



Typification of *Sagina ciliata* and *S. stricta* (Caryophyllaceae), two taxa described from Sweden, and notes on the taxonomy of the *S. apetala* complex

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Sagina ciliata Fr. in Liljeblad (1816: 713) was described from southern Sweden on the basis of material collected by Fries himself “på åkerfält vid Nebelöf nära Ystad” (in arable land at Nebelöf near Ystad). The description (in Swedish) is very brief, but the ciliate leaf margins are pointed to. The name has been used in various ways through history and was recently cited as a heterotypic synonym of *S. apetala* Arduino (1764: 22) by Dillenberger & Kadereit (2022). However, no type was designated.

Sagina stricta Fries (1817: 47) was also described from southern Sweden based on material collected by Fries “in littore maris petroso ad Cimbritshamn” [Simrishamn]. The name was fairly soon relegated to synonymy of *S. maritima* Don (1806: no. 155), described from Scotland, but was not typified until Dillenberger & Kadereit (2022) designated two specimens in LD as lectotype and isolectotype. However, this typification is reconsidered here (see under *Sagina stricta*).

Both *Sagina ciliata* and *S. stricta* were illustrated by Billberg (1819) on the basis of material obtained from Fries. The illustration of *S. ciliata*, which was reproduced by Thulin (2021), shows a plant with leaves ciliate in their basal half, and with some of the flowers seemingly with spreading sepals in fruit. These are characters that would indicate *S. micropetala* Rauschert (1969: 413) in the sense of Dillenberger & Kadereit (2022), whereas the details of the sepals, which are acute and white-margined, rather agree with *S. apetala*.

Elias Magnus Fries (1794–1878) studied in Lund, where he got his doctorate in 1814, and this is where he worked until he got a professorship in Uppsala in 1834. After his death, his herbarium was in 1882 acquired by UPS (see Stafleu & Cowan 1976), where his types are normally housed. Original material of both *Sagina ciliata* and *S. stricta* is extant in UPS and is the basis for the typifications presented here.

Sagina ciliata Fr. in Liljeblad (1816: 713)

Lectotype (designated here):—SWEDEN. Skåne: “in arvis et inter segetes ad Nibelöf inter Ystad et Trelleborg”, s.d., E. Fries s.n. (UPS V-1051094!).

Note:—The lectotype is annotated “*Sagina ciliata* Fries”, “*An nova?*” by E. Fries. The specimen has the stamp “Herb. Th. Fries”, Theodor Magnus Fries (1832–1913) being the eldest son of Elias Fries. This is the only specimen of *Sagina ciliata* in UPS collected by E. Fries in “Nibelöf” [Nebelöf, Nöbbelöv]. The annotation “*An nova?*” (probably new?) shows that it must be original material.

Sagina stricta Fries (1817: 47)

Lectotype (designated here):—SWEDEN. Skåne: “Cimbritshamn” [Simrishamn], 7 July 1817, E. Fries s.n. (UPS V-1051091!).

Note:—The lectotype consists of three plants and, apart from “*Sagina stricta* Fr.”, locality and date, also has the annotation “*ubi prima vice detexi*” (where I first discovered it), all in Fries’ handwriting. The sheet, on which later collected material from two other localities in Skåne is also mounted, has the stamp “Herb. E. Fries”.

The lectotypification takes precedence over the typification proposed by Dillenberger & Kadereit (2022). The lectotype and isolectotype designated by them (C.A. Agardh’s herbarium in LD and with his annotations), lack information on collector and date and cannot be proved to be part of the original material and eligible for lectotypification (Arts. 9.3 and 9.4 of *Shenzhen Code*; Turland *et al.* 2018).

Taxonomy of the *Sagina apetala* complex

During a large part of the 20th century, the name *Sagina apetala* was in general use in Europe for plants with at least some of the flowers having sepals spreading in fruit, whereas *S. ciliata* was used for plants with appressed sepals (see, e.g., Hegi 1911 and Friedrich 1962 for central Europe, or Almquist 1942 for Sweden). This is in agreement with the original illustration provided by Arduino (1764) in the protologue of *S. apetala*, which shows a plant with one of the flowers having spreading sepals in fruit.

However, during the latter part of the 20th century, *Sagina apetala* was often treated as a species with two largely sympatric subspecies, subsp. *apetala* with sepals appressed in fruit, and subsp. *erecta* (Hornemann 1834: 3, tab. 2102) Hermann (1912: 182) with sepals spreading in fruit (see, e.g., Clapham & Jardine 1964, 1993, Stace 1997). This is in agreement with the typification of *S. apetala* made by Crow (1978), who designated an Arduino specimen at LINN with sepals appressed in fruit as lectotype. However, Clapham & Jardine (1964, 1993) emphasized that this taxonomy is tentative and that particularly in the Mediterranean region a distinction between two taxa is difficult to maintain.

In the Mediterranean region most authors have recognized a single variable species without infraspecific taxa, stressing that consistent differences are lacking (see, e.g., Cullen 1967, Meikle 1977, Montserrat Martí & Montserrat Martí 1990, Strid 1997). A similar view was taken by Crow (1978, 2005) for North America, where *Sagina apetala* is considered as an alien introduced during the second half of the 19th century.

Rauschert (1969) gave *Sagina apetala* var. *erecta* Horneman (1834: 3, tab. 2102) the rank of species as *S. micropetala*, providing differences from *S. ciliata* (but not from *S. apetala*). Karlsson (2001) used the names *S. micropetala* and *S. apetala* (with *S. ciliata* in synonymy of the latter name) for two taxa in the Nordic countries; Dillenberger & Kadereit (2022) did the same, mainly for Germany, emphasizing that further studies are needed in other areas. According to Karlsson (2001), “in the C and E Mediterranean, and in SW Asia, *S. micropetala* and *S. apetala* are largely replaced by variants showing a combination of characters from both”.

Dillenberger & Kadereit (2022) listed many synonyms under *Sagina apetala*, some of which were typified, noting that all the synonyms at species level have priority over *S. micropetala*, and that further study is needed. Thulin (2021) made a similar comment and pointed particularly to *S. vasconica* Sennen (1936: 145), with type from northern Spain, as a plant that much resembles *S. micropetala*. In any case, the type of *S. ciliata* designated here is in agreement with *S. apetala* in the sense of Dillenberger & Kadereit (2022).

The plants of the *Sagina apetala* complex are highly autogamous or even cleistogamous according to Crow (1978). Therefore, as suggested by Thulin (2021), inbred strains with different combinations of characters that behave as distinct taxa may form and disperse.

Beside North America, *Sagina apetala* was also introduced to South America in the second half of the 19th century. In more recent times, the species has been reported from, for example, Iran, Afghanistan, Pakistan, India, Japan, Australia, New Zealand, Ethiopia, Tanzania and South Africa (Thulin 2021). Thulin (2021) argued that, rather than having regional taxonomies working for certain areas only, we should for the time being follow the many authors, particularly in the Mediterranean region, who recognize a single variable species only. For a subdivision to be acceptable, this should be shown to work globally.

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