

SILENE SECTION *ELISANTHE* IN THE IBERIAN PENINSULA

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RESUMEN.—En esta nota discutimos brevemente la variabilidad, distribución y ecología de *S. dioica*, *S. diclinis*, *S. latifolia* y *S. marizii* para la Península Ibérica. Una quinta especie, *S. noctiflora* parece no corresponder ni a la sección *Elisanthe* ni a la flora ibérica.

SUMMARY.—The variation, distribution and habitats of *S. dioica*, *S. diclinis*, *S. latifolia* and *S. marizii* in the Iberian peninsula are discussed briefly. A fifth species, *S. noctiflora* appears to belong neither to section *Elisanthe* nor to the Iberian flora.

BACKGROUND INFORMATION ON SECTION *ELISANTHE*

Silene section *Elisanthe* (Fenzl) Fenzl is represented in the Iberian peninsula by four dioecious species: *S. dioica* (L.) Clairv. and *S. latifolia* Poir. which are widespread in Europe and *S. marizii* Samp. and *S. diclinis* (Lag.) M. Laínz which are Iberian endemics. A fifth species, the hermaphrodite *S. noctiflora* L., has been reported from Spain (cf. CHATTER & WALTERS, 1964). However, it is now debatable whether *S. noctiflora* should be included either in section *Elisanthe* or, indeed, in the Spanish flora.

Section *Elisanthe* occupies the systematic interface between *Silene*, *Lychnis* and (the presently unfashionable) *Melandrium* (MCNEILL, 1978). This generic interface is not amenable to hierarchical classification and has been plagued by a history of nomenclatural instability. Repeated attempts to improve the situation by shuffling the members of the section between genera have merely led to a formidable complex of synonyms.

S. dioica and *S. latifolia* have played a historic role in the development of biosystematics. One of the earliest reported hybridization experiments was carried out using these two species (see ZIRKLE, 1935) and they were the subject of Baker's classic work on hybridization (e.g. BAKER, 1947; 1950). *S. dioica* and *S. latifolia* have also played central roles in the study of the genetics of sex determination and gametophytic competition (e.g. BLACKBURN, 1923; CORRENS, 1918).

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Although there are differences in the degree of initial crossability, all the dioecious members of section *Elisanthe* are cross-compatible and can give rise to F₁ offspring with moderate to high pollen fertility (PRENTICE, 1978 and unpublished). In contrast, all attempts to cross the hermaphrodite *S. noctiflora* with the dioecious species in the section have failed (PRENTICE, 1978 and unpublished results).

All the dioecious members of the section have distinctive sex chromosomes although the X and Y chromosomes of *S. declinis* (in contrast to those of *S. dioica*, *S. latifolia* and *S. marizii*) are not clearly heteromorphic (NIGTEVECHT & PRENTICE, 1985). Only the hermaphrodite *S. noctiflora* lacks differentiated sex chromosomes.

There is a considerable body of literature on the biochemical genetics of flavone glycosylation in section *Elisanthe*: MASTENBROEK *et al.* (1983) and MASTENBROEK & BREDERODE (1986) summarize the distribution of petal flavones and of alleles at the isovitexin-glycosylation loci within and among the species in section *Elisanthe*. Again *S. noctiflora* deviates from the usual characteristics of the section.

NOTES AND COMMENTS ON THE INDIVIDUAL SPECIES:
VARIATION, DISTRIBUTION AND HABITAT

Silene dioica

S. dioica occurs in montane woodlands and moist montane meadows in northern Spain. The species is given as present in Portugal in Flora Europaea (CHATER & WALTERS, 1964), but most of the Portuguese herbarium material of "*S. dioica*" is in fact *S. marizii*; other Portuguese specimens assigned to *S. dioica* belong to *S. latifolia*, as does all the central and southern Spanish "*S. dioica*" material that I have examined (H.C. PRENTICE unpublished observation).

S. dioica is widespread in Europe (JALAS & SUOMINEN, 1986, map 1189) and, although it hybridizes freely with *S. latifolia*, the two species are naturally separated by their different habitat preferences (cf. BAKER, 1947). *S. dioica* is absent from southernmost Europe, the eastern Mediterranean region and North Africa where *S. latifolia* occupies woodland habitats.

Silene latifolia

This species occurs throughout Europe, the Middle East and North Africa (JALAS & SUOMINEN, 1986, map 1183; PRENTICE, 1986a). There is extensive clinal variation in morphological and biochemical characters within *S. latifolia sensu lato*, but variation in different character sets is not congruent (PRENTICE, 1986b). Attempts to classify this incongruent variation pattern have led to the description of numerous species referred variously *Lychnis*, *Melandrium* and *Silene*. Subsequent new combinations to accommodate each species within the changing preferences for *Lychnis*, *Melandrium* and *Silene* have left a web of synonymy which has made even the task of locating the correct name for the umbrella species *S. latifolia* into a series of unsatisfactory nomenclatural upheavals (cf. text to map 1183, in JALAS & SUOMINEN, 1986). *S. latifolia* is still variously referred to in the literature as *S. alba* (Mill.) E.H.L. Krause and *S. pratensis* Godron & Gren. as well as *Lychnis alba* Mill. and *Melandrium album* (Mill.) Garcke.

All the Iberian material of *S. latifolia* belongs unambiguously to the "western race" on the basis of seed and pollen morphology and flavone biochemistry (PRENTICE, 1986b; MASTENBROEK & BREDERODE, 1986). Seed colour varies from ochre to greyish buff and the seeds have rounded or bluntly conical tubercles and coarse surface granulation (PRENTICE, 1986a). Pollen is reticulate (PRENTICE *et al.*, 1984; PRENTICE, 1987) and the flavone glycosylation genes present at the g, gl and fg loci are gGm, gl and fg respectively (MASTENBROEK *et al.*, 1982; MASTENBROEK & BREDERODE, 1986). Characters such as calyx

inflation and the orientation of the dehiscing capsule teeth were thought to discriminate among races within *S. latifolia* (cf. CHATER & WALTERS, 1964) but it is now clear that these characters show mosaic variation which is not related to the major trends in seed, pollen and flavonoid variation (MASTENBROEK & BREDERODE, 1986; PRENTICE, 1986b). Most of the local isolates of *S. latifolia* in the Iberian peninsula have their own distinctive combination of morphological characteristics. Although it is possible to pick out geographically delimited races (e.g. ssp. *mariziana* (Gand.) Greuter & Burdet), an attempt to impose an infra-specific classification on the variation pattern in Iberian *S. latifolia* is likely, at best, to recognize the most distinctive among a random selection of regional populations and, at worst, to impose a purely artificial structure on a complex and interesting mosaic of local differentiation.

Silene marizii

This distinctive endemic species is perhaps the least-known and studied of the Iberian members of section *Elisanthe* (cf. PRENTICE, 1977). Atlas Florae Europaeae (JALAS & SUOMINEN, 1986, map 1188) gives an accurate picture of the somewhat disjunct distribution of *S. marizii*. The species is best known from Portugal although ROUY (1894) found it in Spain near Ávila in 1889 where it still occurs (PRENTICE, 1977). *S. marizii* is unusual in having a flower-colour polymorphism: both pure chalk-white and pale rose-pink flowered individuals occur together within populations. The morphology and habitat of *S. marizii* are described in PRENTICE (1977).

Silene diclinis

S. diclinis is a highly restricted endemic, found only in open groves associated with limestone cliffs in the province of Valencia (JALAS & SUOMINEN, 1986, map 1191). MANSANET & MATEO (1980) report *S. diclinis* from seven localities in addition to its locus classicus at Játiva. The exact status of this species is unclear –published population counts only exist for the locus classicus and scrub encroachment appears to be leading to a steady loss of the species habitat–. PRENTICE (1984a) reported a ca. 87% reduction in the number of individuals in the "B" subpopulation at Játiva as a result of matorral invasion, and MANSANET & MATEO (1980) also comment on the adverse effects of scrub encroachment. Further information on population sizes would be helpful.

The collector C. Pau (cf. MANSANET & MATEO, 1980) lamented the fact that *S. diclinis* had been reduced by previous collectors at its locus classicus and was himself only able to uproot enough material of *S. diclinis* to make 50 "sheets". Assuming two individuals per sheet and adding the 20 or so individuals that Pau failed to uproot, we get a very rough estimate of a population size of between 100 and 200 individuals at Játiva in the 1880s. Effective population size in this rare dioecious species (at least at Játiva) is further reduced by biased sex ratios (PRENTICE, 1984b) and by infestation by the anther smut *Ustilago violacea* (H. C. PRENTICE unpublished observations in 1974 and 1978). It seems likely that *S. diclinis* has undergone repeated reductions in population size during historical times, and genetic variability within the Játiva population (as assessed by isozyme variation) is low. Both the Játiva and El Picayo populations contain a proportion of flowers with abnormal morphology suggestive of past genetic bottlenecks (PRENTICE, 1984a, 1984b).

Silene noctiflora

The systematic relationships of *S. noctiflora* are unclear. Flavonoid, chromosome and hybridization data, as well as restriction fragment analyses of chloroplast DNA (H. SANDBRINK, in prep.) suggest that this hermaphrodite species is not closely related to the

dioecious members of section *Elisanthe*. All material identified as "*S. noctiflora*" so far examined from the Iberian peninsula has proved to belong to *S. latifolia* (cf. JALAS & SUOMINEN, 1986, map 1182).

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