’s illustrations and the mention of the plant many times in the pre-Linnaean literature (e.g. Morison 1680: 552), it was completely overlooked by Linnaeus, presumably as he did not have access to any herbarium material and therefore could not study it properly. Forsskål collected a member of *Rhodalsine* in Egypt 1761–1762, but misidentified it as *Cherleria sedoides* L. (Forsskål 1775) and his material is now lost (Christensen 1922; Hepper & Friis 1994). Not until Poiret (1789) de-

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scribed *Arenaria geniculata* Poir. from Algeria did a member of the group first get a valid binomial.

Gay (1845) coined the name *Rhodalsine* and made the combination *R. procumbens* (Vahl) J. Gay, based on *Arenaria procumbens* Vahl (Vahl 1791). However, *R. procumbens*, the type of *Rhodalsine*, was nomenclaturally superfluous when published, and is therefore illegitimate, as *Arenaria geniculata*, the name with priority, was cited in synonymy.

Graebner (in Ascherson & Graebner 1918) treated the group as *Minuartia* subg. *Rhodalsine*, and since then it has mostly been seen as part of *Minuartia*. According to McNeill & Bassett (1974), the number of species in the subgenus is four or five. However, during the last decades *Rhodalsine* has, to some extent, come back into use again at the generic level (for details, see Kool & Thulin 2013).

In the analysis presented by Kool & Thulin (2017), three samples of *Minuartia* subg. *Rhodalsine* were included, representing *M. geniculata* (Poir.) Thell. from the Mediterranean region (Spain), *M. platyphylla* (J. Gay ex Christ) McNeill from the Canary Islands (Lanzarote) and *M. vestita* (Baker) McNeill from Somalia. In the resulting phylogeny, the three samples formed a strongly supported clade and within this clade the samples of *M. platyphylla* and *M. vestita* were weakly supported as sisters. When here revising the group, as *Rhodalsine*, we argue for the recognition of a single variable species in this genus.

Material and methods

Herbarium material and/or images from the following herbaria have been studied: BM, BORD, C, FI, H, K, MA, MPU, O, P, P-Desf, P-LA, PRC, S, TO and UPS. The material studied comprises a representative sample from all parts of the area of distribution, roughly 300 collections in total. As far as possible, the names have been typified, and all type material cited has been seen, either during personal visits to herbaria or as digital images. The distribution map is based almost entirely on information from herbarium labels, but in a few cases also on reliable literature sources, such as Fiori (1923) and Phitos (1997).

Taxonomy

Rhodalsine J. Gay in Ann. Sci. Nat., Bot., sér. 3, 4: 25. 1845 \equiv *Alsine* sect. *Rhodalsine* (J. Gay) Boiss., Fl. Orient. 1: 671. 1867 \equiv *Minuartia* subg. *Rhodalsine* (J. Gay) Graebn. in Ascherson & Graebner, Syn. Mitteleur. Fl.



Fig. 1. Flowers of *Rhodalsine geniculata* from Spain, Lagunas de La Mata, Torrevieja, April 2012, photograph by Marta Rubio-Teixeira.

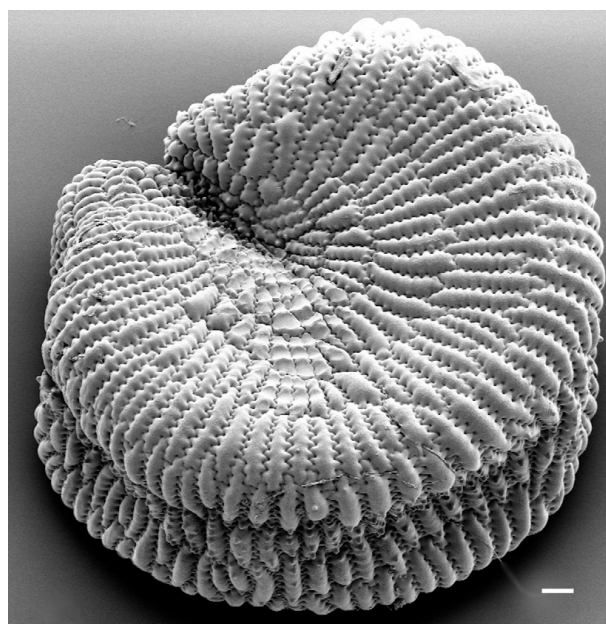


Fig. 2. Scanning electron micrograph (SEM) of seed of *Rhodalsine geniculata* (Rainha 984). – Scale bar = 30 μ m.

5(1): 774. 1918. – Type: *Rhodalsine procumbens* (Vahl) J. Gay, nom. illeg. superfl. (\equiv *Arenaria procumbens* Vahl).

Note — *Psammanthe* Rchb. (Reichenbach 1841) was published as a replacement name at generic level for the validly published generic subdivision *Alsine* [unranked] *Psammophilae* Fenzl (Fenzl in Endlicher 1840). Two species names, *Arenaria thymifolia* Sm. and *A. procumbens* Vahl were cited by Fenzl. Mattfeld (1921) assigned sectional rank to *Psammophilae* under *Minuartia* and placed *M. procumbens* (Vahl) Graebn. (*Arenaria procumbens*) in this section, whereas *M. thymifolia* (Sm.) Bornm. was placed in *M. sect. Sabulina* (Rchb.) Graebn. *Psammanthe*

Rchb., a name not used since its publication, would have had priority over *Rhodalsine*, but is now, following a proposal by Kool & Thulin (2013), a rejected name (Appelquist 2014; Wilson 2016; Turland & al. 2017).

Description — Herbs perennial or sometimes annual, with indumentum of glandular hairs. *Leaves* opposite, without stipules, but leaves of each pair with shortly connate bases. *Flowers* in lax cymes. *Sepals* 5, connate at base into a short hypanthium. *Petals* 5, pink or white, inserted at apex of hypanthium, shortly clawed at base. *Stamens* 10, in 2 whorls, those of outer whorl inserted at base of petals, those of inner whorl antise-palous, inserted on a low, ring-shaped rim surrounding base of ovary; *pollen* trizonocolpate. *Ovary* shortly stipitate, subglobose, thin-walled; *styles* 3, filiform. *Capsule* opening by 3 valves. *Seeds* many, orbicular-reniform, wingless; *radicle* of embryo accumbent. *Chromosome* base number $x = 9$.

Distribution — A genus of a single variable species distributed in the Canary Islands, around the Mediterranean and in the Horn of Africa region.

Rhodalsine geniculata (Poir.) F. N. Williams in Bull. Herb. Boissier 6: 7. 1898 = *Arenaria geniculata* Poir., Voy. Barbarie 2: 166. 1789 = *Alsine geniculata* (Poir.) Strobl in Oesterr. Bot. Z. 35: 212. 1885 = *Minuartia geniculata* (Poir.) Thell. in Mém. Soc. Sci. Nat. Cherbourg 38: 232. 1912 = *Cherleria geniculata* (Poir.) Samp., Lista Herb. Portug.: 82. 1913. – Holotype: without locality, [Poiret] s.n. (P-LA! [P00287174]).

Note — According to Poiret (in Lamarck 1804), he collected *Arenaria geniculata* “dans les environs de la Calle”. “La Calle” is a former French name for Annaba in NE Algeria.

= *Arenaria procumbens* Vahl, Symb. Bot. 2: 50, tab. 33. 1791 = *Alsine procumbens* (Vahl) Fenzl, Vers. Darstell. Alsin.: 57. 1833, nom. illeg. [non *Alsine procumbens* Crantz, Inst. Rei Herb. 2: 404. 1766] = *Rhodalsine procumbens* (Vahl) J. Gay in Ann. Sci. Nat., Bot., sér. 3, 4: 25. 1845, nom. illeg. superfl. = *Minuartia procumbens* (Vahl) Graebn. in Ascherson & Graebner, Syn. Mitteleur. Fl. 5(1): 775. 1918 = *Alsine geniculata* var. *procumbens* (Vahl) Fiori, Nuov. Fl. Italia 1: 464. 1923 = *Rhodalsine geniculata* var. *procumbens* (Vahl) Dubuis in Bull. Soc. Échange Pl. Vasc. Eur. Occid. Bassin Médit. 22: 63. 1988. – **Lectotype (designated here)**: Tunisia, Tönder Lund s.n. (C [C10000450 digital image!]).

Note — Vahl (1791) stated concerning the provenance of *Arenaria procumbens*: “Legi in ruderatis Tuneti. Forsk. in Ægypto”. The reference to “Forsk.” is based on the report by Forsskål (1775) of “*Cherleria sedoides*” from Cairo, collected during his stay in Egypt 1761–1762. *Cherleria sedoides* was an obvious misidentification by Forsskål. There is no extant Forsskål material

of *C. sedoides* (Christensen 1922; Hepper & Friis 1994), but two sheets annotated by Vahl as *A. procumbens* are present in C: (1) a sheet from “Barbaria” without collector [C10000449] and (2) a sheet collected by “Tönder Lund” in “Tuneti” [C10000450]. The second sheet, which consists of a well-preserved flowering branch, is here designated as the lectotype. Vahl’s tab. 33 illustrates a richly branched specimen that does not match any of these two sheets. It was most probably based on the now lost Forsskål material from Egypt. This illustration would also be possible as a lectotype, but we prefer the specimen.

= *Arenaria herniariifolia* Desf., Fl. Atlant. 1: 358. 1798, as “*herniariaefolia*” = *Alsine procumbens* var. *herniariifolia* (Desf.) Strobl in Oesterr. Bot. Z. 31: 213. 1885 = *Rhodalsine geniculata* var. *communis* F. N. Williams in Bull. Herb. Boissier 6: 8. 1898, nom. illeg. superfl. = *Minuartia geniculata* var. *herniarii-folia* (Desf.) Graebn. in Ascherson & Graebner, Syn. Mitteleur. Fl. 5(1): 776. 1918 = *Alsine geniculata* var. *herniariifolia* (Desf.) Fiori, Nuov. Fl. Italia 1: 464. 1923. – Holotype: Algeria, “in arenis prope Mascar”, Desfontaines s.n. (P-Desf! [P00662857]).

= *Arenaria bartolottae* Tineo, Pl. Rar. Sicil.: 10. 1817, as “*bartolotti*” = *Rhodalsine geniculata* var. *glabrata* F. N. Williams in Bull. Herb. Boissier 6: 8. 1898 = *Alsine geniculata* var. *bartolottae* (Tineo) Fiori, Nuov. Fl. Italia 1: 464. 1923, as “*bartolotti*”, nom. illeg. superfl. – Holotype: Sicily, “in maritimis prope Gelam”, Tineo s.n. (PAL destroyed).

= *Arenaria extensa* Dufour in Ann. Gén. Sci. Phys. 7: 291. 1820 = *Alsine procumbens* var. *extensa* (Dufour) Gürke in Richter & Gürke, Pl. Eur. 2: 266. 1899 = *Alsine geniculata* var. *extensa* (Dufour) Fiori, Nuov. Fl. Italia 1: 464. 1923 = *Minuartia procumbens* var. *extensa* (Dufour) Graebn. in Ascherson & Graebner, Syn. Mitteleur. Fl. 5(1): 775. 1918. – Holotype: Spain, Valencia, “Bisquert près de St. Philippe”, Dufour s.n. (BORD digital image!).

= *Arenaria rosea* C. Presl, Fl. Sicul.: 165. 1826. – **Lectotype (designated here)**: Sicily, “in arenis maritimis ad Panormum”, 1817, Presl s.n. (PRC [PRC450927 digital image!]).

Note — Presl (1826) in the protologue of *Arenaria rosea* (as “*A. rosea* α. *lancifolia*”) cited “t.10, f.1A” in Boccone (1674), an illustration that is therefore available for typification. However, Presl’s collection in PRC is preferred as the lectotype.

= *Arenaria rosea* var. *spathulata* C. Presl, Fl. Sicul.: 165. 1826. – **Lectotype (designated here)**: Sicily, “in arenis maritimis ad Panormum”, Presl s.n. (PRC [PRC450926 digital image!]).

Note — Presl (1826) in the protologue of *Arenaria rosea* var. *spathulata* (as “*A. rosea* β. *spathulata*”) cited “t.10, f.1B” in Boccone (1674), an illustration that is therefore available for typification. However, Presl’s collection in PRC is preferred as the lectotype.

- = *Arenaria procumbens* var. *linearifolia* Moris, Fl. Sardoia 1: 276. 1837 ≡ *Rhodalsine procumbens* var. *linearifolia* (Moris) F. N. Williams in Bull. Herb. Boissier 6: 6. 1898. – **Lectotype (designated here):** Sardinia, “la Maddalena”, Apr 1826, *Moris s.n.* (TO digital image!).

Note — Moris (1837), in the protologue of *Arenaria procumbens* var. *linearifolia*, gave the following information: “In maritimis Cagliari alla Scaffa, alla Maddalena; Porto scuso. Fl. aprili, junio”. In the Moris Herbarium at TO, there are two extant specimens of “*Arenaria procumbens* var. *linearifolia*”, one with the annotation “littorea maritima majo” and the other with “la Maddalena aprili 1826”. The latter specimen agrees better with the protologue and is here designated as the lectotype.

- = *Alsine procumbens* f. *angustifolia* Strobl in Oesterr. Bot. Z. 35: 213. 1885. – Holotype: Spain, Malaga, *Fritze s.n.* (W destroyed).
- = *Alsine gayana* Webb ex Christ in Bot. Jahrb. Syst. 9: 102, 159. 1888 ≡ *Minuartia webbii* McNeill & Bramwell in Canad. J. Bot. 52: 1226. 1974 ≡ *Rhodalsine gayana* (Webb ex Christ) Holub in Folia Geobot. Phytotax. 19: 215. 1984. – Holotype: Canary Islands, Fuerteventura, “in arena marit. Gran Tarajal”, *Bolle s.n.* (B destroyed).
- = *Alsine platyphylla* J. Gay ex Christ in Bot. Jahrb. Syst. 9: 103, 159. 1888 ≡ *Rhodalsine geniculata* var. *gayana* F. N. Williams in Bull. Herb. Boissier 6: 10. 1898 ≡ *Minuartia gayana* (F. N. Williams) Maire in Bull. Soc. Hist. Nat. Afrique N. 27: 213. 1936 ≡ *Minuartia platyphylla* (J. Gay ex Christ) McNeill in Notes Roy. Bot. Gard. Edinburgh 24: 135. 1962. – **Lectotype (designated here):** Canary Islands, Fuerteventura, cliffs of Handia, 27 Feb 1846, *Bourgeau 717* (FI [FI000058 digital image!]; isoelectotype: BM!).

Note — In the protologue of *Alsine platyphylla*, Christ (1888) cited “Bourg. et Bolle”. *Bourgeau 717* [FI000058] and *Bolle s.n.* [FI000057], both from Handia, are present in FI, and the Bourgeau specimen is here designated as the lectotype.

- = *Arenaria vestita* Baker in Bull. Misc. Inform. Kew 1895: 212. 1895 ≡ *Minuartia vestita* (Baker) McNeill in Notes Roy. Bot. Gard. Edinburgh 24: 135. 1962. – Lectotype (designated by Gilbert in Thulin, Fl. Somalia 1: 103. 1993): Somalia, Golis range near Dara-as, *Lort Phillips s.n.* (K! [K000313490]).
- = *Moehringia alleizettei* Batt. in Bull. Soc. Hist. Nat. Afrique N. 8: 217. 1917. – Holotype: Algeria, Mostaganem, May 1909, *d’Alleizette s.n.* (MPU [MPU001639 digital image!]).
- = *Alsine maroccana* Batt. in Bull. Soc. Hist. Nat. Afrique N. 12: 187. 1921 ≡ *Minuartia geniculata* var. *maroccana* (Batt.) Maire in Bull. Soc. Hist. Nat. Afrique N. 19: 35. 1928 ≡ *Rhodalsine geniculata* var. *maroccana* (Batt.) Dobignard in Candollea 52: 127. 1997. – Holotype: Morocco, Ksabi, haute Moulouya, 27 May 1915, *Nain s.n.* (MPU [MPU008067 digital image!]).

- = *Minuartia maroccana* Pau & Font Quer in Font Quer, Iter Marocc. 1927, no. 160. 1928 [in sched.] ≡ *M. geniculata* var. *fontqueri* Maire in Cavanillesia 2: 48. 1929 ≡ *Rhodalsine geniculata* var. *fontqueri* (Maire) Dobignard in Candollea 52: 127. 1997. – **Lectotype (designated here):** Morocco, Punta de los Frailes, 19 May 1927, *Font Quer 160* (MA [MA35719 digital image!]; isoelectotypes: BC [BC10936 digital image!], BM! [BM000843946], MA [MA35718 digital image!], MPU [MPU006348 digital image!]).
- = *Minuartia procumbens* f. *glauco-virens* H. Lindb. in Acta Soc. Sci. Fenn., Ser. B, Opera Biol. 1(2): 46. 1932. – Lectotype (designated by Väre in Phytotaxa 47: 59. 2012): Tunisia, Sbeitla, 3 Apr 1924, *Lindberg s.n.* (H [H1335842 digital image!]; isoelectotype: H [H1335834 digital image!]).
- = *Minuartia procumbens* var. *obovata* H. Lindb. in Acta Soc. Sci. Fenn., Ser. B, Opera Biol. 1(2): 46. 1932. – Lectotype (designated by Väre in Phytotaxa 47: 59. 2012): Sicilia, Sferracavallo prope oppidum Palermo, 24 Apr 1924, *Lindberg s.n.* (H [H1335831 digital image!]).
- = *Minuartia geniculata* f. *filifolia* Caball., Discurso Apert. Madrid: 79. 1935. – Holotype: Morocco, Ifni, Tamarrut, 6 Jul 1934, *Caballero s.n.* (MA [MA35755 digital image!]).
- = *Minuartia procumbens* var. *glabrescens* Pamp. in Arch. Bot. (Forli) 12: 27. 1936. – Holotype: Libya, Cirenaica, Bengasi, Giocchi el Chebir (Lefe), 9 Mar 1933, *Pampanini 2459* (FI [FI003770 digital image!]).
- = *Minuartia senneniana* Maire & Mauricio in Bull. Soc. Hist. Nat. Afrique N. 27: 213. 1936 ≡ *Rhodalsine senneniana* (Maire & Mauricio) Greuter & Burdet in Willdenowia 12: 189. 1982. – Holotype: Morocco, Cabo de Tres Forcas, 15 Aug, *Mauricio s.n.* (MPU [MPU0003573 digital image!]).
- = *Minuartia geniculata* f. *villosissima* Faure & Maire in Bull. Soc. Hist. Nat. Afrique N. 29: 410. 1938. – Holotype: Algeria, Mostaganem, 2 May 1936, *Faure s.n.* (MPU [MPU003905 digital image!]).

Description — *Stems* from a usually ± woody taproot, prostrate to ascending or suberect, 10–70 cm long, often much branched, sparsely to densely pubescent with glandular hairs 0.2–1(–1.5) mm long, particularly in the upper part. *Leaves* sessile or almost sessile, linear to obovate or almost orbicular in outline, 4–35 × 0.5–9 mm, sparsely to densely pubescent with glandular hairs, with prominent midrib abaxially, apex acute to obtuse. *Flowers* in terminal and axillary lax cymes; *bracts* similar to leaves but smaller; *pedicel* 3–25 mm long, erect to spreading, slender, glandular pubescent. *Sepals* lanceolate to narrowly ovate, 2.5–5 mm long, obscurely 1–3-veined, particularly inner sepals with ± wide scarious margin, glandular pubescent abaxially, apex obtuse to subacute.

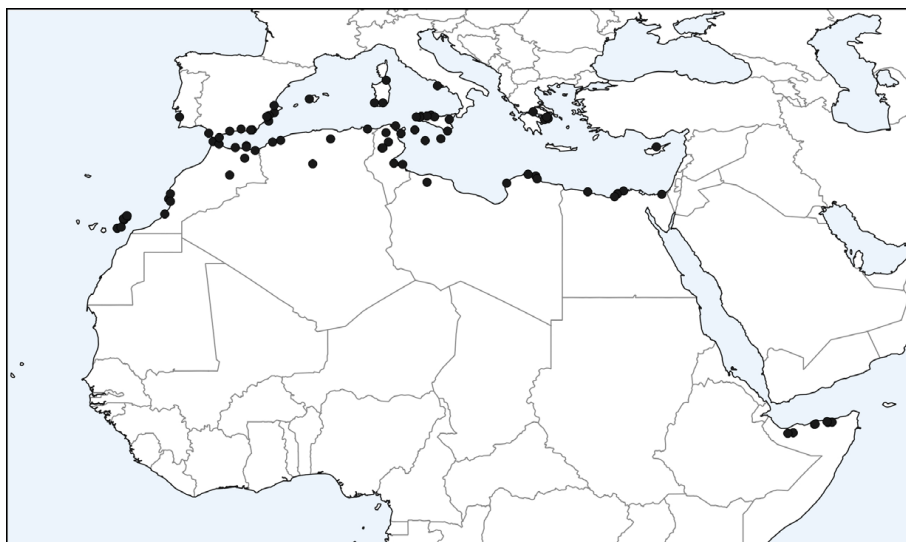


Fig. 3. Distribution of *Rhodalsine geniculata*.

Petals broadly elliptic to ovate, slightly shorter to slightly longer than sepals, apex obtuse to subacute. *Stamens* shorter than petals; *filaments* slender, glabrous; *anthers* yellow, oblong, 0.5–0.8 mm long. *Styles* 1–2 mm long. *Capsule* ovoid-oblong, about as long as sepals, thin-walled, splitting to base into 3 boat-shaped valves. *Seeds* dark brown, shiny, 0.5–0.8 mm in diam., shallowly channelled on back, faces narrowly reticulate with radiating, elongate cells with sinuate margins. – Fig. 1 & 2.

Distribution and ecology — *Rhodalsine geniculata* is known from Portugal, Spain (including the Canary Islands, Melilla and the Balearic Islands), Gibraltar, Italy (including Sardinia, Sicily, Pantellaria and Linosa), Malta, Greece, Cyprus, Morocco, Algeria, Tunisia, Libya, Egypt and Somalia (Fig. 3). It occurs in sandy, stony or rocky places from near sea level up to 2050 m. In most of its range it is found at elevations below 600–700 m and it is often confined to habitats on or close to sea shores. However, in Morocco the species is also found at elevations up to about 1500 m in the Atlas Mountains, whereas in Somalia the known altitudinal range is 1350–2050 m.

Taxonomic remarks — Already Boccone (1674) captured much of the variation within *Rhodalsine geniculata* in his illustrations of a broad-leaved and a narrow-leaved form of “*Alsine maritima* ...” in Sicily. Many of the names in the synonymy above have been coined for forms with different leaf shapes, but also density of the indumentum and length of the hairs, flower colour and seed characters have been used to differentiate taxa.

During the last decades there has been a general agreement in floristic treatments in Europe and most of North Africa that only a single variable species, *Rhodalsine geniculata* (or *Minuartia geniculata*), can be recognized (e.g. Meikle 1977; Ghafoor 1978; Jalas & Suominen 1983; Favarger & Montserrat 1990;

Halliday 1993; Phitos 1997; Boulos 1999).

However, McNeill (1962) stated that *Minuartia platyphylla* in the Canary Islands “certainly seems to merit specific recognition”, and McNeill & Bassett (1974) also considered *M. webbii* in the Canary Islands to be distinct, apparently mainly by being annual. Three species have since then generally been recognized in the Canary Islands: *M. geniculata*, *M. platyphylla* and *M. webbii* (e.g. Bramwell & Bramwell 2001; Schönfelder & Schönfelder 2012). Bramwell & Bramwell (2001) described

M. webbii as “annual to perennial” and *M. platyphylla* as having ovate to suborbicular leaves in contrast to the “narrower-leaved Mediterranean species *M. geniculata*”. In Morocco a distinction is currently made between a more broad-leaved *Rhodalsine* (*Minuartia*) *senneniana* with longer hairs and a narrow-leaved *R. geniculata* with shorter hairs (Ouyahya 1999; Fennane & Ibn Tattou 2005). However, the variation seen in the Canary Islands and Morocco is part of a continuous variation across the whole area of distribution.

Minuartia vestita in Somalia was first associated with *Rhodalsine* by McNeill (1962), who stated it to be a “distinct species”, but no particular characteristics were mentioned. Today a much richer material from Somalia is available and, according to our investigations, *M. vestita* falls entirely within the variation of *Rhodalsine geniculata*.

Representative collections examined — CANARY ISLANDS: Lanzarote, Monte Famara, 4 Feb 1961, Hummel s.n. (S). — PORTUGAL: Baixo Alentejo, 10 Apr 1946, Rainha 984 (UPS). — SPAIN: Andalusia, Almería, Aguadulce, 15 Apr 1957, Monasterio & Rivas Goday s.n. (UPS). — GIBRALTAR: 15 May 1887, Reverchon s.n. (K, UPS). — ITALY: Sicily, Ragusa, Pozzallo, 20 May 1960, Brummitt 60.E.379 (K). Pantellaria, Il Lago, 24 May 1960, Davies s.n. (K). — MALTA: Insula Gaulos [Gozo], 22 Apr 1874, Duthie s.n. (K). — GREECE: Attica, Phaleron, 26 Apr 1856, Heldreich 205 (UPS). — CYPRUS: Kyrenia, 27 Apr 1939, Syngressides 12 (K). — MOROCCO: 44 km NNW of Oujda, 35°00'N, 02°10'W, 21 Feb 1995, Jury & al. 15833 (K). — ALGERIA: Mostaganem, 15 Mar 1851, Balansa 189 (K). — TUNISIA: Djerbah, Feb 1924, Riley H135 (K). — LIBYA: Benghazi, 19 Mar 1959, Keith 406 (K). — EGYPT: Burg al Arab, 6 May 1956, Arvidson s.n. (UPS). — SOMALIA: Sanaag, Daalo, 10°46'N, 47°19'E, 17 May 2002, Thulin 10937 (K, UPS).

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References

- Appelquist W. L. 2014: Report of the Nomenclature Committee for Vascular Plants: 66. – *Taxon* **63**: 1358–1371.
- Ascherson P. F. A. & Graebner K. O. R. P. P. 1918: Synopsis der mitteleuropäischen Flora **5(1)**. – Leipzig: Gebr. Borntraeger.
- Boccone P. 1674: Icones et descriptiones rariorum plantarum Siciliae, Melitae, Galliae, et Italiae. – London: Robert Scott.
- Bonnet E. 1883: Étude sur un herbier de Boccone conservé au Muséum de Paris. – *Bull. Soc. Bot. France* **30**: 213–221.
- Boulos L. 1999: Flora of Egypt **1**. – Cairo: Al Hadara Publishing.
- Bramwell D. & Bramwell Z. 2001: Wild flowers of the Canary Islands, ed. 2. – Madrid: Editorial Rueda.
- Christ H. 1888: Spicilegium canariense. – *Bot. Jahrb. Syst.* **9**: 86–122.
- Christensen C. 1922: Index to Pehr Forsskål: Flora aegyptiaco-arabica 1775, with a revision of Herbarium Forsskål. – *Dansk Bot. Ark.* **4(3)**: 1–54.
- 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.
- Endlicher S. L. 1840: Genera plantarum secundum ordines naturales disposita **13**. – Wien: Fr. Beck.
- Favarger C. & Montserrat P. 1990: *Rhodalsine* Gay. – Pp. 231–233 in: Castroviejo S., Laínz M., López González G., Montserrat P., Muñoz Garmendia F., Paiva J. & Villar L. (ed.), Flora iberica. Plantas vasculares de la Península Ibérica e Islas Baleares **II**. – Madrid: Real Jardín Botánico, CSIC.
- Fennane M. & Ibn Tattou M. 2005: Flore vasculaire du Maroc: inventaire et chorologie 1. – *Trav. Inst. Sci. Univ. Mohammed V, Sér. Bot.* **37**: 1–483.
- Fiori A. 1923: Nuova flora analytica d'Italia **1(3)**. – Firenze: M. Ricci.
- Forsskål P. 1775: Flora aegyptiaco-arabica. – Copenhagen: Möller.
- Gay J. 1845: Holostei, Caryophyllearum Alsinearum generis, monographia. – *Ann. Sci. Nat. Bot., sér. 3*, **4**: 23–44.
- Ghafoor A. 1978: *Caryophyllaceae*. – Pp. 1–122 in: Jafri S. M. H. & El-Gadi A. (ed.), Flora of Libya **59**. – Tripoli: Al Faateh University.
- 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. (ed.), Flora europaea, ed. 2, **1**. – Cambridge: Cambridge University Press.
- Hepper F. N. & Friis I. 1994: The plants of Pehr Forsskål's Flora aegyptiaco-arabica. – Kew: Royal Botanic Gardens.
- Jalas J. & Suominen J. 1983: Atlas florae europaeae. Distribution of vascular plants in Europe **6**. – Helsinki: The Committee for Mapping the Flora of Europe and Societas Biologica Fennica Vanamo, Helsinki.
- Kool A. & Thulin M. 2013: (2178) Proposal to reject the name *Psammanthe* (Caryophyllaceae). – *Taxon* **62**: 833.
- Kool A. & Thulin M. 2017: A giant spurrey on a tiny island: on the phylogenetic position of *Sanctambrosia manicata* (Caryophyllaceae) and the generic circumscriptions of *Spergula*, *Spergularia* and *Rhodalsine*. – *Taxon* **66**: 615–622.
- Lamarck J. B. A. P. M. de 1804: Encyclopédie méthodique. Botanique **6**. – Paris: Panckoucke, Liège: Plomteux.
- Mattfeld J. 1921: Beitrag zur Kenntnis der systematischen Gliederung und geographischen Verbreitung der Gattung *Minuartia*. – *Bot. Jahrb. Syst.* **57(Beibl. 127)**: 13–63.
- McNeill J. 1962: Taxonomic studies in the *Alsinoideae*: I. Generic and infra-generic groups. – *Notes Roy. Bot. Gard. Edinburgh* **24**: 79–155.
- McNeill J. & Bassett I. J. 1974: Pollen morphology and the infrageneric classification of *Minuartia* (Caryophyllaceae). – *Canad. J. Bot.* **52**: 1225–1231.
- Meikle R. D. 1977: Flora of Cyprus **1**. – Kew: Royal Botanic Gardens.
- Moris G. G. 1837: Flora sardoa. – Torino: Ex Regio Typographeo.
- Morison R. 1680: Plantarum historiae universalis **2**. – Oxford: e Theatro Sheldoniano.
- Ouyahya A. 1999: *Rhodalsine*. – P. 223 in: Fennane M., Ibn Tattou M., Mathez J., Ouyahya A. & El Oualidi J. (ed.), Flore pratique du Maroc **1**. – Rabat: Institut Scientifique, Université Mohammed V.
- Phitos D. 1997: *Rhodalsine*. – Pp. 191–192 in: Strid A. & Tan K. (ed.), Flora hellenica **1**. – Königstein: Koeltz Scientific Books.
- Poiret J. L. M. 1789: Voyage en Barbarie **2**. – Paris: J. B. F. Née de la Rochelle.
- Reichenbach H. G. L. 1841: Der deutsche Botaniker, erster Band, das Herbarienbuch. – Dresden & Leipzig: Arnoldische Buchhandlung.

- Schönfelder P. & Schönfelder I. 2012: Die Kosmos-Kanarenflora, ed. 3. – Stuttgart: Franckh-Kosmos.
- Turland N. J., Wiersema J. H., Monro A. M., Deng Y.-F. & Zhang L. 2017: XIX International Botanical Congress: report of Congress action on nomenclature proposals. – *Taxon* **66**: 1234–1245.
- Vahl M. 1791: *Symbolae botanicae, sive plantarum tam earum quas in itinere imprimis orientali collegit Petrus Forskål* **2**. – Copenhagen: Nicolaus Möller et filius.
- Williams F. N. 1898: Note monographique sur le genre *Rhodalsine* Gay. – *Bull. Herb. Boissier* **6**: 1–10.
- Wilson K. L. 2016: Report of the General Committee: 15. – *Taxon* **65**: 1150–1151.

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