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Studies in Greek *Caryophylloideae*: *Agrostemma*, *Silene*, and *Vaccaria*

Abstract

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Taxonomic and nomenclatural changes resulting from a revision of Greek silenoid taxa for the purposes of “Flora hellenica” are explained. *Silene*, redefined to include a number of smaller generic offshoots such as *Cucubalus*, *Heliosperma*, *Lychnis*, *Melandrium*, and *Viscaria*, is one of the major genera of the Greek flora, with 117 species presently known from the area (38 endemic). It includes several polymorphic and taxonomically problematic species groups, of which in particular those clustered around *S. italica*, *S. radicata*, *S. roemerii*, *S. fabaria*, *S. flavescens*, *S. saxifraga*, and *S. pusilla* are here reappraised. New names and combinations at the ranks of species, subspecies, and variety are validated, not only in *Silene* but also in *Agrostemma* and *Vaccaria*.

Introduction

Silene is one of the larger genera of the World’s flora. In the wide sense adopted here it counts c. 700 species, of which about half occur in the Mediterranean area to which no less than 40 % of their total are endemic. The S Balkan Peninsula and SW Asia are two of the main centres of diversity for the genus. The present paper is a corollary to the *Silene* account prepared for vol. I of “Flora hellenica” (Phitos & al., in press), just completed and due for publication later this year. It thus concerns an area placed at the junction of the two aforesaid centres of diversity.

The treatment in “Med-Checklist” (Greuter, Burdet & Long 1984) on which the “Flora hellenica” accounts normally rely includes a number of taxa within *Silene* that were traditionally kept generically distinct in much of this Century’s European floristic literature, to name *Heliosperma* (Reichenb.) Reichenb., *Lychnis* L., *Melandrium* Röhl., and *Viscaria* Röhl. (= *Steris* Adanson); other generic splits recognized by some E European authors, but which have failed to achieve widespread recognition, are similarly included: *Oberna* Adanson, *Otitis* Adanson, and *Pleconax* Raf. Furthermore, the monotypic *Cucubalus* L. is now added to the lot, based not only on personal experience but on the detailed analysis by Rohweder & Urmí (1978) whose implicit conclusions have gained momentum through the results of recent

nuclear rDNA sequence analysis (Oxelman & Lidén, in prep.). The generic and infrageneric taxon boundaries to be used in “Flora hellenica” will be explained elsewhere in some detail (Greuter 1995). Following a proposal by Rabeler (1992), *Silene* is now a conserved name (Brummitt 1994).

As revealed by the “Flora hellenica” account, in Greece alone no less than 118 *Silene* species are presently known to occur, of which 38 are endemic to the country and to which several (again mostly endemic) subspecies may be added. This figure compares favourably with species numbers of *Silene* sensu lato known for much larger areas: 122 for Turkey (Davis 1967), 141 for the “Flora iranica” area (Rechinger 1988), and 203 for the whole of Europe (Tutin & al. 1993).

In addition to *Silene* in the wide sense, two small silenoid genera were also treated by me for “Flora hellenica”. Since each has its own small nomenclatural and taxonomic problem, reference to both has been added to the present paper – which among other things lent justification to the mention of the correct if still unfamiliar subfamily designation in its title (see Rabeler & Bittrich 1993).

A new subspecies of *Agrostemma githago* from Greece

On their joint journey to Thessaly in 1885, Heldreich and Haussknecht, in the vicinity of Farsala, collected plentifully an *Agrostemma* taxon which they found to differ from the widespread *A. githago* L., both morphologically and in its ecology: the plant was growing on rocky hillsides among scrub of, i.a., *Ruta divaricata* Ten. and *Teucrium flavum* L., not in fields or along field margins as is usual for *A. githago*. Haussknecht (1887: 61, 1893: 47) unhesitatingly identified his gathering with the W Anatolian *Githago gracilis* (Boiss.) Boiss. (\equiv *Agrostemma gracile* Boiss.) and, in so doing, was followed by Halácsy (1900–1901: 150–151, 1900) and virtually all other relevant floras up to and including “Med-Checklist” (Greuter, Burdet & Long 1984: 160) and “Flora europaea” (Tutin & al. 1993: 190).

Quite independently Formánek (1897: 197) described plants he had collected in 1896 on Mts Chasia and Othri, in Thessaly, and named them *Githago thessala* – a name that was relegated by Halácsy (1900–1901: 150, 1900) to the synonymy of *Agrostemma githago*.

Finally Bornmüller (1908: 20–21), apparently ignoring Formánek’s publication, pointed out major differences between the Anatolian taxon and the plants collected by Heldreich and Haussknecht, recognizing the latter as a separate variety which, he wrote, one might just as well consider as a species of its own. The latter advice was followed by Hayek (1924–1927: 1081, 1927) who, in an “Addenda and corrigenda” section to the first volume of his “Pro-dromus”, rectified the main treatment published three years earlier in the same book (where he had followed Halácsy) and validated the binomial *Agrostemma thessalum* for a species including both Formánek’s specimens and Heldreich and Haussknecht’s gathering. Bornmüller’s and Hayek’s notes, perhaps somewhat hiddenly published, were completely ignored by the mainstream floristic literature.

Re-examination of the plants in question led to the following results: (1) Hayek was right in considering all these specimens to represent one and the same taxon; (2) he (and, tentatively so, Bornmüller) were equally right in recognizing the specific distinctness of the Thessalian plants from the W Anatolian endemic; (3) *Agrostemma gracile* must therefore be deleted as a member of the European flora; (4) the Thessalian taxon is, however, closely related to the widespread and weedy *A. githago*, and is best considered a subspecies of it.

Agrostemma githago L., Sp. Pl.: 435. 1753. – Lectotype (Ghafoor in Jafri & El-Gadi 1979: 56): Herb. Linnaeus No. 601.1 (LINN!).

1. Fruiting calyx urceolate, with grooves at least as wide as the veins; sepals distinctly (often 2–3 times) longer than the calyx tube, exceeding the petals which are mostly 3-veined and emarginate subsp. *githago*
- Fruiting calyx almost cylindrical, with grooves that are narrower than the veins; sepals at most as long as the calyx tube, shorter than the petals which are mostly 5-veined and broadly rounded subsp. *thessalum*

Agrostemma githago subsp. *thessalum* (Bornm.) Greuter, **comb. & stat. nov.** ≡ *A. gracile* var. *thessalum* Bornm. in Mitth. Thüring. Bot. Vereins 24: 20. 1908. – Lectotype (designated here): [Greece, Thessalia], “Planities Thessaliae: Pharsala in sup.”, 14. 6. 1885, *Hausknecht* (B!; isotypes: JE!).

= *Githago thessala* Formánek in Verh. Naturf. Vereines Brünn 35: 197. 1897 ≡ *Agrostemma thessalum* (Formánek) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 1081. 1927. – Lectotype (designated here): [Greece, Thessalia, Mt Chasia], “Mitrica”, [8. 1896], *Formánek* (BRNM No. 01679/34!).

According to present knowledge, *Agrostemma githago* subsp. *thessalum* is endemic to the mountainous areas between the Pindos range and the coastal mountains of E Central Greece. It is however to be looked for elsewhere in N Greece and in the F.Y.R. Makedonija, where fairly similar plants have occasionally been collected. It may quite likely be the wild progenitor of subsp. *githago*.

Agrostemma gracile is distinct from *A. githago*, i.a., on account of its subulate calyx lobes that are bisulcate on the back due to raised marginal veins and midvein, its shorter, more tightly appressed, brittle indumentum, its winter annual habit resulting in the presence of a basal leaf rosette, and its smaller capsule.

A special kind of ragged robin in the Central Balkan Peninsula

Silene subintegra (Hayek) Greuter, **comb. nova** ≡ *Lychnis flos-cuculi* subsp. *subintegra* Hayek in Österr. Bot. Z. 70: 14. 1921 ≡ *L. subintegra* (Hayek) Turrill in Hooker’s Icon. Pl.: ad t. 3228. 1934 ≡ *S. flos-cuculi* subsp. *subintegra* (Hayek) Greuter & Burdet in Willdenowia 12: 189. 1982. – Lectotype (designated here): [Greece, N Pindos], “Pindus tymphaeus: Said Pascha”, 9. 7. 1896, *Sintenis 814* (LD!; isotypes: G [4 sheets]!, K [2 sheets]!).

Silene subintegra is similar to *S. flos-cuculi* (L.) Greuter & Burdet and is usually regarded as a subspecies of it, but on closer scrutiny I have to agree with Turrill (1934) when he claims that it deserves the status of a separate species. In the field it is a very distinctive entity, as already noted by Alston and Sandwith, according to Turrill. The diagnostic characters given below might be considered insufficient if both taxa were strict geographical vicariants, as they indeed are in Greece where *S. subintegra* is confined to the Pindos range and *S. flos-cuculi* to a few localities in the north-east. But then, they both appear to coexist in largely the same areas and habitats in the F.Y.R. Makedonija (Micevski 1993) and in W to S Bulgaria (see Turrill 1934; the newer Bulgarian floras being too lax in their distributional statements as to be of any use), without any intermediates having been reported so far.

The following differences have been found, of which those relating to the calyx and corolla are of primary importance. In *Silene subintegra* the sessile rosette leaves are firm and often persist at anthesis. The pedicels may be up to 5 times the length of the calyx, which tends to become obconical and mostly has green veins. The petal limb is white to pale pink, flat, shallowly 4-lobed, with broadly rounded middle lobes no longer than wide and small, tooth-like, triangular lateral lobes. The stamens are clearly exerted and exceed the coronal scales. In *S. flos-cuculi* the long-petiolate rosette leaves are withered at flowering. The pedicels are on average about twice as long as the calyx, which tends to become urceolate and usually has purplish veins. The petal limb is bright pink to purple, deeply 4-fid, with elongate, linear middle lobes and somewhat shorter, subulate lateral lobes spread in different planes. The anthers are barely exerted and do not exceed the petal claws. Both species grow on wet or marshy mountain meadows, often in forest clearings, at altitudes of 600–1600 m, and flower from late May to July.

Notes on the *Silene italica* group in Greece

While the W and C Mediterranean representatives of the complex of *Silene italica* (L.) Pers. are relatively well understood, thanks in particular to the thorough revisionary activities of Jeanmonod (1984, etc.), the same cannot be said for the Balkan taxa. Some progress has recently been made during the preparation of the second edition of "Flora europaea" (Tutin & al. 1993), when two of its constituent species, *S. sieberi* Fenzl and *S. damboldtiana* Greuter & Melzh., were duly recognized (Akeroyd & Walters 1988). It was nevertheless inevitable that the plentiful material now available for study should lead to some new or better insights.

The most clear-cut species pair in the complex comprises *Silene cythnia* (Halácsy) Walters and *S. goulimy* Turrill, the former of which is an island endemic centred on the Cyclades and just extending to the E Aegean (Greuter 1976: 203–206), the latter being restricted to a narrow band crossing the S Central Peloponnisos from west to east. They share a preference for cliff habitats, a glabrous calyx, and a showy, bright pink corolla obviously fully expanded in sunshine when all other representatives of the group have inrolled, inconspicuous petal limbs.

A second pair is less easy to identify and has so far not been recognized as such: *Silene sieberi* (whose name has been proposed for conservation in order to preserve its traditional acceptance for a Cretan endemic, see Greuter 1994) and *S. spinescens* Sm. They share not only a dense, canescent indumentum of their vegetative parts, but also a relatively short anthophore (always shorter than the capsule) and a calyx indumentum of minute, often sessile glands. True, *S. spinescens* in its typical form has a unique habit due to its squarrose, eventually pungent-tipped sterile branches, but then this is not a constant feature, and the less xeric variant described as var. *argolica* Boiss. may come fairly close to some exuberant, many-flowered and loosely branched *S. sieberi* specimens from Cretan cliffs. Accepting this relationship we can recognize a north-to-south vicariance pattern, where *S. spinescens*, ranging from Evvia and the Delfi area to the NE Peloponnisos, provides the more northerly partner.

It may be possible to tentatively define a third vicarious species pair formed by *S. damboldtiana* in the mountains of NW Greece and, outside the Greek borders, the more northerly *S. nemoralis* Waldst. & Kit. This couple is still imperfectly understood, but its components obviously share a dense eglandular calyx indumentum and a relatively compact vegetative growth, which in the case of *S. nemoralis* leads to biennial duration of the plants. Due to the

present uncertainty of their relationship, the northern limit of the range of *S. damboldtiana* (which certainly extends beyond Greece into the neighbouring territories) is still in doubt. But, at least in Greece, the limits against *S. italica* proper are reasonably clear-cut, the only possible doubts arising through the rare variant with eglandular calyces discussed below.

What remains once the endemic taxa mentioned above are removed is a reasonably coherent species widespread and common almost throughout Greece (but absent from the S Aegean and most of the Central Aegean): *Silene italica*.

Silene italica (L.) Pers., Syn. Pl. 1: 498. 1805 ≡ *Cucubalus italicus* L., Syst. Nat., ed. 10: 1030. 1759. – Lectotype (Ghafoor in Jafri & El-Gadi 1979: 85): Herb. Linnaeus No. 582.13 (LINN!) [but see the following remarks!].

The correct application of the name *Silene italica*, and of its autonyms in infraspecific classifications, depend on the lectotype of the species name, which has so far been designated twice in different ways: the first time by Ghafoor (in Jafri & El-Gadi 1979: 85) who chose specimen No. 582.13 in the Linnean Herbarium (LINN), the second by Jeanmonod (1984: 599–600), who selected the second Linnean specimen in that same herbarium, No. 582.14. The second choice is clearly unacceptable, not only because it is later but because the corresponding specimen is not part of the original material. It bears a label in an unknown hand, reading “*Cucubalus* [deleted: *viscosus*] 10-and 3-g [decandria trigynia] Bullstrode garden. Pray see. if it be the same with that we found at Gloddaeth”; and there is Smith’s reply appended, signed JES: “no, that was *Silene nutans*. See Herb. Banks.” In other words, the specimen in question is a later addition, by Smith, of a plant collected in Britain, where the species is not native. The plant does not match any wild Mediterranean provenance of *Silene italica* but, by its small (14–16 mm) and eglandular-pubescent calyx as well as by its general habit, appears to belong to a garden form that used to be grown in Britain, and was sometimes collected as an escape, throughout the last Century. But specimen No. 812.13, while likely part of the original material, is worse: it has minute calyces 12–13 mm long, also eglandular-pubescent, and does not to my knowledge fit any other *S. italica* specimen, whether wild or cultivated. Clearly, accepting this as the basis of the Linnean binomial would upset, at the very least, the infraspecific nomenclature of the species. A conservation proposal to designate a new type will certainly be necessary. For the time being, I have chosen to disregard the Linnean type and apply the autonym *S. italica* subsp. *italica* in the traditional sense, as by “*Flora europaea*” (Tutin & al. 1993) and the monographer Jeanmonod (1984, etc.), to the widespread taxon with long, glandular-pubescent calyces.

In Greece, *Silene italica* is characterized primarily by a loosely matted growth due to numerous stolon-like, trailing, eventually rooting innovations, and by a loosely pyramidal, symmetrical, several-flowered inflorescence. The calyx is almost consistently glandular-pubescent, the exceptions being an eglandular-pubescent variant in the extreme north-east (Evros valley) that corresponds to var. *strandjensis* Panov (described from adjacent SE Bulgaria), and an unnamed local island population from Lefkas that has the minute, sessile glands otherwise typical of *S. spinescens*.

There is, however, a more significant variational pattern to be observed in Greek *Silene italica*, which concerns calyx size and anthophore length. Data on the latter feature were in fact obtained and published long ago by Melzheimer (1981) who, curiously, failed to recognize their significance. Whereas all over the country, as well as in marginal areas of the N and E Peloponnisos, calyx measurements range from 15 to 22 mm and the anthophore is 5–10 mm long, all plants from the mountain area of the Peloponnisos, and from Mts Elikona and

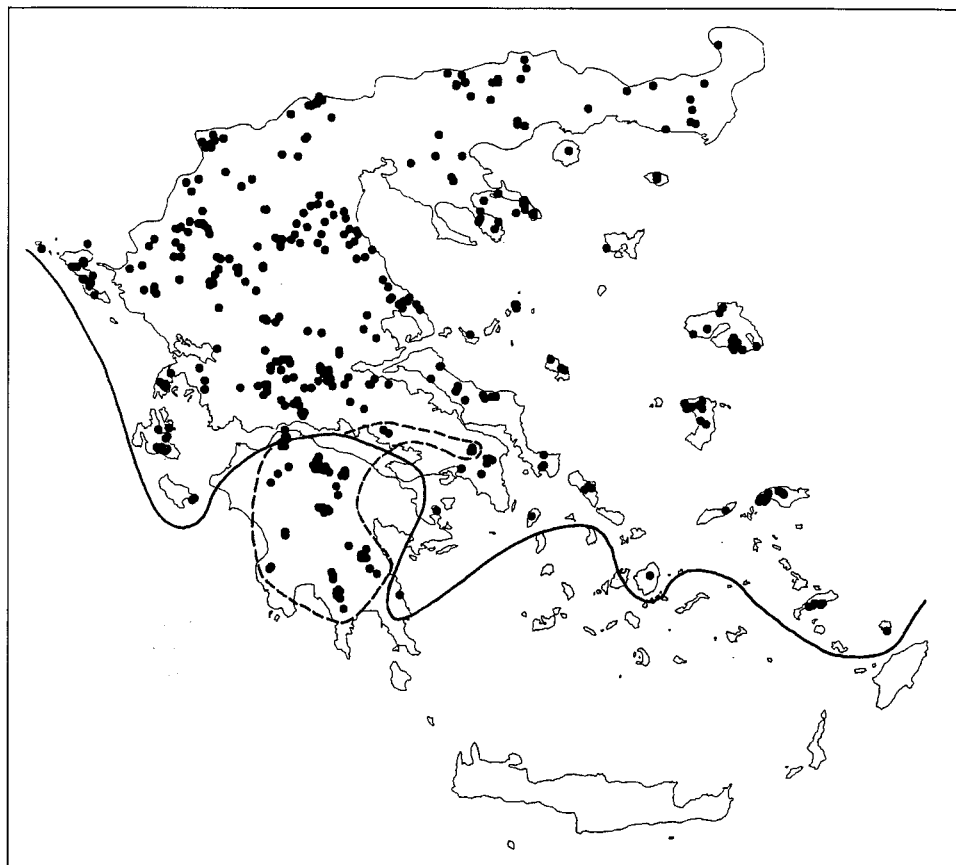


Fig. 1. Distribution of *Silene italica* in Greece: subsp. *italica* (N of the solid line) and subsp. *peloponnesiaca* (broken line: total distribution).

Parnitha in E Central Greece, show lower corresponding values. Clearly, two neat subspecies showing remarkably little overlap (Fig. 1) can thus be defined.

1. Calyx 15–22 mm; anthophore 5–10 mm; capsule 1–1.6 times as long as the anthophore; innovations often elongated; rosette leaves relatively large, normally green subsp. *italica*
- Calyx 9–15 mm; anthophore 3–5 mm; capsule about twice as long as the anthophore; innovations short; leaves relatively small and narrow, often greyish pubescent subsp. *peloponnesiaca*

Silene italica subsp. *peloponnesiaca* Greuter, **subsp. nova** – Holotype: [Greece, Peloponnisos, Ep. Kalamon], “Mt. Taygetos, S part, NE of Mavrovouna, above place called Ag. Dimitrios, along valley leading to the summit ridge,” 1600–1950 m, 30. 6. 1979, *Strid & Papanicolaou* 15236 (B!; isotypes: C!, G!, herb. Greuter!). – Fig. 2.

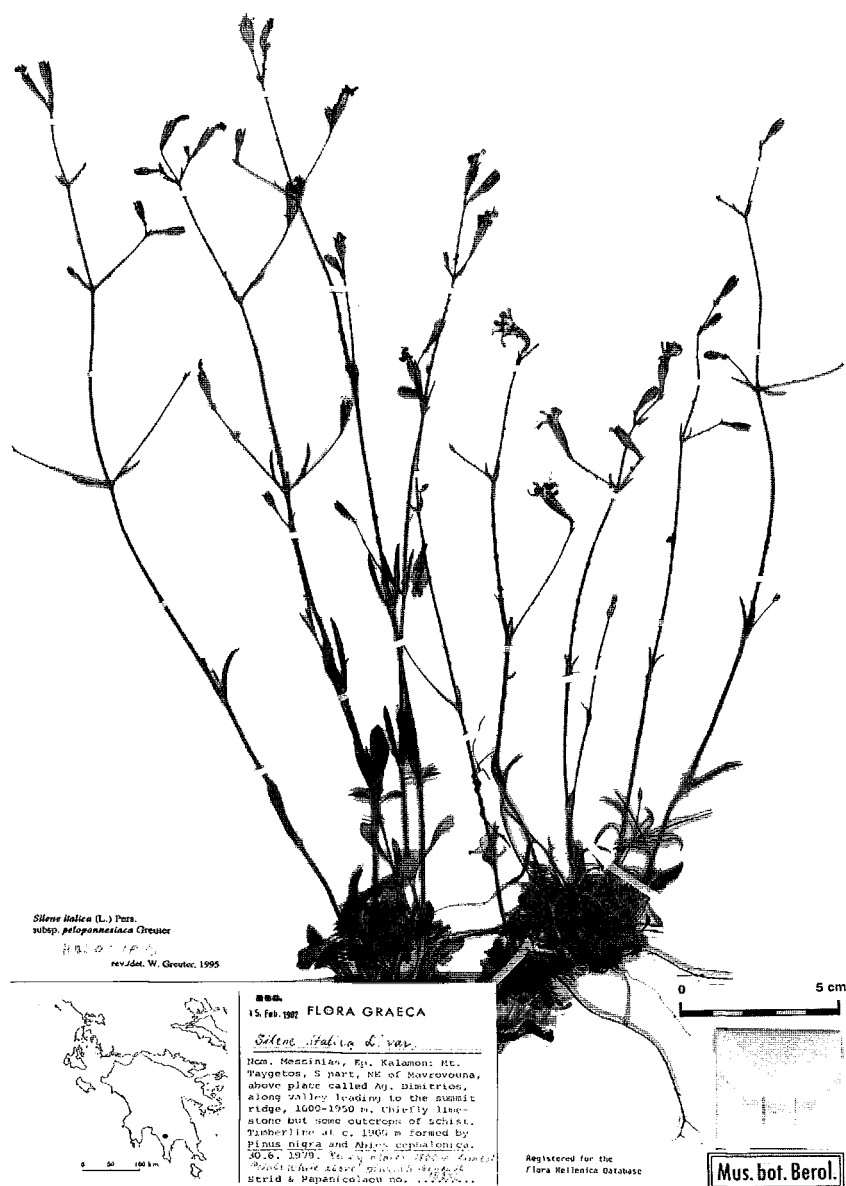


Fig. 2. *Silene italica* subsp. *peloponnesiaca* Greuter (holotype specimen).

Differt a planta typica innovationibus brevioribus, folia pro rata parva angusta densius griseo-pubescentia gerentibus; floribus saepe numerosioribus; calyce 9–15 mm et anthophoro 3–5 mm tantum longis; capsula anthophoro sesqui- vel duplo longiore.

One important question remains to be answered: that of the relationship of the new subspecies with the Calabro-Sicilian *S. italica* subsp. *sicula* (Ucria) Jeanmonod (1984: 603–605), a name applied to plants with a relatively short calyx (mostly 17–19 mm) and anthophore (8–10 mm), and with capsules at least 1.5 times as long as the anthophore (Jeanmonod's key, 1984: 599, has "2/3" instead of 1.5 times, but this is merely a slip). One might at first be tempted to extend the concept of subsp. *sicula* to include the plants from Peloponnisos. The question of typification, then, again arises. In Ucria's almost unknown protologue reference is made to a polynomial phrase from Cupani's "Panphyton siculum", but this is not to be found on the published plates of the pirated Bonanno edition of 1713. It has been traced by Pietro Mazzola in one of the rare collections of original (unpublished) plates, kept in the Jesuite library in Palermo and used by Gussone and the old Sicilian botanists, and I owe a copy of that plate to Mazzola's kindness. This, in the absence of specimens, is the obligate lectotype (if not holotype) of Ucria's name. Since the drawing of course lacks a scale, an epitype is needed to interpret it, which, having kindly been suggested by the same Mazzola, is designated below.

The epitype specimen has calyces 15–18 mm and anthophores 5–7 mm long, and relatively few-flowered, asymmetrical inflorescences, and is thus well representing Jeanmonod's concept of *Silene italica* subsp. *sicula*. It fully falls, however, within the range of variation of subsp. *italica* as found in Greece and as circumscribed for the purposes of "Flora hellenica". I hesitate at this moment to plainly sink subsp. *sicula* into synonymy, pending reinvestigation of the whole complex, but am sceptical as to its taxonomic value. At any rate, the Peloponnisos plants, with their much smaller flowers and their tendency to form many-flowered, regular inflorescences, differ from those of Calabria and Sicily. Full citation of the latter's name follows.

Silene italica subsp. *sicula* (Ucria) Jeanmonod in Willdenowia 14: 46. 1984 ≡ *S. sicula* Ucria in Nuovo Racc. Opusc. Aut. Sicil. 6: 251. 1793. – Lectotype (designated here): [icon ined. in] Cupani, Panph. Sicul. 1: t. 155 (bibl. Soc. Jesu Panorm.); epitype (designated here): [Sicily], "In fruticetis sylvaticis montosis – Boschi di Valdemone, Majo", *Todaro*, Fl. Sicul. Exsicc. No. 377 (PAL!; isoeotypes: B!, etc.).

Subspecies differentiation within *Silene gigantea*

Opinions on the appropriate status of *Silene rhodopea* Janka (= *S. pseudonutans* Pancić), as expressed in the various relevant floras, are about equally divided between those granting it full specific status and those others treating it as a variety, or plain synonym, of *S. gigantea* (L.) L. The two plants, when you look at them, are different enough, yet it is difficult to describe and quantify these differences and, if you try, they tend to break down as soon as you add further material.

Yet, there are characters to be found, especially in calyx indumentum, which might lend justification to the splitter's view, were it not for (a) the occurrence of probable introgression zones with populations showing variable or variably mixed features, in Ipiros and perhaps in Anatolia; and (b) the presence of a taxon showing intermediate features but having an individuality of its own, in a geographically intermediate position. The material at hand is not yet sufficient for a quantitative statistical analysis, yet my impression is that the observed variation is stepwise rather than fully clinal, and that the sensible way of dealing with it is by the recognition of three vicarious subspecies (Fig. 3). They can be distinguished by the following key.

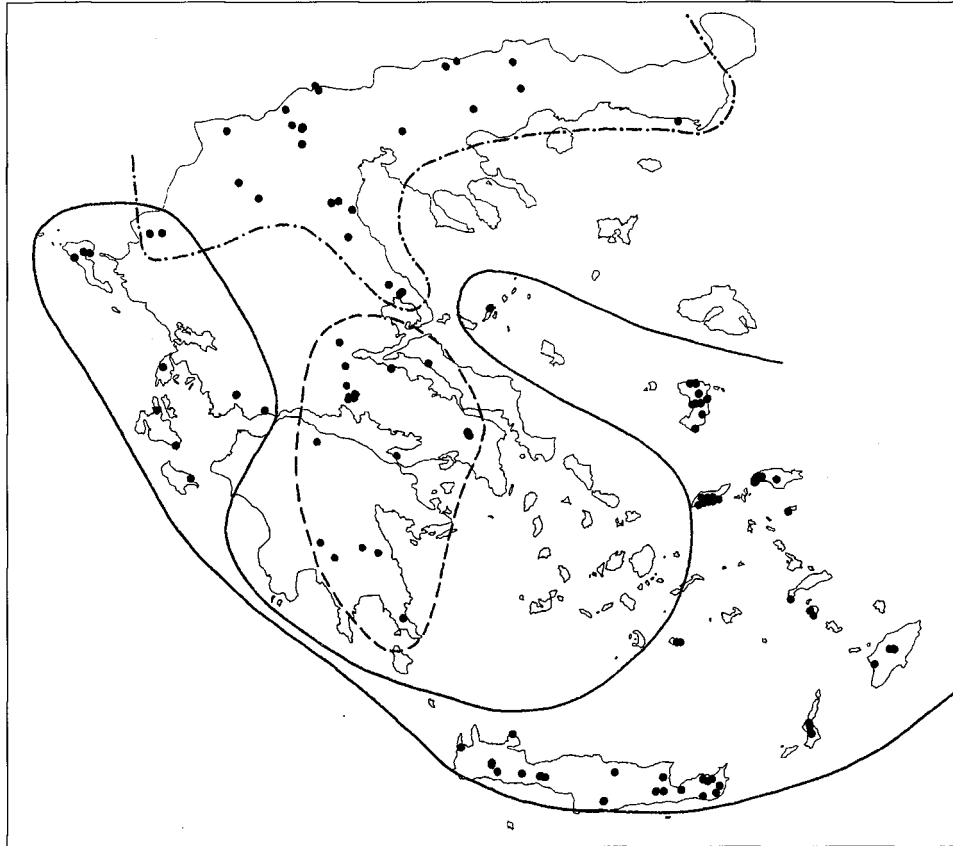


Fig. 3. Distribution of *Silene gigantea* in Greece: subsp. *rhodopea* (N of the broken-and-dotted line), subsp. *hellenica* (broken line: total distribution), and subsp. *gigantea* (solid line).

Silene gigantea (L.) L., Syst. Nat., ed. 10: 1031. 1759 \equiv *Cucubalus giganteus* L., Sp. Pl.: [err. in calce]. 1753. – Descr. from “Lusitania” [in error]. Lectotype (designated here): Herb. Linnaeus No. 583.26 (LINN!).

1. Calyx with minute, often sessile glands, lacking eglandular hairs; inflorescence a regular, compound, loosely pyramidal thyrsus (stony slopes; mainland of N Greece, S to Mt Pilio; from Albania and E Srbija to Bulgaria, W and S Anatolia) . . . subsp. *rhodopea*
 - Calyx with coarse glandular and/or eglandular hairs; inflorescence less regular, the flowers at least partly in condensed verticillasters 2
2. Hairs on calyces and pedicels all glandular; verticillasters 6–10-flowered; rosette leaves mostly withered at flowering (limestone cliffs; Central Greece except in the west, Peloponnisos, Evvia; endemic) subsp. *hellenica*
 - Hairs on calyces and pedicels mostly eglandular or mixed, rarely all glandular; most verticillasters more than 10-flowered; rosette leaves greening throughout the flowering

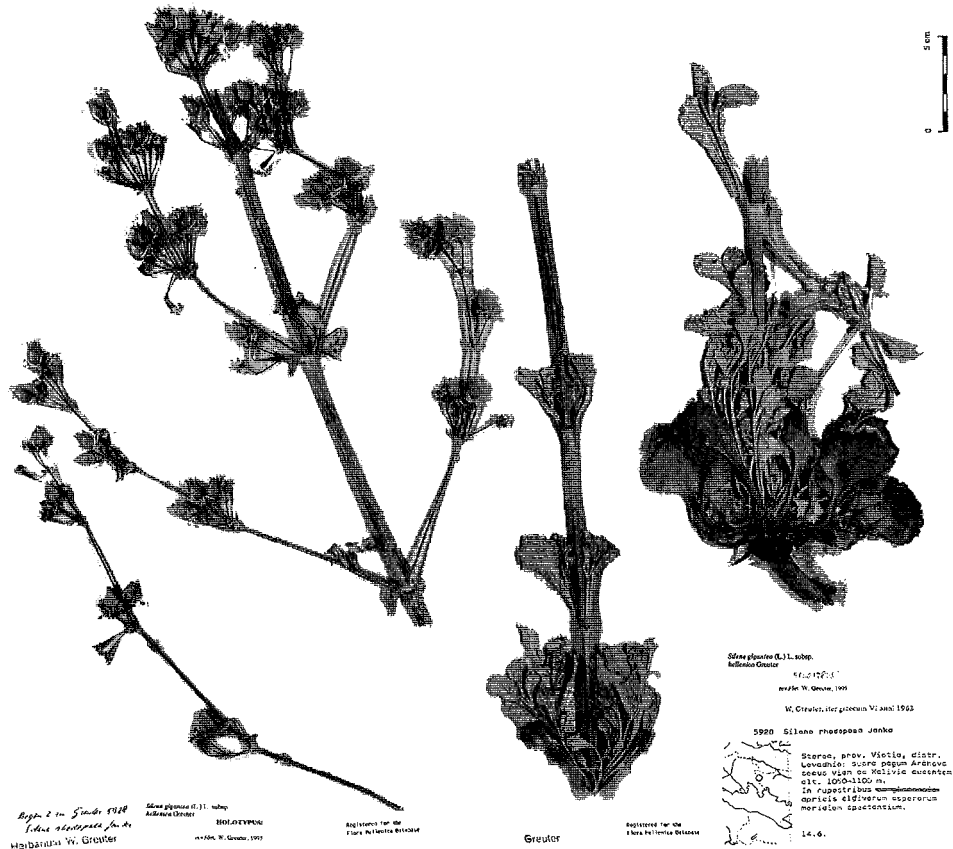


Fig. 4. *Silene gigantea* subsp. *hellenica* Greuter (holotype specimen: portions of a single plant mounted on two sheets; for purposes of [excessive] precision, the flowering parts on the left-hand sheet shall count as the actual holotype).

period (limestone cliffs; W Central Greece, Ionian and Aegean islands; W and S Anatolia, Cyprus) subsp. *gigantea*

***Silene gigantea* subsp. *hellenica* Greuter, subsp. nova** – Holotype: [Greece, Sterea Ellas, Mt Parnassos], “supra pagum Arahova secus viam ad Kalivia ducentem”, 1050–1100 m, 14. 6. 1963, *Greuter 5928* (herb. Greuter!; isotypes: B!, C!, LD!, UPA!). – Fig. 4.

Folia rosularum florendi tempore plerumque emortua; pubescentia partium inferiorum, praecipue ad foliorum margines, densa sed breviuscula, pilis quam 1 mm brevioribus; calyces, pedicelli et bractae pilis glandulosis robustis modice obtecti, pilis eglandulosis carentes. Inflorescentia thysoidea, bis vel ter composita, dichasiis congestis paucifloris verticillastra laxiuscula inaequidistantia ad summum 10-flora aemulantibus. Pedicelli saepius erecto-patentes, 5–15(–20) mm longi.

Silene gigantea subsp. *rhodopea* (Janka) Greuter, **comb. & stat. nov.** ≡ *S. rhodopea* Janka in Természetráji Fü. 2: 28. 1878. – Holotype: [Bulgaria], “supra Stanimak ad ped. septemtr. m. Rhodopes non procul a Philippopoli”, 6. 7. 1871, Janka (?CL, ?BP).
= *S. italica* var. *incana* Griseb., Spic. Fl. Rumel. 1: 173. 1843 ≡ *S. gigantea* var. *viridescens* Boiss., Fl. Orient. 1: 646. 1867, nom. illeg. ≡ *S. gigantea* var. *incana* (Griseb.) Chowdhuri in Notes Roy. Bot. Gard. Edinburgh 22: 254. 1957. – Syntypes from “Macedonia”, *Fridvaldszky, Friedrichsthal*.

The *Silene radicata* group rearranged

Melzheimer (1977), when revising the present group, recognized two species in it: *Silene radicata* Boiss. & Heldr., with three subspecies (subsp. *radicata*, subsp. *pseudoradicosa* Rech. fil., and the newly described subsp. *rechingeri* Melzh.), and *S. oligantha* Boiss. & Heldr. His four taxa are well described and soundly delimited, and will be maintained with virtually the same circumscription in “Flora hellenica”, with the minor proviso that the population from Mt Parnitha in Attica, which Melzheimer (perhaps on the basis of inadequate material) assigned to *S. radicata*, has turned out to constitute a new, yet undescribed taxon. What is being changed, however, is the taxonomic arrangement.

First of all, what Melzheimer newly described as *Silene radicata* subsp. *rechingeri* was found to be so well characterized by stable, reliable characters that it deserves the status of an independent species, adding to the already impressive list of isolated serpentine endemics of the Greek mainland. Secondly, the three eastern local endemics from Mt Olimbos, Evvia and Mt Parnitha appear to be closely related, much closer to each other than to the widespread *S. radicata* with which the latter two had been associated: they are here treated as subspecies belonging to a single, separate species. This leaves *S. radicata*, a taxon showing considerable vegetative plasticity but little if any variation in structural characters, as a monolithic unit. The following key may serve to distinguish the five mentioned taxa.

1. Staminal filaments ciliate with long, slender hairs, at least at the base; lower leaves glabrous except for short recurved hairs on the midrib and margins and dense, long, flexuous cilia on the petiole and sheath 4
 - Staminal filaments glabrous; lower leaves either pubescent all over beneath, or with shortly and stiffly ciliolate petiole and sheath (on limestone; endemic) *S. oligantha* 2
2. Rosette leaves pubescent all over beneath, glabrous above, with long-ciliate petiole and sheath (Mt Olimbos) subsp. *oligantha*
 - Rosette leaves glabrous except on the midvein beneath and along the margin, with shortly and stiffly ciliolate petiole and sheath 3
3. Loosely caespitose plants with slender, several-flowered stems; calyx 7–8 mm (Evvia) subsp. *pseudoradicosa*
 - Densely caespitose plants with 1–3-flowered, robust stems; calyx 10–15 mm (Mt Parnitha) subsp. *parnesia*
4. Calyx in bud and flower with 10 coloured bands each keeled by its vein, alternating with white membranous bands; calyx teeth fringed with short and straight cilia; capsule wide, often subspherical (on ophiolithic substrate; endemic to the N Pindos range) *S. melzheimeri*
 - Calyx in bud and flower with 10 fleshy ridges separated by narrow furrows; calyx teeth fringed with dense, crisp, intervoven cilia; capsule ellipsoidal (on limestone; Peloponnis and mainland Greece, but rare in the NE; S Albania, F.Y.R. Makedonija) *S. radicata*

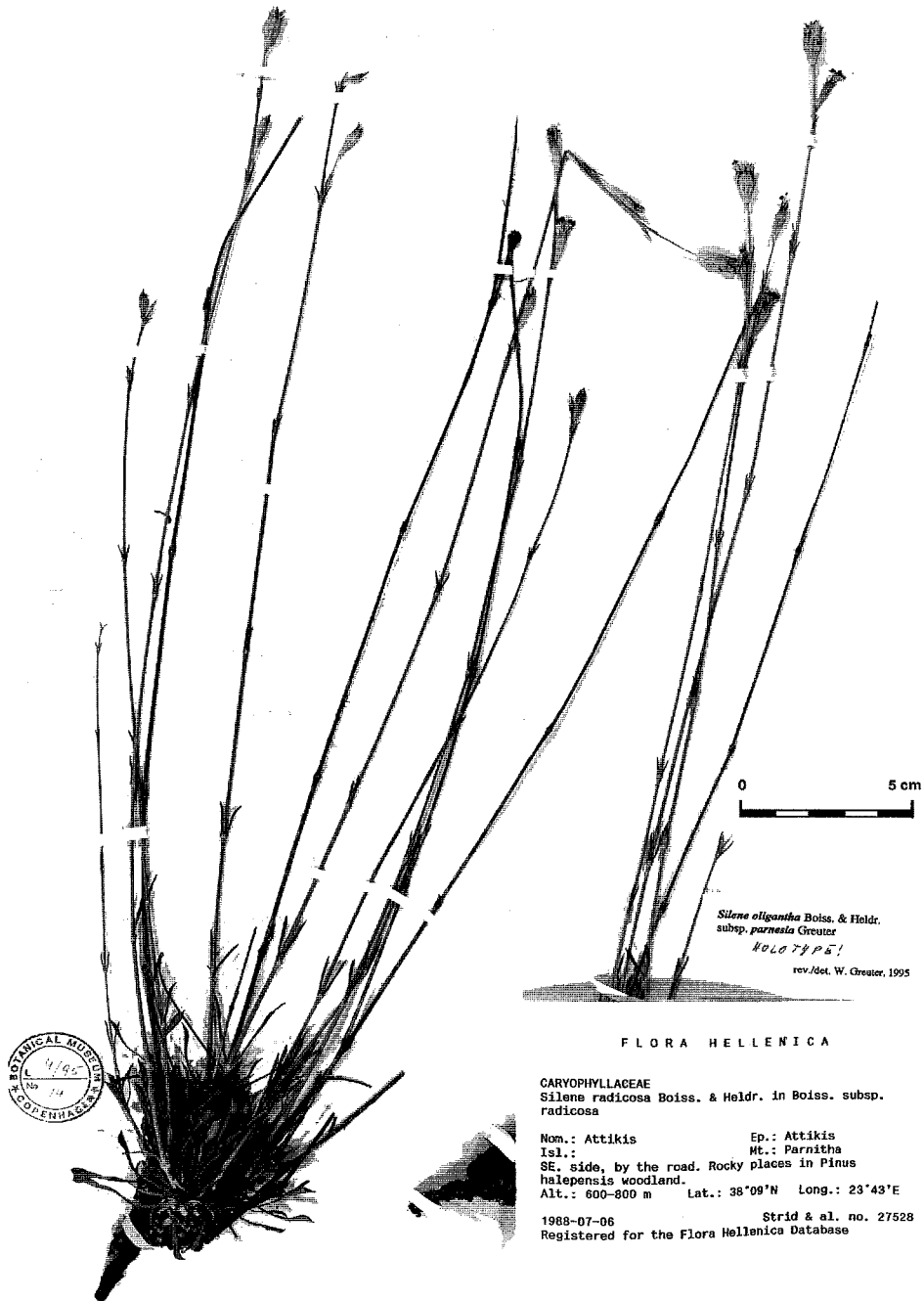


Fig. 5. *Silene oligantha* subsp. *parnesia* Greuter (holotype specimen).

Silene oligantha Boiss. & Heldr. in Boissier, Diagn. Pl. Orient., ser. 2, 1: 75. 1854 ≡ *S. radicata* var. *breviflora* Boiss., Fl. Orient. 1: 645. 1867. – Holotype: [N Central Greece], “In reg. sylvat. m. Olympi Thessaliae”, 22.–30.7. 1851, *Heldreich 2420* (G-BOIS!; isotypes: FI-W!, K!).

Silene oligantha subsp. *pseudoradicosa* (Rech. fil.) Greuter, **comb. nova** ≡ *S. radicata* subsp. *pseudoradicosa* Rech. fil. in Bot. Jahrb. Syst. 80: 320. 1961. – Holotype: [Greece, Evvia], “Montes Kandili: In ascensu ab Achmet Aga versus Hagios Sotir”, 300–700 m, 21. 7. 1956, *Rechinger 18214* (W; isotypes: G!, K!).

Silene oligantha subsp. *parnesia* Greuter, **subsp. nova** – Holotype: [Greece, Attiki, Mt Parnitha], “SE. side, by the road”, 600–800 m, 6. 7. 1988, *Strid & al. 27528* (C!). – Fig. 5.

Dense caespitosa, caulibus robustis 1–3-floris 20–60 cm altis. Folia surculorum plerumque spatulato-lanceolata, margine et costa subtus breviter retrorse ciliata faciebus glabra, petiolo cum vagina breviter rigide ciliolato. Calyx 10–15 mm longus, dentibus pilis densis crispulis intertextis ciliatis. Lacinae petalorum anguste lineares. Capsula 8–13 mm longa, ovoidea vel ellipsoidalis, anthophoro triplo quadruplove longior, calycem aequans vel subsuperans.

Silene melzheimeri Greuter, **nom. nov.** ≡ *S. radicata* subsp. *rechingeri* Melzh. in Bot. Jahrb. Syst. 98: 31. 1977 [non *S. rechingeri* Bocquet in Candollea 22: 11. 1967]. – Holotype: [Greece, N Pindos], “in monte Tsouka Rossa ditionis pagi Vouvousa (Viosa)”, 1600–1850 m, 2. 8. 1956, *Rechinger 18589* (W; isotypes: B!, G!, K!, LD).

Silene radicata Boiss. & Heldr. in Boissier, Diagn. Pl. Orient. 6: 24. 1846. – Holotype: [Greece, Peloponnisos], “Taygète: aux limites supérieures de la 3^{ème} région près de la Varvara”, 15. 7. 1844, *Heldreich 344* (G-BOIS!; isotype: FI-W!).

Solving the riddle of the *Silene roemeri* group

Hayek (1924–1927: 277–279. 1924) recognized three species in what I will call the *Silene roemeri* aggregate (= *S. sect. Albopetalae* Panov): *S. roemeri* Friv., *S. sendtneri* Boiss., and *S. ventricosa* Adamović. The same are still recognized in recent accounts (Melzheimer in Strid 1986: 145–146; Chater & al. in Tutin & al. 1993: 202), sometimes with *S. velenovskyi* Jordanov & Panov and *S. roemeri* subsp. *balcanica* Formánek added (Greuter, Burdet & Long 1984: 273), but always with a more or less explicit indication of doubt about the taxonomic value and geographical range of all these taxa.

Recently, Foggi & Ricceri (1993), while refraining from dealing with the Balkan tangle, have revived yet another name, *Silene staminea* Bertol., to designate the Italian representatives of the group. Their biometrical data would appear to demonstrate that it is indeed a distinct species, but then, obviously (judging from the minimal variation of their Balkan measurements, for which they do not cite vouchers), they have only used specimens of *S. roemeri* s.str., perhaps all from Bulgaria, for their comparison.

The study of a very copious material from Greece, and of generous samples from other Balkan countries, has now led to a much clearer picture of the variation and of its taxonomic background. As in several other similar cases, the pieces of the jigsaw puzzle fall neatly into place once you realize that more than a single layer is involved (see e.g. the *Silene italica*

group, above, and the *S. saxifraga* group, to follow). In the present case there are two such "layers" of vicariance, each corresponding to a species with two or three subspecies. The main distinctive characters, at species level, are size and shape of the calyx, with which inflorescence features correlate at least in part.

The first of these species, *Silene roemerii*, has campanulate calyces with ovate teeth of which some overlap slightly and some not at all at the base. It includes three subspecies with successively larger calyces and longer pedicels: subsp. *roemerii* in the north-east (Bulgaria to E Serbia and F.Y.R. Makedonija), subsp. *staminea* (Bertol.) Nyman in the west (Italy: Central and S Apennines), and subsp. *macrocarpa* (Vandas) Greuter in-between (F.Y.R. Makedonija, S Albania, W and Central mainland Greece). The latter, almost certainly including *S. ventricosa* (of which however no type material has so far been located), completely bridges the apparent morphological gap between the two former.

The second species, *Silene sendtneri*, has obconical calyces with wider teeth that all distinctly overlap at the base. In its typical form (subsp. *sendtneri*), which ranges from Hrvatska and Serbia to Albania, the F.Y.R. Makedonija, and W Bulgaria, the petals are rounded to truncate and the inflorescence is more or less compact, glomerate. Towards the south and east (in the F.Y.R. Makedonija, S Bulgaria, and N Greece) this is replaced by subsp. *balcanica* (Formánek) Greuter, which has bilobed petals and interrupted, often branched inflorescences (from which *S. velenovskiyana*, said to have narrower petals and non-viscid stem internodes, cannot to my mind be kept distinct). In the contact zone between the two subspecies intermediate plants are found, which have been designated as *S. sendtneri* var. (or f.) *emarginata* G. Beck (see Micevski 1993: 320).

While transition between the different subspecies may thus in places be fluent, no such intergrading has been observed between representatives of the two species even when they coexist in the same area (e.g. *Silene sendtneri* subsp. *balcanica* and *S. roemerii* subsp. *roemerii* in Bulgaria, the same and *S. roemerii* subsp. *macrocarpa* in N Greece). The taxa of the latter pair often coexist on the same mountain, but, as a rule, are altitudinally vicarious; when, as on Mt Vitsi, they grow in close vicinity, *S. sendtneri* subsp. *balcanica* flowers earlier by perhaps a fortnight.

A clarification is needed with respect to sex distribution in all these plants, on which contradictory statements have been published. As far as I could ascertain from dry material, all these taxa are basically dioecious, although often incompletely so. The flowers are "functionally" unisexual, meaning that they invariably bear sterile, reduced organs of the opposite sex. This phenomenon has been correctly described and beautifully illustrated by Turrill (1934: t. 3227) for *Silene ventricosa* and appears to be of generalized occurrence within the group, in spite of Melzheimer's (in Strid 1986: 146) contrary statement. Monoecy, which has also been reported, does indeed occur as a frequent anomaly in individual plants, where basically male individuals may bear a few female or bisexual flowers. While Foggi & Ricceri (1993) do not mention sex for Italian plants, their drawing may well be of a male flower with a reduced, sterile ovary; the inference that *S. roemerii* subsp. *staminea* might deviate by being a hermaphrodite taxon is, therefore, at least premature. An identification key and nomenclatural digest of the relevant taxa follows.

1. Calyx 3–4 mm, glabrous, broadly obconical, not or scarcely umbilicate at the base, never purplish-tinged; teeth cordate-ovate to suborbicular, all distinctly overlapping by their bases *S. sendtneri* 2
- Calyx 4–8 mm long, glabrous or pubescent, broadly campanulate from an umbilicate base, usually suffused with purple at least distally; teeth ovate to triangular, not overlapping by their bases, or only the odd ones slightly so *S. roemerii* 3

2. Inflorescence rather compact, typically with 1–2 many-flowered, globular clusters; petal limb rounded to truncate subsp. *sendtneri*
 – Inflorescence elongated, usually interrupted basally and often with shorter, thyrsoid side branches; petal limb bilobed subsp. *balcanica*
3. Caespitose, with upright or ascending innovations; rosette leaves oblanceolate; flowers subsessile; calyx 4–5 mm, glabrous; capsule subspherical, 4–5 mm subsp. *roemeri*
 – Matted, with decumbent, eventually rooting innovations; rosette leaves obovate-spathulate; pedicels 2–4 mm; calyx 5–7 mm, minutely pubescent at least apically and at the base; capsule broadly ovoid, 5–7 mm subsp. *macrocarpa*
 – Caespitose, with upright or ascending innovations; rosette leaves obovate-spathulate; pedicels often >4 mm; calyx 6–8 mm, minutely pubescent; capsule broadly ovoid, c. 8 mm subsp. *staminea*

Silene roemeri Friv. in Flora 19: 439. 1836. – Lectotype (Foggi & Ricceri 1993: 195): [Bulgaria], “Rumelia”, 1834, [Hinke & Manolesko in] *Frivaldszky* (OXF; isotypes: G-BOIS!, K [3 sheets]!, PRC!).

Silene roemeri subsp. *macrocarpa* (Vandas) Greuter, **stat. nov.** ≡ *S. roemeri* f. *macrocarpa* Vandas, Reliq. Formánek.: 69. 1909. – Lectotype (designated here): [Greece, S Pindos], “m. Chaliki in Pindo”, 1891, *Formánek* (PR!).

= *S. ventricosa* Adamović in Österr. Bot. Z. 55: 180. 1905. – Holotype: [F.Y.R. Makedonija, Mt Pelister], “Baba Planina”, 1903, *Adamović* (?LE, ?W).

Silene roemeri subsp. *staminea* (Bertol.) Nyman, Consp. Fl. Eur.: 91. 1878 ≡ *S. staminea* Bertol., Fl. Ital. 4: 585. 1841. – Lectotype (Foggi & Ricceri 1993: 197): [Italy, Abruzzo], “M. Corno, Costa di Riuso”, [sent in] 1819, *Orsino 72* (BOLO).

Silene sendtneri Boiss., Fl. Orient. 1: 608. 1867 ≡ *S. roemeri* subsp. *sendtneri* (Boiss.) Jordanov & Panov in Jordanov, Fl. Nar. Rep. Bălg. 3: 458. 1966. – Holotype: [Bosna] “Bosnie”, 1847, *Sendtner 831* (G-BOIS!; isotypes: FI-W!, G [2 sheets]!).

Silene sendtneri subsp. *balcanica* (Formánek) Greuter, **comb. nova** ≡ *S. roemeri* subsp. *balcanica* Formánek in Verh. Naturf. Vereines Brünn 36: 98. 1898. – Lectotype (Vandas 1909: 69): [Bulgaria], “Val. Elidere in mt. Rh[odope]”, 1897, *Formánek* (?PR, ?BRNM).

= *S. velenovskiana* Jordanov & Panov in Jordanov, Fl. Nar. Rep. Bălg. 3: 592. 1966. – Holotype: [Bulgaria], “in graminosis subalpinis m. Rilo”, *Velenovský* (?PRC, “non vidi” [sic!]).

Some changes and additions in *Silene* sect. *Behen*

When revising the Balkan representatives of this section exclusive of *Silene vulgaris* (Moench) Garcke, Melzheimer (1980: 181–182) transferred the Samothrake population that had been described as *S. variegata* var. *samothracica* Rech. fil. to *S. caesia* Sm., simultaneously raising it to subspecific rank and including into it plants from the E Aegean island of Chios that had been previously recorded under the name *S. caesia*. What is obviously the same taxon was since also reported from Samos (Christodoulakis 1984: 77) where it had first been collected by Swedish botanists in 1960–1962 (unpublished data).

The material at hand is still rather scanty and often consists of poor or poorly developed plants. One cannot therefore exclude that the taxon as a whole, due to so far undetected inter-is-

land variation of its characters, may be more variable than we presently believe and than Melzheimer's detailed description suggests. Yet it is sufficiently clear that, while Melzheimer's dissociating it from *Silene variegata* (Desf.) Boiss. & Heldr. is justified in spite of obvious similarities in general habit, its links with *S. caesia* are not very close either. Differences in calyx venation (reticulate almost from the base) and petal shape (large, denticulate auricles; minute limb) are of particular note. The status of a separate species appears to be appropriate.

Silene samothracica (Rech. fil.) Greuter, **comb. & stat. nov.** ≡ *S. variegata* var. *samothracica* Rech. fil. in Repert. Spec. Nov. Regni Veg. Beih. 100: 119. 1938 ≡ *S. caesia* subsp. *samothracica* (Rech. fil.) Melzh. in Bot. Jahrb. Syst. 101: 181. 1980. – Holotype: [Greece, N Aegean, Samothraki], "In monte Phengari", 900 m, 18.-20. 6. 1936, *Rehinger 9776* (G!; isotypes: BM, LD!, W).

In a second paper, devoted to variation in *Silene fabaria* (L.) Sm., Melzheimer (1987) included into this species, as a subspecies, *S. thebana* Boiss. that he had previously kept separate. As defined by him, *S. fabaria* subsp. *thebana* (Boiss.) Melzh. comprised two Greek inland populations: the first from limestone cliffs near Thive in Boeotia, from where *S. thebana* was originally described, the second from ophiolithic screes in the Domokos area (Fthiotis); whereas subsp. *fabaria* was said to be a plant of maritime cliffs of the Aegean coasts and islands.

My own results do not fully corroborate Melzheimer's findings. The Boeotian population (of which some additional localities have recently been found, extending south to Mt Gerania in W Attica) cannot in fact be kept apart at any rank from typical *Silene fabaria* with which it fully intergrades. Similar non-halophytic ecotypes occur elsewhere in the area of the species, in particular in Anatolia where it can reach considerable altitudes (up to 1600 m according to Coode & Cullen in Davis 1967: 214–215). By consequence, *S. thebana* becomes a straightforward synonym.

The situation is somewhat different with respect to Melzheimer's second population, which has been repeatedly collected on the ophiolithic hills extending between Domokos and Loutropigi, in the border zone between Fthiotis and SE Thessaly. This appears to be a serpentinophyte deviating in a number of features, as given in the following key, and is best considered a separate, new subspecies, described and named below.

Silene fabaria (L.) Sm., Fl. Graec. Prodr. 1: 293. 1809 ≡ *Cucubalus fabarius* L., Sp. Pl.: 414. 1753. – Neotype (Melzheimer 1980: 167): [Orient], "Lychnis maritima saxatilis, folio anacamperotis", *Tournefort* (P-TRF [photo!]).
= *S. thebana* Boiss., Fl. Orient. 1: 627. 1867 ≡ *S. fabaria* subsp. *thebana* (Boiss.) Melzh. in Pl. Syst. Evol. 155: 252. 1987. – Holotype: [Greece, Viotia], "prope Thebas", 4./16. 5. 1861, *Orphanides 335* (G-BOIS!).

1. Long-lived suffrutescent plants with short and thick, woody aerial branches bearing stout flowering stems 50–100 cm; leaves glaucous, somewhat succulent; stem leaves in 8–16 pairs, often hardly diminishing in size upward; petal limb white or cream (coastal limestone cliffs, 0–400 m, more rarely inland) subsp. *fabaria*
- Short-lived hemicyptophytic plants with a branched, woody underground stock and slender flowering stems 30–60 cm; leaves discolorous, green above and glaucous beneath, membranous; stem leaves in 4–8 pairs, soon diminishing in size; petal limb pale yellow (ophiolithic scree, 300–1000 m) subsp. *domokina*

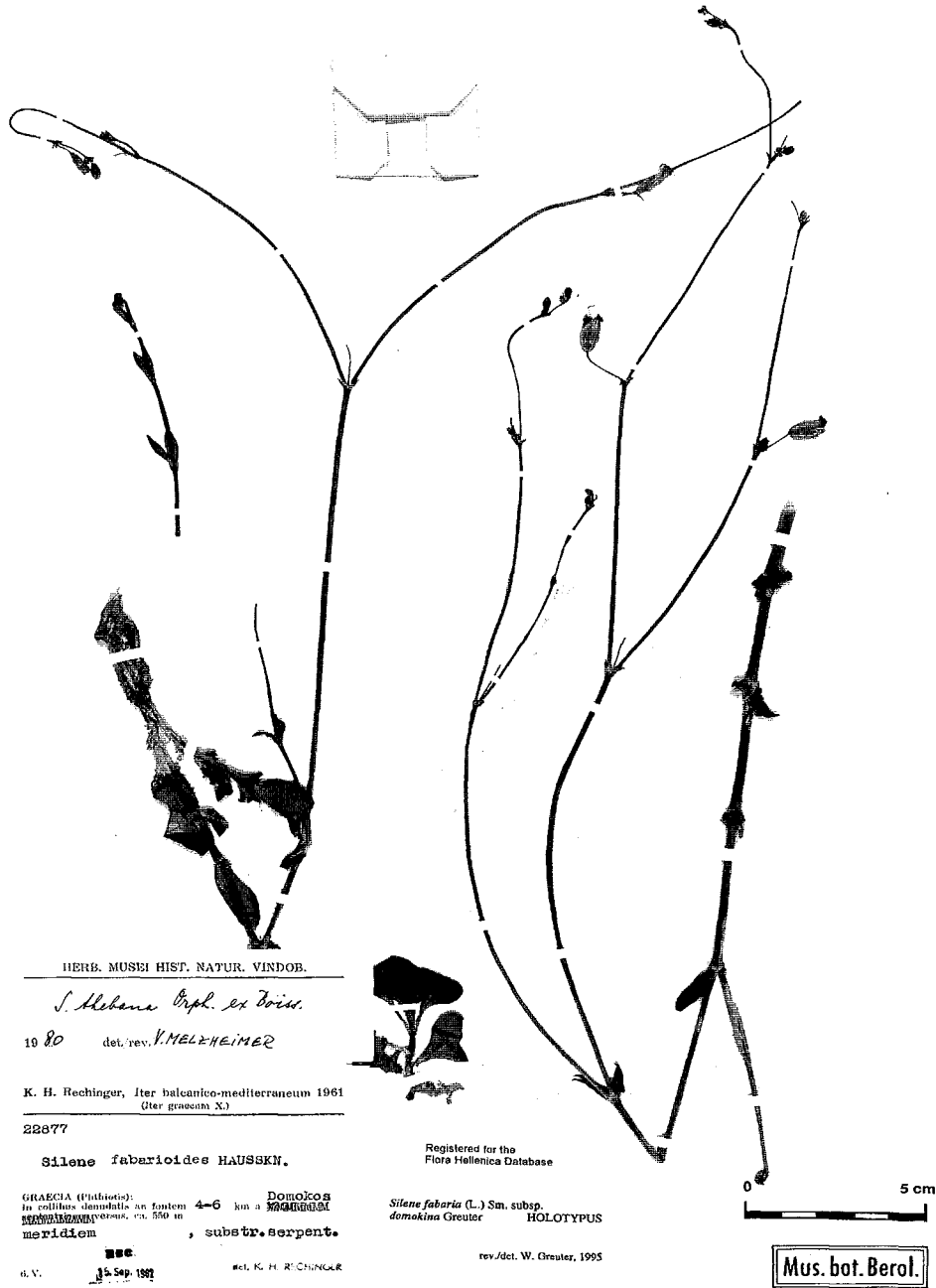


Fig. 6. *Silene fabaria* subsp. *domokina* Greuter (holotype specimen).

Silene fabaria subsp. *domokina* Greuter, **subsp. nova** – Holotype: [Greece, Fthiotis], “in collibus denudatis an [sic!] fontem 4–6 km a Domokos meridiem versus, substr. serpent.”, 550 m, 6. 5. 1961, *Rehinger* 22877 (B!; isotypes: G!, herb. Greuter!). – Fig. 6.

Planta hemicryptophytica perennans, caudice lignoso ramoso, caulibus floriferis gracilibus 30–60 cm altis. Folia membranacea, discoloria, supra viridia subtus glauca, caulina pauca (4–8 paria) superne cito diminuta. Limbus petalorum pallide flavus.

Doubtless the most widespread and most variable of Greek *Silene* species is the bladder campion, *S. vulgaris* (a name whose conservation will be proposed separately elsewhere). Numerous infraspecific taxa have been described, and several are currently recognized, mostly at subspecific rank. Yet a satisfactory treatment is presently impossible, not only because it is hazardous to correlate the variation observed in Greece with that elsewhere in Europe and to apply names and concepts stemming from there to Greek material, but also and perhaps primarily because variation patterns in Greece are fluent as well as reticulate and impossible to cast into a satisfactory taxonomic frame. Phenotypic plasticity may be considerable, but little is positively known. Clinal ecotypic variation is also obvious and results in frequent parallelisms. Correlation between features that have been used to define some taxa, such as growth form, leaf shape, capsule shape and size, and chromosome number, has been taken for granted on the basis of few and tenuous data but may well turn out to be at least partly a myth.

For the purposes of “Flora hellenica” only a tentative characterization of taxa occurring in Greece, with equally tentative designations for some of them, can be produced. In spite of the provisional and largely unsatisfactory nature of such a treatment, I have found it necessary to add to the already appallingly large number of infraspecific taxa. A small but homogeneous population, endemic on ophiolith on Mt Vourinos at elevations of 1300–1850 m, is obviously so far unnamed but worthy of being recognized. It is described below.

Silene vulgaris (Moench) Garcke, Fl. N. Mitt.-Deutschland, ed. 9: 64. 1869 ≡ *Cucubalus behen* L., Sp. Pl.: 414. 1753 ≡ *Behen vulgaris* Moench, Methodus: 709. 1794. – Lectotype (Aeschmann & Bocquet 1983: 204): Herb. Linnaeus No. 582.4 (LINN!).

Silene vulgaris subsp. *vourinensis* Greuter, **subsp. nova** – Holotype: [Greece, W Makedonia], “montes Vourinos, in summo vertice Vourinos ejusque crista septentrionali”, 1660–1850 m, 26. 7. 1978, *Greuter* 16333 (B!; isotype: herb. Greuter!). – Fig. 7.

Planta glabra hemicryptophytica, subsp. *prostratae* (Gaudin) Schinz & Thell. ut videtur proxima, sed caules graciles erecti elatiores et folia caulina numerosiora (paribus 11–16), erecto-patentia, fere aequidistantia, subaequalia, ovato-lanceolata, longe acuminata, ad 32 mm longa et 8 mm lata sed saepius minora, internodia aequantia vel superantia; flores numerosi (ad minimum 5); calyx mediocris (13–17 mm longus); capsula subglobosa. Floret mensibus Julio et Augusto in pratis montis Vourinos Macedoniae occidentalis inter 1300–1850 m altitudinis.

Silene flavescens and its relatives

The *Silene flavescens* group belongs to *S.* sect. *Brachypodae* (Boiss.) Chowdhuri, of which the Balkan representatives have been thoroughly revised by Melzheimer (1977). He recognizes two species that fall within that group, one of them with two subspecies: *S. flavescens* Waldst. & Kit., *S. thessalonica* Boiss. & Heldr. subsp. *thessalonica* and subsp.



Fig. 7. *Silene vulgaris* subsp. *vourinensis* Greuter (holotype specimen).

dictaea (Rech. fil.) Melzh. A further Greek representative of the group, not treated by Melzheimer, is the SW Anatolian *S. leptoclada* Boiss. which some years ago has also been collected on the island Megisti of the Kastellorizo group (Greuter 1979).

The copious new material now available for study, in particular from N Greece, has made it apparent that, whereas Melzheimer was obviously right in considering *Silene dictaea* Rech. fil. as not specifically distinct from *S. thessalonica*, he was too optimistic when keeping the latter separate from *S. flavescens*. These two taxa differ in little else than stickiness calyx indumentum, characters that have proved to be quite variable within several other *Silene* species. Also, intermediates between them do occur, if rarely (*Raus & Schiers 16689*, from the Nestos gorge near Toxotes). Were it not for the fact that they grow in discrete, juxtaposed areas, one would be tempted to consider them as minor variants. Their vicarious occurrence makes subspecific rank more appropriate.

For Melzheimer (1977), *Silene thessalonica* is a Greek endemic whereas *S. flavescens* would stop short at the Greek national border. If this were true it would be a rare example of country limits playing the role of phytogeographical divides. In reality, *S. flavescens* sensu stricto has been collected repeatedly in northernmost Greece from 1977 onward. Conversely, there are records of "*S. flavescens* var. *thessalonica*" from southernmost Bulgaria (Slavjanka and Central Rodope Mts) in the relevant floristic literature (see Jordanov & Panov in Jordanov 1966: 477; however, the records from Mt Slavjanka in all probability do not belong here: see below). Furthermore, it occurs in the F.Y.R. Makedonija (Vardar gorge at Demir Kapija, *Greuter 15858*).

A further taxon of the *Silene flavescens* group has recently been discovered which, due to a number of marked qualitative differences, clearly deserves the status of an independent species. It is apparently endemic to Mt Orvilos (= Mt Slavjanka), and while so far I have seen it only from the southern, Greek flank of that mountain it quite likely also occurs on the Bulgarian side (see the records of *S. flavescens* var. *thessalonica* referred to above). It will be known as *S. orbelica* and is keyed out below against the other taxa of the group.

1. Pubescence eglandular on the lower but predominantly glandular on the upper calyces and pedicels; anthophore 2–3 mm; petal limb yellowish, bilobed for up to one third, with rounded, ciliolate lobes (SW Anatolia, Kastellorizo) *S. leptoclada*
- Pubescence of lower and upper calyces and pedicels equal; petal limb more deeply divided, with non-ciliolate lobes 2
2. Calyx glandular-pubescent, narrowly clavate in flower, its inner teeth ligulate, broadly rounded; anthophore c. 3 mm; petal limb 6–7 mm, deep yellow above; stamens subexserted, the anthers reaching the corolla throat; capsule c. 3 times as long as the anthophore (Mt Orvilos) *S. orbelica*
- Calyx glandular- or eglandular-pubescent, fusiform in flower, its inner teeth triangular-ovate, subacute; anthophore 1–2 mm; petal limb 3–6 mm, yellowish-white to greenish-yellow above; stamens included, the anthers not reaching the corolla throat; capsule several times as long as the anthophore *S. flavescens* 3
3. Plants pubescent with short eglandular hairs, lacking glandular hairs, with non-viscid upper internodes (E Central Balkans, just reaching NE Greece) subsp. *flavescens*
- Plants eglandular-pubescent below, glandular-pubescent above, with viscid upper internodes 4
4. Stems 15–60 cm, often with some side-branches and several flowers (mainly NE Greece, S to Volos and Lesvos) subsp. *thessalonica*
- Stems 5–20 cm, unbranched, 1–2-flowered (E Crete) subsp. *dictaea*

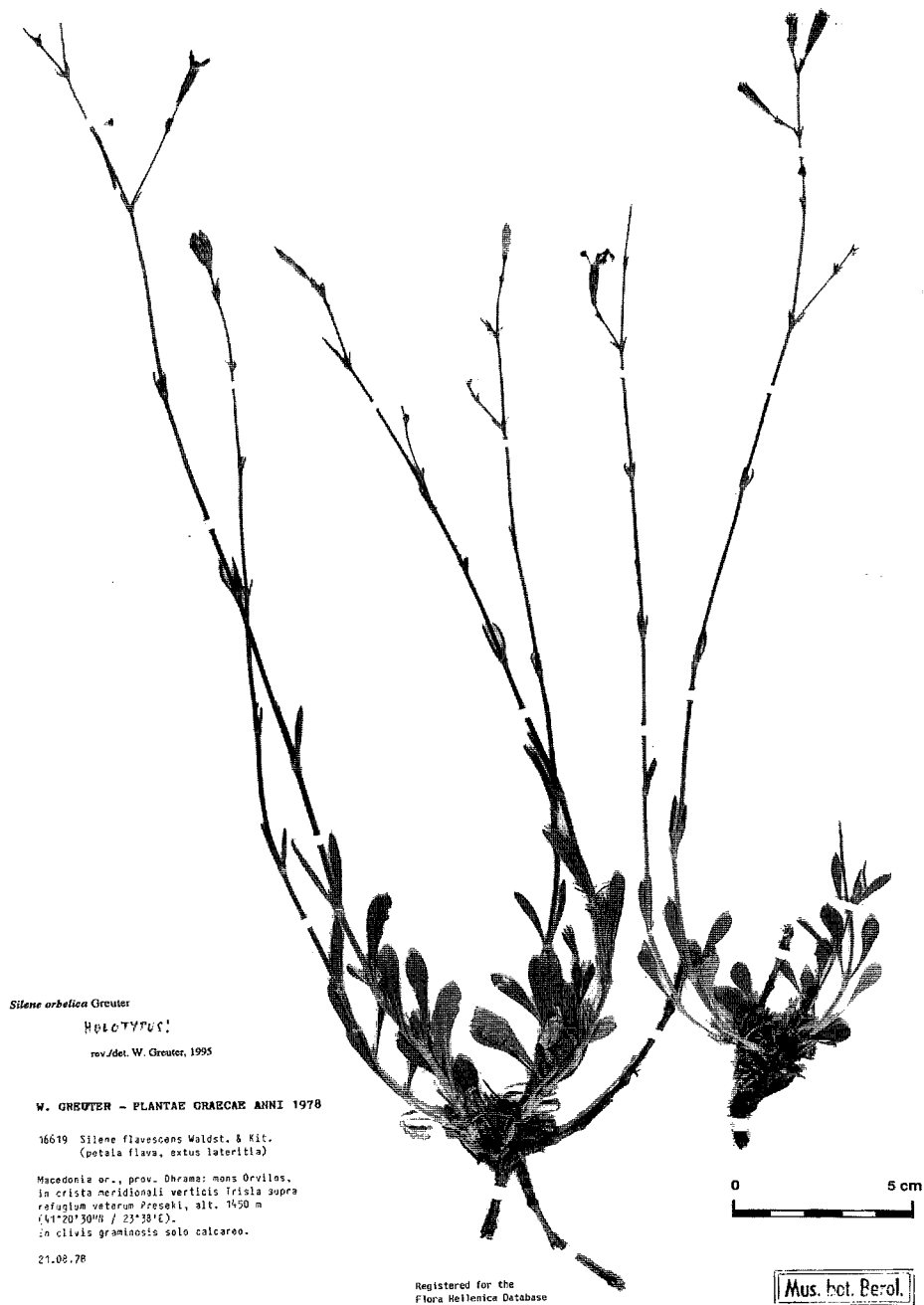


Fig. 8. *Silene orbelica* Greuter (holotype specimen).

Silene leptoclada Boiss., Fl. Orient. 1: 647. 1867. – Lectotype (Coode & Cullen in Davis 1967: 215): [Anatolia, Antalya Prov.], “in rupestribus ad basim montis Elmalu”, 30. 5. 1860, *Bourgeau* 45 (G-BOIS!; isotypes: E, G-BOIS [as *Bourgeau* 112, with handwritten French label]!).

Silene orbelica Greuter, **sp. nova** – Holotype: [NE Greece], “mons Orvilos, in crista meridionali verticis Trisla supra refugium veterum Preseki”, 1450 m, 21. 8. 1978, *Greuter* 16619 (B!; isotypes: C!, G!, herb. Greuter!, etc.). – Fig. 8.

Silene flavescens similis sed laxius caespitosa, caulibus floriferis numerosis radiatim diffusis arcuato-ascendentibus; superne glanduloso-pubescentibus et internodiis viscidis praeditis. Flores singuli vel bini in ramis synflorescentiae irregularis laxae paniculati, pedicellis glanduligeris 1–6(–12) mm longis suffulti. Calyx glanduloso-pubescentis, florendi tempore anguste clavatus, saepe purpura suffusus, dentibus interioribus ligulatis late rotundatis. Anthophorum c. 3 mm longum, dense breviter pubescens. Coronae squamulae conicae parvae (0.5–1 mm longae) vel nullae; limbus petalorum 6–7 mm longus, supra saturate luteus infra brunneo-viridis vel purpurascens, ad medium in lobos lineares bipartitus. Stamina subexserta, antheris faucem corollae attingentibus. Capsula anthophoro triplo c. longior.

Silene flavescens Waldst. & Kit., Descr. Icon. Pl. Hung.: 191. 1804. – Descr. from Rumania, Banat (several localities).

Silene flavescens subsp. *thessalonica* (Boiss. & Heldr.) Nyman, Consp. Fl. Eur.: 89. 1878 ≡ *S. thessalonica* Boiss. & Heldr. in Boissier, Diagn. Pl. Orient., ser. 2, 1: 74. 1854 ≡ *S. flavescens* var. *thessalonica* (Boiss. & Heldr.) Rohrb., Monogr. Silene: 146. 1869. – Holotype: [Greece, E Makedonia], “in rupibus m. Korthiati pr. Thessalonicam”, 450 m, 10. 7. 1851, *Heldreich* 2336 (G-BOIS!; isotypes: FI!, FI-W!).

Silene flavescens subsp. *dictaea* (Rech. fil.) Greuter, **comb. in stat. nov.** ≡ *S. dictaea* Rech. fil., Ber. Bot. Forschungsr. Kreta: 3. 1943 [preprint?]; et in Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 80(12): 57. 1943–1944 ≡ *S. thessalonica* subsp. *dictaea* (Rech. fil.) Melzh. in Bot. Jahrb. Syst. 98: 45. 1977. – Holotype: [Greece, Kriti], “zwischen Kalkfelsen SE vom Gipfel Aphendi Christos oberhalb des Hirtenlagers Asphendami”, 1900 m, 12. 7. 1942, *Reichinger* 14355 (W).

Another two-layer jigsaw: the *Silene saxifraga* group

As here defined, the *Silene saxifraga* group shall not include the more clearcut Greek members of *S. sect. Saxifragoideae* Willk., such as *S. falcata* Sm., *S. urvillei* Dum.-Urville, *S. waldsteinii* Griseb., *S. linoidea* Otth; nor even the proteiform and widespread *S. multicaulis* Guss., in spite of its not too unfrequent confusion with *S. saxifraga* sensu lato. In fact, the two last-named taxa differ very neatly and constantly in leaf ciliation and calyx teeth shape, so that even dwarfed or incomplete plants can usually be identified without difficulty.

The *Silene saxifraga* group has its main centre of diversity in the Greek mountains, although it is widely spread through much of S Europe, north to the Alps and west to Spain (see the map of “*S. saxifraga* sensu lato”, almost identically defined, in Jalas & Suominen 1986: 73) and although some Anatolian taxa not studied by me may also belong here. In Greece, as Melzheimer (in Strid 1986: 154–155) acknowledges, the group is in need of revision, and his treatment of it is tentative. Here again, the answer apparently lies in recogni-

zing that variation occurs in two superposed, geographically overlapping “layers”. Even if a study focused on Greek material cannot admittedly solve all problems, it will, I hope, contribute greatly to clarifying the situation.

The main criteria by which the two form series I recognize can be distinguished are anthophore elongation and capsule presentation. In the first series, that includes *Silene saxifraga* L. proper, the anthophore does not elongate through anthesis but remains (2–)3–7 mm long, and the capsule only slightly exceeding the calyx that sheathes it below and is torn open irregularly by its growth. In the second series, centred on *S. parnassica* Boiss. & Spruner, the anthophore elongates conspicuously through anthesis to reach 6–26 mm in fruit, and the capsule is completely exerted from the calyx which, when longer than the anthophore, either retreats by shrinkage or is split open apically on one side. The observed differentiation patterns differ conspicuously between the two series.

In the *Silene saxifraga* series, a widespread and polymorphic core taxon is surrounded by isolated, mostly quite local, morphologically reasonably well differentiated outposts that may happily keep their traditional status of independent species, to name: *S. antri-jovis* Greuter & Burdet in Central and E Crete, *S. conglomeratica* Melzh. from a single locality in N Central Peloponnisos, *S. dirphya* Greuter & Burdet from Mt Dirfi on Evvia, and *S. taygetea* Halácsy ex Vierh. from Mt Taigetos. *S. saxifraga* proper is found in N Greece, E of the Pindos range, and is a variable species within which the recognition of subspecies would be premature. It includes the large-flowered taxon that is predominant in E Makedonia, to which Melzheimer (in Strid 1986: 155) has misapplied the name *S. balcanica* (Urum.) Hayek (in fact designating a plant from Central Bulgaria with normal-sized flowers but said to have red anthers – presumably a smut-infected specimen) and which, when treated at varietal rank, is correctly named *S. saxifraga* var. *pirinica* Stoj. & Acht. (\equiv *S. stojanovii* Panov); it also includes a yet unnamed variant, known from a single, inadequate specimen (Nomos Xanthi, WNW of the village Dimari, *Stamatiadou 20713*, ATH), that grows at the southeastern limit of the range of the species and requires further study.

The *Silene parnassica* series, in contrast, consists of taxa of more nearly equivalent weight, with mostly contiguous if vicarious distributional ranges (Fig. 9) and with some transitional forms or populations tending to blur their boundaries. Only one of them, *S. orphanidis* Boiss. from Mt Athos, is sufficiently distinctive to deserve specific rank. All the others are better, I believe, treated as subspecies of a single species. To these, one may upon further study have to add the closely related *S. hayekiana* Hand.-Mazz. & Janchen, an E Alpine to NW Illyrian taxon that would then represent a northwestern extension of the range of *S. parnassica*. One should note that records of the latter species from the Italian peninsula (see e.g. Jalas & Suominen 1986: 75) are obviously incorrect. A key and nomenclatural synopsis is provided hereunder for all Greek taxa of the *S. saxifraga* group.

1. Anthophore (2–)3–7 mm, not elongating through anthesis; capsule only slightly exceeding the calyx that sheathes it below and is torn open irregularly by its growth 2
- Anthophore 6–26 mm in fruit, elongating conspicuously through anthesis; capsule completely exerted from the calyx which may retreat by shrinkage or become split on one side 7
2. Calyx 7–10(–11) mm; anthophore 2–4 mm 3
- Calyx 10–15 mm; anthophore 4–7 mm 6
3. Plants caespitose; leaves linear to linear-lanceolate, less than 2 mm wide 4
- Plants matted; leaves lanceolate-spathulate to spathulate, mostly 2–3 mm wide 5

4. Loosely caespitose, leafy in the lower third; anthophore 3–4 mm; seeds smooth or slightly verruculose on the back (N Central Greece on Mts Tzena, Voras, and Olimbos; S Europe from Spain to the Balkans) *S. saxifraga* var. *saxifraga*
 - Dwarf, densely caespitose, with leaves all crowded near the base; anthophore 2–3 mm; seeds muricate (Peloponnisos: Mt Taigetos) *S. taygetea*
5. Perennial axes rooting; leaves membranous, spatulate, often obtuse; calyx 6–8 mm (Evia: Mt Dirfi) *S. dirphya*
 - Perennial axes non-rooting; leaves firm, decaying tardily, lanceolate-spatulate, acute; calyx 9–11 mm (Peloponnisos: Vouraikos valley) *S. conglomeratica*
6. Stems usually branched, 15–35 cm; leaves linear to linear-lanceolate, less than 2 mm wide (NE Greece, S Bulgaria) *S. saxifraga* var. *pirinica*
 - Stems unbranched, mostly 5–10 cm; leaves oblanceolate, the larger 2–4 mm wide (Central and E Crete) *S. antri-jovis*
7. Pedicels 0.5–1(–4) mm, the bracteoles apparently supporting the flower; anthophore 20–26 mm in fruit; petal lobes obovate (Mt Athos) *S. orphanidis*
 - Pedicels 4–50 mm, the bracteoles distant from the flower; anthophore 6–18 mm; petal lobes linear *S. parnassica* 8
8. Calyx covered with glandular and eglandular hairs; leaves often scabrid-pubescent on the faces (N Central Greece: Mt Vourinos) subsp. *vourinensis*
 - Calyx glabrous; leaves scabrid on margins and keel but glabrous on the faces 9
9. Innovations short, much more compact than the leafy part of the stems; leaves triquetrous-canaliculate, subulate, c. 0.5 mm wide (N and E Central Greece: Mts Olimbos to Mt Ossa) subsp. *dionysii*
 - Innovations ± elongated, evenly leafy, resembling the leafy part of the stems; leaves flat, linear to linear-lanceolate, the larger 1–2.5 mm wide 10
10. Stems usually with one to several flower-bearing side-branches; calyx 12–18 mm; anthophore 11–15 mm (N Central Greece, E of the Pindos range; Central Balkans) subsp. *serbica*
 - Stems normally unbranched; either calyx longer or anthophore shorter 11
11. Calyx 10–14 mm; anthophore 5–10 mm; capsule about equalling the anthophore (from Peloponnisos to the Pindos range; S Albania) subsp. *parnassica*
 - Calyx 17–24 mm; anthophore 10–16 mm; capsule shorter than the anthophore (on ophioliths: N Pindos; SE Albania) subsp. *pindicola*

Silene saxifraga L., Sp. Pl.: 421. 1753. – Lectotype (Talavera & Muñoz 1989: 443): [France], “prope Massiliam in montibus”, Herb. Burser XI: 128 (UPS [photo!]).

Silene saxifraga var. *pirinica* Stojanov & Acht. in Izv. Carsk. Prir. Inst. Sofija 12: 184. 1939 ≡ *S. stojanovii* Panov in Dokl. Bulg. Akad. Nauk 26: 1229. 1973. – Holotype: [Bulgaria], “Mt. Pirin, supra refugium Banderica”, 1950 m, *Achtarov* (SOM No. 23344).

Silene taygetea Halácsy ex Vierh. in Mitt. Naturwiss. Vereins Univ. Wien, ser. 2, 4: 55. 1906 ≡ *Saxifraga fruticulosa* subsp. *taygetea* (Halácsy ex Vierh.) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 270. 1924. – Holotype: [Greece, Peloponnisos, Lakonia], “in regione alpina m. Taygeti, ad rupes (Megala Zonaria, Kukochioni etc.)”, 7. 1899, *Zahn* in Heldreich, Herb. Graec. Norm. No. 1512 (WU, herb. Halácsy; isotypes: B!, G!, PR!, WU).

Silene dirphya Greuter & Burdet in Willdenowia 13: 281. 1984 ≡ *Saponaria caespitosa* Sm., Fl. Graec. Prodr. 1: 282. 1809 [non DC. in Mém. Agric. Soc. Agric. Dép. Seine 11: 78. 1808] ≡ *Saponaria smithii* Ser. in Candolle, Prodr. 1: 367. 1824 ≡ *Silene smithii* (Ser.) Boiss. & Heldr. in Boissier, Diagn. Pl. Orient., ser. 2, 1: 77. 1854 [non J. F. Gmelin, Syst. Nat. 2: 714. 1791] ≡ *Silene saxifraga* subsp. *smithii* (Ser.) Nyman, Consp. Fl. Eur.: 92. 1878. – Descr. from [Greece], “in Delphi monte Euboeae”, *Sibthorp*.

Silene conglomeratica Melzh. in Willdenowia 13: 123. 1983. – Holotype: [Greece, Peloponnisos, Achaia], “in rupestribus calcareis regionis abietinae prope coenobium Mega Spilaeon”, 800–900 m, 16. 6. 1893, *Halácsy* (WU).

Silene antri-jovis Greuter & Burdet in Willdenowia 16: 440. 1987 ≡ *S. fruticulosa* Sieber ex Oth in Candolle, Prodr. 1: 376. 1824 [non M. Bieb., Tabl. Prov. Mer Casp.: 115. 1798] ≡ *S. saxifraga* subsp. *fruticulosa* Arcangeli, Comp. Fl. Ital., ed. 2: 312. 1894. – Holotype: [Greece, Kriti], “in m. Ida”, *Sieber* (herb. Oth, lost?; isotypes: JE!, PR!).

Silene orphanidis Boiss., Fl. Orient. 1: 651 (1867). – Lectotype (designated here): [Greece, E Makedonia], “in regione superiori montis Athos”, 1860 m, 18./30. 8. 1862, *Orphanides 348* (G-BOIS!).

Silene parnassica Boiss. & Spruner in Boissier, Diagn. Pl. Orient. 8: 91. 1849 ≡ *S. saxifraga* var. *parnassica* (Boiss. & Spruner) Halácsy in Verh. K.K. Zool.-Bot. Ges. Wien 48: 706. 1899 ≡ *S. saxifraga* subsp. *parnassica* (Boiss. & Spruner) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 269. 1924. – Holotype: [Greece, Sterea Ellas], “auf dem Parnaß”, 1849, *Spruner* (G-BOIS!).

Silene parnassica subsp. *yourinensis* Greuter in Willdenowia 14: 47. 1984. – Holotype: [Greece, W Makedonia], “Mt. Vourinos, summit and northern ridge”, 1600–1850 m, 26. 7. 1978, *Greuter 16349* (B!; isotype: herb. Greuter!).

Silene parnassica subsp. *dionysii* (Stoj. & Jordanov) Greuter, **comb. & stat. nov.** ≡ *S. dionysii* Stoj. & Jordanov in God. Sofijsk. Univ. Fis.-Mat. Fak. 34: 175. 1938 ≡ *S. dionysii* var. *elata* Stoj. & Jordanov in God. Sofijsk. Univ. Fis.-Mat. Fak. 34: 176. 1938. – Lectotype (Kuzmanov 1971: 197): [Greece, W Makedonia], “In rupibus calcareis mt. Olympo Thessaliae in valle Enipevs, non procul ad Monast. Hagion Dionysios”, 1450 m, 20. 7. 1937, *Stojanov & Jordanov* (SO).

Silene parnassica subsp. *serbica* (Vierh. & Adamović) Greuter, **comb. nova** ≡ *S. serbica* Vierh. & Adamović in Mitt. Naturwiss. Vereins Univ. Wien, ser. 2, 4: 51. 1906 ≡ *S. multicaulis* var. *serbica* (Vierh. & Adamović) Hayek in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 269. 1924 ≡ *S. multicaulis* subsp. *serbica* (Vierh. & Adamović) Trinajstić & Zi. Pavletić in Trinajstić, Suppl. Fl. Anal. Jugosl. 6: 14. 1979. – Several syntypes from SW Srbija, Crna Gora and N Albania (W, WU).

Silene parnassica subsp. *pindicola* (Hausskn.) Greuter, **comb. & stat. nov.** ≡ *S. pindicola* Hausskn. in Mitt. Geogr. Ges. (Thüringen) Jena 5(2): 85. 1887. – Lectotype (designated here): [Greece, Pindos range], “in summo montis Zygos (Lakmon veter.) supra Metzovo”, 1200–1500 m, 7. 1885, *Haussknecht* (JE [with Janka label]!; isotypes: JE [3 sheets]!, LD!).

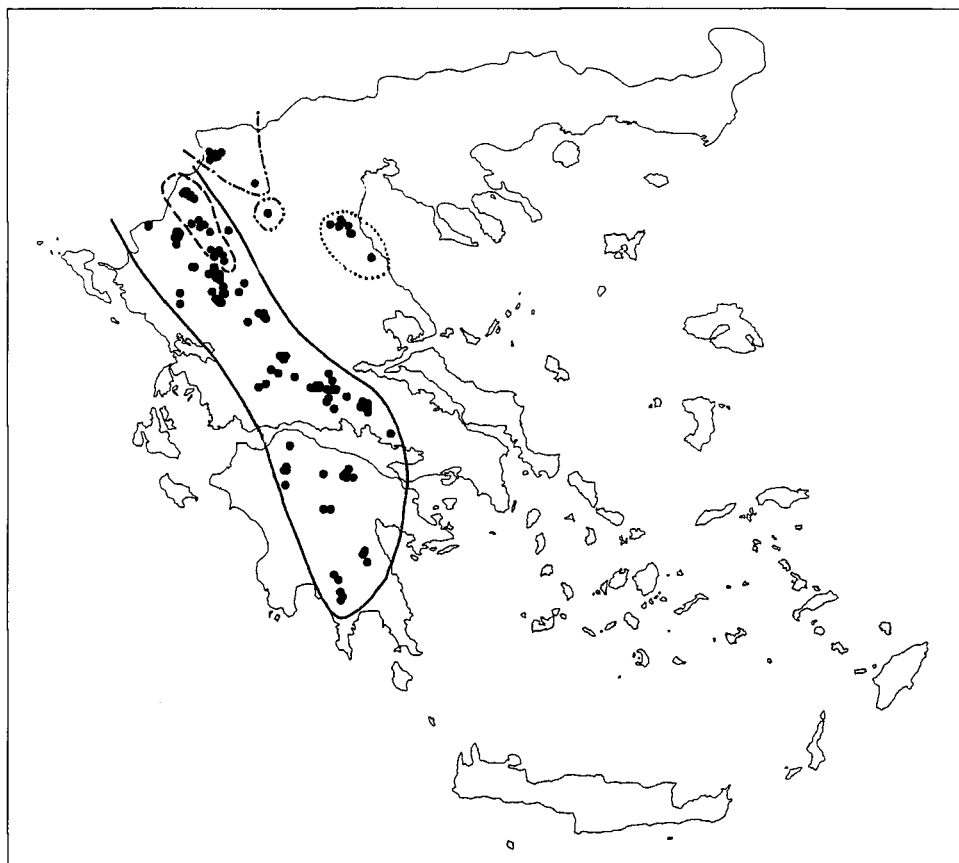


Fig. 9. Distribution of *Silene parnassica* in Greece: subsp. *serbica* (N of the broken-and-dotted line), subsp. *pindicola* (broken line: total distribution), subsp. *parnassica* (solid line), subsp. *vourinensis* (broken-and-double-dotted line: total distribution), and subsp. *dionysii* (dotted line: total distribution).

Three Greek subspecies in *Silene pusilla*

Silene pusilla Waldst. & Kit. is an extremely variable species in the Balkan Peninsula, where many subspecies and variants, plus several more or less distinctive species belonging to the same complex, have been described and named. Unfortunately Neumayer's planned monographic treatment was never completed, and regional floras have often added to the confusion rather than resolving it. A long-needed overall biosystematic revision will probably greatly reduce the number of recognized taxa. Within Greece, three chorologically well defined and morphologically fairly clear-cut subspecies can be recognized (Fig. 10). What is perhaps a fourth subspecies has been recorded under the designation *S. pusilla* var. *pudibunda*

(Hoffmanns.) Jordanov & Panov from several mountains of S Bulgaria, just outside the Greek border, but is yet to be found in NE Greece.

The first of the Greek subspecies, *Silene pusilla* subsp. *albanica* (K. Maly) Greuter & Burdet, has often been considered a straightforward synonym of *S. pusilla* sensu stricto, but it has a number of features to distinguish it from the Central European populations of that species. It is perhaps somewhat variable in, e.g., petal size, shape and colour, but has a fairly uniform habit and habitat (moist gravel, brooksides and springs, mostly in trickling water); splitting it even further – as suggested on Neumayer's determinavit labels in, e.g., the Florence Herbarium – does not seem feasible. A single collection from Mt Agrafa (*Andersson & Franzén 660*) somewhat resembles the next subspecies but, judging from its habitat and general habit, is more likely a glandular-pubescent, dwarf variant of subsp. *albanica*; it requires further investigation.

Silene pusilla subsp. *chromodonta* (Boiss. & Reuter) Greuter is a local endemic of Mt Olimbos and has usually been considered as specifically distinct from *S. pusilla*. However, some of the alleged differences between the two taxa are either completely imaginary or tend to break down when more material is examined. This is true, in particular, for petal shape, seed size, and relative or absolute length of the dorsal seed papillae. The remaining differences either concern general habit, being obviously correlated with the peculiar habitat of the plants (damp, shaded limestone rocks), or the indumentum, or other features that are known to vary among the various subspecific taxa of *S. pusilla*.

The third subspecies of the lot, newly described here, is again restricted to a single mountain massif, Mt Timfi in Ipiros. Melzheimer (in Strid 1986: 166), and some others before him, have included the Timfi population in *Silene chromodonta*, with which it has indeed considerable affinity, also sharing its habitat. Constant if unobtrusive differences in indumentum features, together with the largish geographical gap separating the two taxa, makes it advisable to recognize it as an entity of its own. A synopsis of Greek *S. pusilla* follows.

Silene pusilla Waldst. & Kit., Descr. Icon. Pl. Hung.: 325. 1807 ≡ *Heliosperma pusillum* (Waldst. & Kit.) Reichenb., Icon. Fl. Germ. Helv. 5–6: 78. 1844 ≡ *S. quadridentata* subsp. *pusilla* (Waldst. & Kit.) H. Neumayer in Österr. Bot. Z. 72: 277. 1923. – Descr. from [Hungary] Mts Mrzin, Plissvicza and Velebitch.

1. Loosely matted; calyx obconical, herbaceous, with sessile or subsessile glands; capsule several times as long as the anthophore, distinctly exceeding the calyx (W Greece and Peloponnisos, E to Mt Tzena; Albania, F.Y.R. Makedonija [etc.?.]) . . . subsp. *albanica*
 - Caespitose; calyx clavate, membranous, with stipitate glands or glandular hairs; capsule 2–3 times as long as the anthophore, about equalling the calyx 2
2. Plant covered with slender glandular (or partly eglandular) hairs in all its parts (Mt Olimbos) subsp. *chromodonta*
 - Plant with stipitate glands on calyces and pedicels, and long, flexuous, mostly eglandular cilia in its lower parts, glabrous elsewhere (Ipiros: Mt. Timfi) subsp. *tymphaea*

Silene pusilla subsp. *albanica* (K. Malý) Greuter & Burdet in Willdenowia 12: 190. 1982 ≡ *Heliosperma albanicum* K. Malý in Wiss. Mitt. Bosnien Herzegowina 10: 634. 1907 ≡ *S. quadridentata* subsp. *albanica* (K. Malý) H. Neumayer in Österr. Bot. Z. 72: 285. 1923. – Holotype: [Albania], “ad pontem supra Kiri prope Planti terr. Pulati distr. Scutari”, 22. 7. 1897, *Baldacci 104* (isotype: G!).

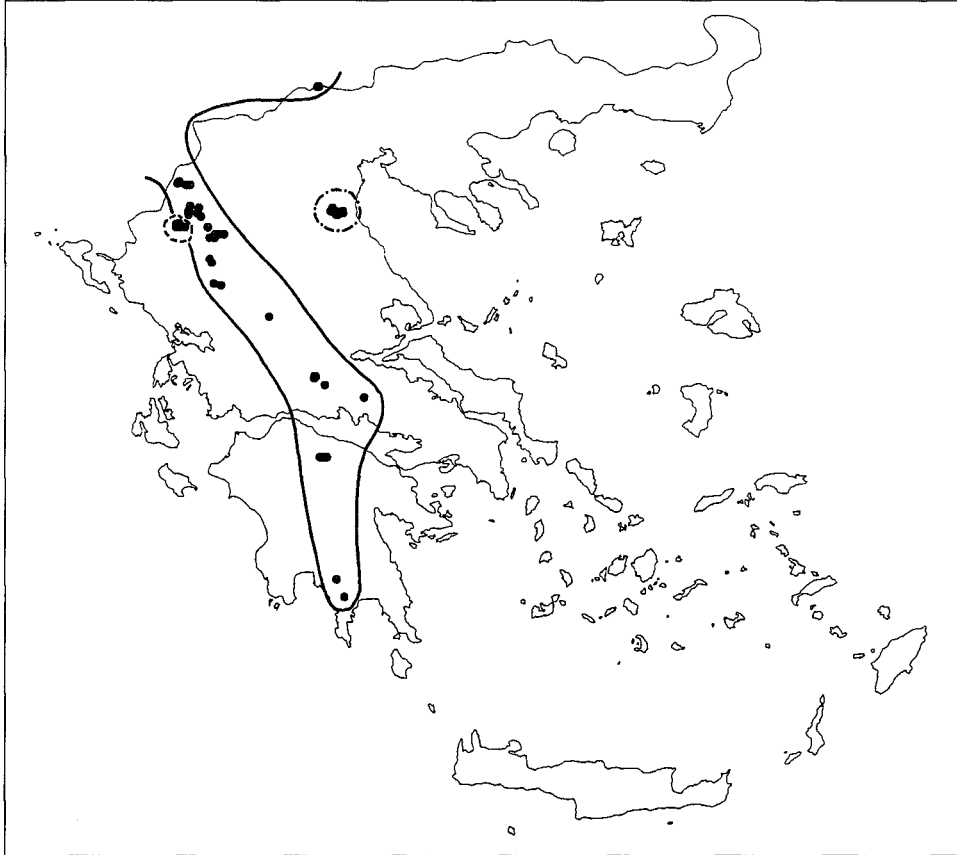


Fig. 10. Distribution of *Silene pusilla* in Greece: subsp. *pusilla* (N of the solid line), subsp. *tymphaea* (broken line: total distribution), and subsp. *chromodonta* (broken-and-dotted line: total distribution).

Silene pusilla subsp. *chromodonta* (Boiss. & Reuter) Greuter, **comb. nova** \equiv *S. chromodonta* Boiss. & Reuter in Boissier, Diagn. Pl. Orient., ser. 2, 1: 71. 1854 \equiv *Heliosperma chromodontum* (Boiss. & Reuter) Juratzka in Verh. K. K. Zool.-Bot. Ges. Wien 8: 38. 1858 \equiv *S. quadridentata* subsp. *chromodonta* (Boiss. & Reuter) H. Neumayer in Repert. Spec. Nov. Regni Veg. Beih. 30(1): 266. 1924. – Holotype: [Greece], “ad rupes in reg. nivali m. Olympi Thessaliae”, 24.–31. 7. 1851, *Heldreich 2416* (G-BOIS!; isotype: FI-W!).

Silene pusilla subsp. *tymphaea* Greuter, **subsp. nova** – Holotype: [Greece, Ipiros, Mts Timfi], “in latere boreo-occidentali montis Ploskos”, 1800–1900 m, 20. 8. 1974, *Greuter 12466* (herb. Greuter!; isotypes: ATH!, UPA!) – Fig. 11.

Subspeciei *chromodontae* similis sed in parte media glabra; pili longi, albi, flexuosi, rite eglandulosi adsunt ad margines petiolorum, nonnusquam in facie superiore foliorum surculo-

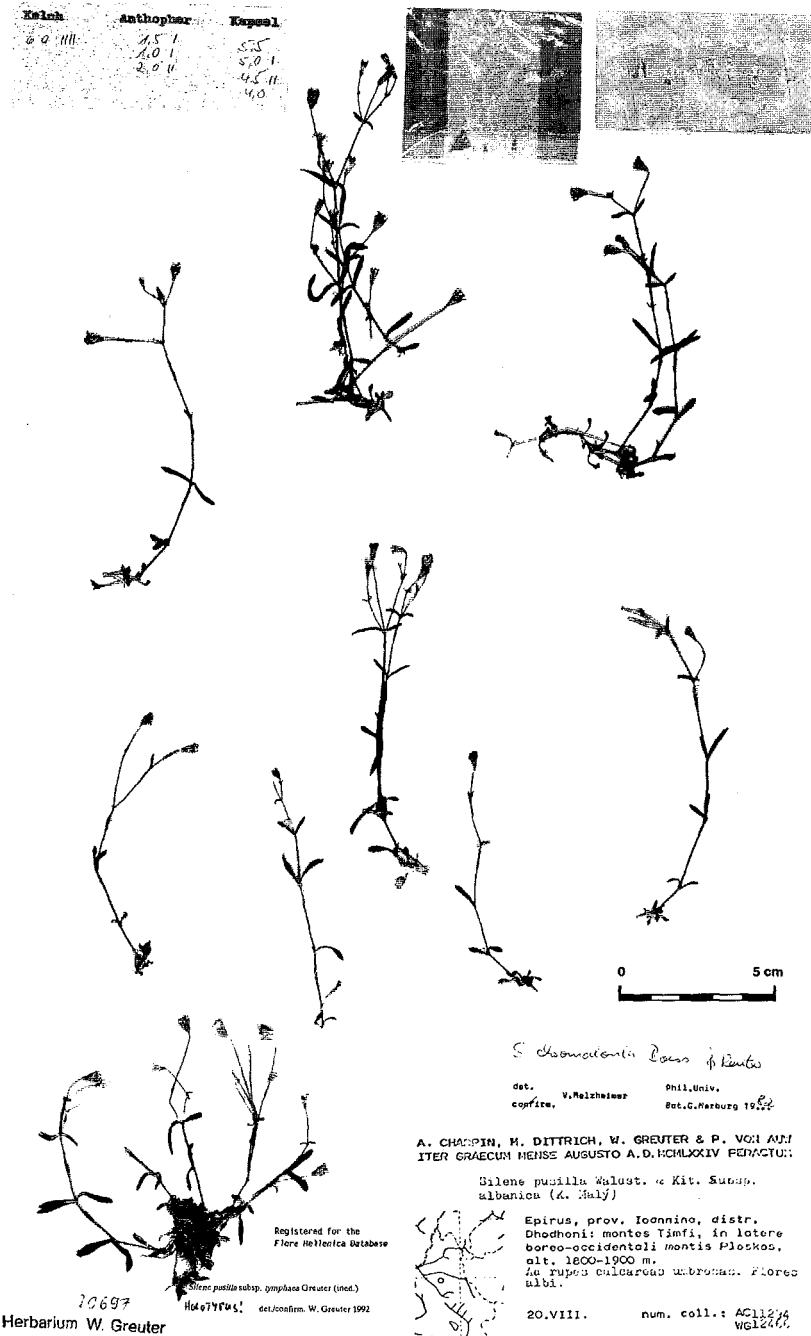


Fig. 11. *Silene pusilla* subsp. *typhaea* Greuter (holotype specimen).

rum et interdum ad basin internodiorum infimorum; pedicelli et calyces glandulis subsessilibus vel breviter stipitatis obsiti. Petala alba, raro roseo-suffusa.

Some new and neglected annual taxa

The Cretan endemic *Silene pinetorum* Boiss. & Heldr. has long been known to exist in two disjunct areas on that island: one in the east, which was first discovered by Heldreich in 1846 and from where the species was originally described, and a second one in the south-west, in the gorges of the Sfakia region. The two populations differ in habit, with the eastern plants showing a lower and more compact growth, so that Zaffran (1976: 37–38), in the first, preliminary version of his Cretan floristic account, listed the western plants under the designation “*Silene* sp. nov.,” intending to publish it later jointly with myself. That idea was soon abandoned, however, particularly since a scanning microscope study of the seeds revealed no tangible differences.

The “Flora hellenica” account of *Silene* sect. *Rigidulae* (Boiss.) Šiškin, to which *S. pinetorum* belongs, is being authored by Bengt Oxelman. During its preparation we both came independently to the conclusion that there are indeed structural differences between the two populations, concerning the indumentum and the shape of the coronal scales if not the seeds, and that they justified the recognition of distinct subspecies which we shall propose jointly below. The material at our disposal is now fairly large, and we feel confident that the differences, if minute, are stable. The area of the western taxon has recently been widened by its discovery in the neighbouring eparchia of Monofatsi (E of Sfakia) by Ralf Jahn (UPA!, unpublished data).

Silene pinetorum Boiss. & Heldr. in Boissier, *Diagn. Pl. Orient.* 8: 75. 1849. – Lectotype (designated here): [Greece, Kriti], “in lapidosis apricis pineti au Psychro sur le revers méridional du Mt. Cavoutsi (Sitia)”, 900 m, 27. 4. 1846, *Heldreich 1442* (G-BOIS!; isotypes: FI!, FI-W!, G!, G-BOIS!).

1. Rosette leaves and lower stem internodes shortly pubescent, cauline leaves hairy on both sides; coronal scales denticulate, with 2–3 uneven, triangular teeth (E Kriti, Eparchia Sitia) subsp. *pinetorum*
- Rosette leaves and lower stem internodes glabrescent, cauline leaves hairy above but glabrous beneath; coronal scales deeply lacerate into 2–4 upright, tentacular, subulate lacinae (SW Kriti, Eparchias Sfakia and Monofatsi) subsp. *sphaciotica*

Silene pinetorum subsp. *sphaciotica* Oxelman & Greuter, **subsp. nova** – Holotype: [Greece, Kriti, Ep. Sfakion], “zwischen dem unteren Ende der Samaria-Schlucht und dem Hafen von Ajia Roumeli”, 40–60 m, 30. 5. 1984, *Matthäs 1621* (B!; isotypes: C!, GB!, PAL!, UPA!, herb. Greuter!, herb. Matthäs!).

Folia rosularum et basis caulium glabrescentia, folia caulina superne pilosa sed in facie inferiore glabra; coronae squamulae in lacinas 2–4 erectas, subulato-tentaculares profunde laceratae.

The annual *Silene* sect. *Behenantha* Otth is represented in Greece by no less than 11 species, some of which are very similar and difficult to tell apart, yet showing little variation and quite characteristic distributional patterns. Some of these taxa have often been lumped in



FLORA CRETICA

Caryophyllaceae

Silene pinetorum Boiss. & Heldr.
subsp. *sphaciotica* Oxelman & Greuter

Siakiá, Weg zwischen dem unteren Ende der
Samaría-Schlucht und dem Hafen von Aja Rouméli,
35°14'00"-14°30" N / 23°57'50"-58°00" E.
Phryganafuren und Schotterflächen, 40-60 m.

30. Mai 1984
leg. U. Matthäs No. 1621

Silene pinetorum Boiss. & Heldr.
subsp. *sphaciotica* Oxelman & Greuter

HOLOTYPE! rev./det. W. Greuter, 1995



Mus. bot. Berol.

Fig. 12. *Silene pinetorum* subsp. *sphaciotica* Oxelman & Greuter (holotype specimen).

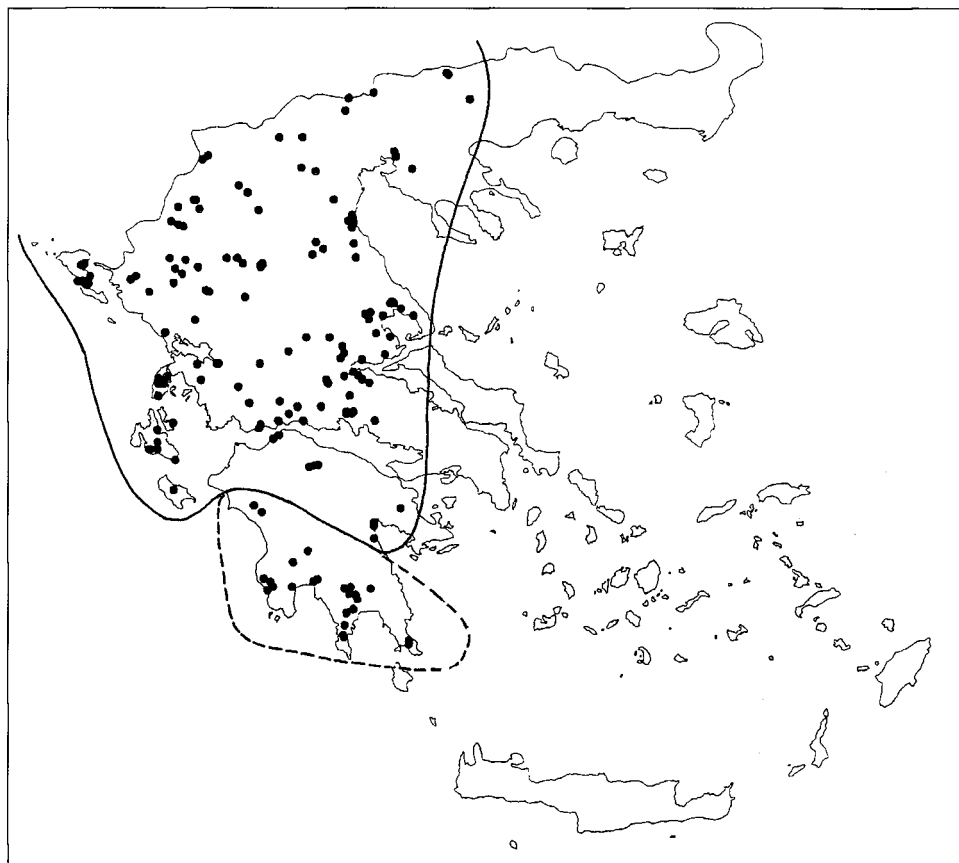


Fig. 13. Distribution of *Silene graeca* in Greece (N of the solid line), and total distribution of *S. nutabunda*

the past, e.g. *S. tenuiflora* Guss. with *S. cretica* L., and *S. pseudobehen* Boiss. or *S. reinholdii* Heldr. with *S. behen* L. One such species has not yet been recognized at all, having always been confused with *S. graeca* Boiss. & Spruner. The two taken together form a closely related vicarious pair, of which *S. graeca* is the more widespread, ranging from N Peloponnisis through the Ionian Islands and mainland Greece to S Albania, the F.Y.R. Makedonija, and southwesternmost Bulgaria; whereas the new species is endemic to SW Peloponnisis (Fig. 13). In fact, the original material of *S. graeca* was found to be mixed, which makes the past confusion even more easy to explain. Here follows a comparison of the two.

1. Pedicels and flowers erecto-patent throughout anthesis; calyx (11-)12-15 mm, its teeth semicircular to squarish in outline, broadly rounded to truncate, remaining flat; anthophore 2.5-3.5 mm; petal claws forming a narrow tube that protrudes by 1-4 mm beyond the calyx teeth; coronal scales forming a low rim, obliquely truncate, wider than long; capsule cylindrical-ellipsoidal, 7-10 mm, c. twice as long as wide *S. graeca*

- Pedicels becoming patent to reflexed at full anthesis, with the flowers nodding; calyx (8–)9–11 mm, its teeth ovate, rounded, with margins tending to inroll at maturity; anthophore c. 2 mm; petal claws not or scarcely protruding beyond the calyx teeth, not forming a narrow tube; coronal scales 1.5–2 mm, obliquely lanceolate, sometimes bidentate; capsule broadly ellipsoidal, 6–7 mm, c. 1.5 times as long as wide *S. nutabunda*

Silene graeca Boiss. & Spruner in Boissier, Diagn. Pl. Orient. 1: 36. 1843. – Lectotype (designated here): [Greece, Peloponnisos, Argolis], “Arachnaeon”, 1841, *Spruner* (G-BOIS!; isotype: C!).

Silene nutabunda Greuter, **sp. nova** – Holotype: [Greece, Peloponnisos, Messinia], “Ep. Pilia: Bucht Voidhokoilia zwischen Petrohori und Paleokastro Navarinou”, 0–5 m, 17. 4. 1979, *Greuter & Merxmüller 17203* (herb. Greuter!; isotype: B!). – Fig. 14.

Flores dum optime expansi nutantes, pedicello patente vel reflexo, serius denuo suberecti; calyces (8–)9–11 mm longi, florendi tempore interdum subinflati cylindrico-campanulati, dentibus ovatis rotundatis margine saepe demum involuto; anthophorum c. 2 mm longum; ungues petalorum calycem vix excedentes, haud in tubum angustum dispositi; squamulae coronae 1.5–2 mm longae oblique lanceolatae nonnunquam bidentatae; lamina alba vel raro pallide rosea; capsula late ellipsoidal, 6–7 mm longa, latitudine sesquialongior. Notae caeterae ut in affini *S. graeca*.

The Greek members of the equally annual *Silene* subg. *Conoimorpha* (Ott) Fenzl have lately been revised by Pirker and myself. Owing to delay in publication of the corresponding treatment (Pirker & Greuter 1995) the single new nomenclatural validation required is effected hereunder. The detailed rationale for recognizing this hitherto neglected N Aegean endemic as a separate species will be found in the forthcoming revision.

Silene grisebachii (Davidov) Pirker & Greuter, **comb. & stat. nov.** ≡ *S. subconica* var. *grisebachii* Davidov in Trav. Soc. Bulg. Sci. Nat. 8: 52. 1815 ≡ *S. subconica* subsp. *grisebachii* (Davidov) Jordanov & Panov in Jordanov, Fl. Nar. Rep. Bălg. 3: 512. 1966 ≡ *Pleconax subconica* subsp. *grisebachii* (Davidov) Šourková in Österr. Bot. Z. 119: 580. 1972. – Lectotype (Kuzmanov 1971): [Greece, Thraki], “In arenosis maritimis Thraciae occident.: ad ostium rivi Maritza”, 18. 5. 1914, *Davidov* (SOM No. 23424).

Vaccaria hispanica*, the large-flowered variant of Linnaeus’s *Saponaria vaccaria

The variation observed within the genus *Vaccaria* N. M. Wolf has been, and still is, interpreted very differently by different authors in taxonomic terms. Whereas some (e.g. Rechinger 1988: 337–341) recognize four different species, others such as Greuter, Burdet & Long (1984: 288–289) treat them as subspecies, perhaps a majority (e.g. Cullen in Davis 1967: 177–179) have them as varieties, and quite a few, like Villar (in Castroviejo & al. 1990: 419–420), do not formally recognize them at all.

In Greece, where *Vaccaria* occurs as a weed, two variants are found: one, which has relatively small, deeply coloured flowers, becomes more frequent inland and northwards; the other, which has larger and usually brighter flowers, predominates in the south and in coastal areas. They are not however sharply delimited, nor do they show a distinct distributional



Fig. 14. *Silene nutabunda* Greuter (holotype specimen).

pattern, and since they both have large and widely overlapping synanthropic areas, extending over much of the Mediterranean region and beyond, treating them as varieties is certainly most appropriate. (This does not preclude maintaining the two rather distinctive other taxa, found in SW Asia but absent from Greece, at subspecific rank.)

Burt & Lewis (1952: 342), when typifying *Saponaria vaccaria* L. by a specimen in the Clifford Herbarium (BM), made it clear that their lectotype specimen, and therefore “typical” *S. vaccaria*, corresponds to the small-flowered variant, which they contrasted with var. *grandiflora* Fischer ex Ser. Rauschert (1965, 1966) pointed out that the epithet *hispanica* is the earliest one available under *Vaccaria*, and he therefore made the new combination *V. hispanica* (Miller) Rauschert to replace *Saponaria vaccaria* L., and its homotypic synonyms, for use in a collective sense; he did not, however, refer to infraspecific taxonomy and nomenclature. Subsequent authors, none of whom has likely consulted Miller’s original treatment, have automatically and invariably taken it for granted that *S. hispanica* Miller and Linnaeus’s *S. vaccaria* must be one and the same plant. They were almost certainly wrong.

Miller (1768) contrasts *Saponaria vaccaria* and his new *S. hispanica* (which he named *S. amplicimus* in the main entry, replacing the epithet by *hispanica* in the Errata at the end) in several ways, principally by overall size, leaf shape and dimensions, petal features, and geographical origin. *S. vaccaria* is said to originate from S France and Italy, grow to “near a foot and a half high”, have oblong-ovate, sessile leaves 1.5 by 0.5 inches, and petals that “are but small; ... obtuse, and of a reddish purple colour”. *S. hispanica* is as one might guess a Spanish plant, “about two feet high”, with “oval spear-shaped leaves three inches long, and an inch and a half broad ... , and half embrace the stalks with their base”, and “five obtuse red petals, which spread open flat above the empalement [calyx]”. The latter description obviously applies to the large-flowered variant, which is usually more robust and has larger leaves on average. This means that *S. vaccaria* var. *grandiflora* must be regarded as a straight-forward synonym of *V. hispanica*, whereas *S. vaccaria*, when considered at varietal rank under *Vaccaria*, must be renamed – the varietal epithet *vaccaria* having priority, under the autonym rule, as from 1824. The principal synonymy can be summarized as follows.

Vaccaria hispanica (Miller) Rauschert in *Wiss. Z. Martin-Luther-Univ. Halle-Wittenberg, Math.-Naturwiss. Reihe* 14: 496. 1965 ≡ *Saponaria hispanica* Miller, *Gard. Dict.*, ed. 8: in erratis. 1768. – Descr. from garden plants originating from Spain.

= *Saponaria vaccaria* var. *grandiflora* Fischer ex Ser. in *Candolle, Prodr.* 1: 365. 1824 ≡ *V. grandiflora* (Fischer ex Ser.) Jaub. & Spach, *Ill. Pl. Orient.* 3: ad t. 231. 1850 ≡ *V. perfoliata* var. *grandiflora* (Fischer ex Ser.) Halácsy, *Consp. Fl. Graec.* 1: 190. 1900 ≡ *V. pyramidata* subsp. *grandiflora* (Fischer ex Ser.) Hayek in *Repert. Spec. Nov. Regni Veg. Beih.* 30(1): 218. 1924 ≡ *V. pyramidata* var. *grandiflora* (Fischer ex Ser.) Cullen in *Notes Roy. Bot. Gard. Edinburgh* 27: 214. 1967 ≡ *V. hispanica* var. *grandiflora* (Fischer ex Ser.) Meusel & H. Mühlberg in *Hegi, Ill. Fl. Mitt.-Eur.*, ed. 2, 3: 978. 1971 ≡ *V. hispanica* subsp. *grandiflora* (Fischer ex Ser.) J. Holub in *Folia Geobot. Phytotax.* 11: 83. 1976. – Holotype: [Gruzinia], “Iberia, Tiflis”, 1819, *Fischer* (G-DC!).

Vaccaria hispanica* var. *vaccaria (L.) Greuter, **comb. nova** ≡ *Saponaria vaccaria* L., *Sp. Pl.*: 409. 1753 ≡ *V. pyramidata* Medicus, *Philos. Bot.* 1: 96. 1789 ≡ *V. parviflora* Moench, *Methodus*: 63. 1794, nom. illeg. ≡ *V. perfoliata* Halácsy, *Consp. Fl. Graec.* 1: 189. 1900, nom. illeg. ≡ *V. pyramidata* subsp. *parviflora* Hayek in *Repert. Spec. Nov. Regni Veg. Beih.* 30(1): 218. 1924, nom. inval. – Lectotype (Burt & Lewis 1952: 342): *Herb. Clifford*: 166, *Saponaria* No. 2 (BM!).

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