Silene fetlerii (Caryophyllaceae), a new species from Bulgaria

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A new species, Silene fetlerii D. Pavlova (Caryophyllaceae), found in the Eastern Rhodope Mts., Bulgaria is described. It is distributed in a limited area, mainly in scree and rocky places, and appears to be a new addition to the remarkable serpentine flora. Silene fetlerii belongs to the section Spergulifolii and is morphologically defined mainly by the following features: anthophore shorter than capsule; small pyriform or 3-sulcate capsules; viscid stem nodes; and a greenish-yellow corolla. The plant is hermaphrodite. The differences between S. fetlerii and the morphologically similar species are discussed.

Silene (Caryophyllaceae) is a large genus comprising ca. 700 species, about half of which occur in the Mediterranean area (Greuter 1995). The south Balkans and southwest Asia are considered the main centres of its diversity (Greuter 1995). The section Spergulifolii of Silene contains ca. 20 species distributed mainly in southwest Asia, extending to east Europe and Korea, Japan and NW parts of North America. The section was divided by Chowdhuri (1957) into four subsections: Polyphyllae, Brachycarpae, Repentes and Olgae, based primarily on characters of stems, leaves, calyx, petals and fruits.

According to Jordanov and Panov (1963) and Petrova (1992), the section Spergulifolii in the Bulgarian flora is represented by S. thymifolia and S. supina. While S. thymifolia is found in sandy habitats along the Black Sea coast, S. supina was reported from Northeastern Bulgaria, Znepole region and Tundza hilly region, growing mainly on limestone. Silene thymifolia is characterized mainly by its prostrate-ascending shoots, short, fleshy and ovate leaves, and few flowers in the inflorescence. Silene supina is quite a variable species (Greuter 1997) and some similar taxa (S. pruinosa and S. virgata from Anatolia and western Iran; S. soskai from the Balkan Peninsula) were included in it in some floras (e.g., Schischkin 1936, Coode & Cullen 1967). The variation in S. supina was discussed more recently and a new subspecies from Romania was described by Ciocărlan (2006). The species was taxonomically variously treated in some floristic publications (Chater & Walters 1964, Chater et al. 1993), or regarded as a synonym of S. spergulifolia (Chater et al. 1993, Micevski 1993, Niketić & Stevanović 2012), or S. spergulifolia was a synonym of S. supina (Chater & Walters 1964, Marhold 2011). The taxonomical status of S. supina was presented differently in the Bulgarian floristic treatments (Delipavlov & Chechmedziev 2003, Assyov et al. 2006,
Assyov & Petrova 2012). *Silene spergulifolia* was accepted in the Bulgarian floristic literature only by Delipavlov and Chechmedziev (2003), probably following Chater et al. (1993), but the material in the Bulgarian herbaria (SO, SOM, SOA) was not revised. That taxonomical concept was not accepted in modern floristic and chorological literature, where only *S. supina* has been reported in Bulgaria (Assyov et al. 2006, Assyov & Petrova 2012).

After revision of the material kept in the Bulgarian herbaria in my opinion *S. spergulifolia* is not present in Bulgaria. The populations of *S. supina* and *S. thymifolia* are ecologically well differentiated. *Silene thymifolia* is widely distributed on maritime sands along the Black sea coast while *S. supina* inhabits sandy or calcareous stony places, with a more or less rich vegetation. The populations of *S. supina* distributed in western Bulgaria (Rudina Mt.) differ somewhat in their morphology (inflated calyx with reticulate veins above, linear leaves, shorter stem) from those in eastern Bulgaria, but this needs more detailed analyses.

On the basis of the habit, leaf shape, calyx length and number of the flowers in the inflorescence Greuter (1997) recognized both *S. supina* and *S. spergulifolia* and reported them for Greece. He paid attention to the fairly westward, isolated populations of the otherwise Asiatic *S. spergulifolia* (Thraki, Nom. Evrou, northeastern Greece), its habitat (stony or rocky ground in clearings of deciduous oak woods, on siliceous substrates at 100–750 m a.s.l.) and propounded that those populations may represent an undescribed species.

In Bulgaria such plants in anthesis were found for the first time in June 2002 on the serpentines SW of Fotinovo village, and determined as *S. spergulifolia*. The population grows ca. 85 km northwest of the locality reported by Melzheimer and Greuter (1979) in Greece. In 2010 the same plant was found in another place, ca. 5 km further south, near the village of Chichevo (Kirkovo municipality), also on serpentines. After a detailed morphological analysis of both populations, comparisons with specimens of other species (*S. supina, S. thymifolia, S. spergulifolia*) of sect. *Spergulifoliae* in several herbaria (SO, SOA, SOM, ATH, MA, B), with my own collections, and consulting *Flora NR Bulgaria* (Jordanov & Panov 1966), *Flora Hellenica* (Greuter 1997), *Flora USSR* (Schischkin 1936), *Flora of Turkey* (Coode & Cullen 1967), *Flora Iranica* (Melzheimer 1988), and *Flora Europaea* (Chater et al. 1993), it became clear the populations represented an undescribed species.

**Silene fetleri** D. Pavlova, sp. nova
(Figs. 1–3)


**Etymology**: The specific epithet refers to the Felter hamlet, Kirkovo municipality, where the specimens were collected.

Subshrub, with spreading vegetative shoots and ascending to erect, simple stems 10–25 cm long, densely and very shortly retrorsely eglandular-pubescent, reddish at least in lower part; lower nodes usually viscid. Leaves narrowly linear, to 12 mm long, slightly broader at base; usually with sterile shoots in their axils, lower leaves covering stem, ciliate and ± scabrid; middle and upper leaves 6–12 mm long and 0.5–1 mm broad, grading into herbaceous lanceolate, ciliate, 3–5 × 1.5–2 mm bracts. Inflo-
rescence without glandular hairs, paniculate with 3 (rarely 5) flowers in a terminal dichasium and paired or single-flowered lateral dichasia, solitary or paired in 1–2 preceding nodes, sessile or on 1–2 mm long pedicel. Calyx 6–10 mm long, narrowly cylindrical at anthesis, sometime reddish, with 10 not anastomosing veins, densely glandular; teeth obtuse, ovate, glandular-setose, ciliolate. Anthophore 2–4 mm, puberulent. Petals exceeding calyx, greenish-yellow beneath and cream to pale greenish-yellow on upper surface, 2/3 to 1/2 bifid, limb 5–7 mm; coronal scales reduced to small rims; claw smooth, exceeding calyx. Entirely hermaphroditic. Styles shorter than petals. Stamens not exceeding petals, filiform. Capsule 5–6 mm, with a rounded base, narrowed into an acute neck or 3-sulcate, included in calyx, slightly longer to twice as long as anthophore. Seeds reniform, 1–1.32 × 0.56–0.82 mm, grey to dark reddish-brown; flanks flat to convex; back usually flattish, ca. 0.67 mm broad; testa cells almost flat, the longest cells ca. 0.16 mm, with sinuous margins; hilum cells with a small papilla in the centre of each cell. Flowering in mid-May–June, fruiting in June–July.

Silene fetleri is morphologically very similar to the polymorphic Irano-Turanian species S. sperguliformia and they both clearly belong to sect. Sperguliformia, but there are several diagnostic characters useful in distinguishing the species (Table 1). These two species are quite distinct from S. supina and S. thymifolia, representatives of the same section distributed in Bulgaria, mainly by their linear leaves, dense inflorescence, shape of the capsules, shorter calyces and shorter capsules.

The polymorphism in the flowers of S. sperguliformia related to their sex (Coode & Cullen 1967) is not present in S. fetleri, because the flowers of the latter are exclusively hermaphro-
Fig. 3. SEM micrographs of Silene fetleri seeds. — A: Lateral surface. — B: Back side. — C: Hilum. — D: Papilla (stipitate "gland") in hilum area. — E: Testa cells in flanks. — F: Surface detail of testa cells.

ditic. Such an entirely hermaphroditic population of *S. spergulifolia* was, however, reported from northern Greece (Melzheimer & Greuter 1979, Greuter 1997). The plants from Greece have the anthophore and capsule of equal length, or the anthophore is slightly longer, glandular hairs restricted to inflorescence, triangular-subulate bracts, styles that are longer than petals, a white corolla and a higher number of flowers in the terminal dichasia. Although that population was treated as representing *S. spergulifolia*, in my opinion it is morphologically closer to *S. fetleri*. Although the seed morphology of *S. spergulifolia* was studied by Yıldız and Çırpıcı (1998)
there is no information of papillate cells (stipitate "gland", Greuter 1995) in the hilum area, characteristic of S. fetleri. More investigations of the seeds of S. spargulifolia may confirm this feature to be diagnostic.

The chromosome number of S. fetleri is 2n = 24 (Pavlova 2008, as S. spargulifolia). The same number was also published for S. spargulifolia (Goukasian & Safarian 1990, Goukasian & Nerserian 1992, Nerserian & Goukasian 1995, Yıldız & Çır nanop 1996, Greuter 1997) for populations from Armenia, Turkey and Greece.

HABITAT: Silene fetleri grows on rocky serpentinite slopes with western or southwestern exposure in the Eastern Rhodope Mts. It is a typical serpentinophyte. The vegetation is composed of xerothermic communities of submediterranean type; it includes also some local serpentine endemics (Aethionema rhodopaem, Onosma pavlovae), the Balkan endemics Saponaria stranjensis, Micromeria dalmatica subsp. bulgarica, Anthemis rumelica, Verbascum humile, Thymus bracteosus, Convolvulus boisierii subsp. parnassicus, and some rare species in the Bulgarian flora such as Orchis papilionacea. Silene fetleri is a remarkable member of the local serpentine flora and parts of its vulnerable populations are currently included in a newly protected area. The same habitat is also included in the electronic version of the Red Data Book of the natural habitats in Bulgaria (Biserkov 2012) and categorized as vulnerable.


Table 1. Diagnostic morphological characters of Silene fetleri, S. spargulifolia and S. supina.

<table>
<thead>
<tr>
<th>Characters</th>
<th>S. fetleri</th>
<th>S. spargulifolia</th>
<th>S. supina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower stem nodes</td>
<td>usually viscid</td>
<td>never viscid</td>
<td>never viscid</td>
</tr>
<tr>
<td>Leaves (middle and upper)</td>
<td>narrowly linear, ca. 1 mm broad</td>
<td>filiform, ca. 1 mm broad</td>
<td>oblongate to linear spathulate, more than 1 mm broad</td>
</tr>
<tr>
<td>Bracts</td>
<td>lanceolate</td>
<td>narrowly triangular-subulate</td>
<td>ovate lanceolate to elliptic</td>
</tr>
</tbody>
</table>
| Inflorescence          | paniculate with 3-5 rarely 5-flowered terminal dichasium and paired or single-flowered lateral dichasium, solitary or paired at 1–2 preceding nodes | densepaniculate with 5–7 flowered terminal dichasium and 3–5 single-flowered lateral dichasium, solitary or paired at 1–2 preceding nodes | 3–6
| Calyx length (mm)      | 6–10       | 10–12            | 14–19 |
| Calyx veins            | not anastomosing | not anastomosing | anastomosing |
| Anthophore length (mm) | 2–4        | 3–6              | 6–8 |
| Petal color            | greenish-yellow | white to pale yellow | cream to pale greenish yellow |
| Coronal scales         | reduced    | reduced          | ca. 1 mm, well developed |
| Capsule length (mm)    | 5–6        | 3–5              | 7–8 |
| Capsule:anthophore ratio | 2:1 or 1.5:1 | 1:1 or 1.2:1 | acuminated-fusiform |
| Capsule shape          | rounded base, narrowed into acute neck or 3-sulcate | pyriform | |
| Seed color             | grey to dark reddish-brown | grey to black | reddish-brown |
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References


