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## ***Silene notarisii* (Caryophyllaceae), a neglected species of the Central Apennines, Italy**

### **Abstract**

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*Silene* (sect. *Saxifragoides*) *notarisii*, usually wrongly synonymised with *S. saxifraga* or *S. multicaulis*, is shown to be a species allied to but separate from *S. saxifraga* and endemic to the Central Apennines, Italy. The name *S. notarisii* is lectotypified and reliable morphological differences to *S. multicaulis*, *S. parnassica* and *S. saxifraga* are pointed out.

### **Introduction**

*Silene* (sect. *Saxifragoides* Willk.) *parnassica* Boiss. & Spruner was reported for the Italian peninsula by several authors (Lacaita 1913, Pignatti 1982, Chater & al. 1993), but its occurrence has been considered doubtful by Santangelo & al. (1989-90) and Greuter (1995, 1997). Only recently, Gubellini & al. (2001) confirmed its absence from Italy and, at the same time, identified a largely neglected *Silene* in central Italy, which has often been confused with *S. parnassica*, but is instead very close to *S. saxifraga* L.

The taxon was in fact noticed earlier by Italian botanists. Montelucci (1951) named it “*Silene rupicola* Huet”, a binomial applied in 1856 by A. & E. Huet du Pavillon to a plant from Mt Coccia, central Italy, on a herbarium label. Although never published and thus invalid, the name has been used since in the floristic literature of Italy by several authors and for different species. Boreau (1857) attributed it to *S. vulgaris* (Moench) Garcke, Lojacono (1908) and Lacaita (1913) used it at infraspecific rank in *S. saxifraga*, Rohrbach (1869) synonymised it with *S. saxifraga* and Nyman (1878) with *S. multicaulis* Guss., another species of *S. sect. Saxifragoides* but further remote from the *S. saxifraga* group.

Still earlier, however, Cesati (1838) published the name *Silene notarisii* for a plant of the same taxon from Mt Corno, central Italy, and illustrated it (Cesati 1840; reproduced in Fig. 1).



The name was synonymised with *S. saxifraga* by Parlato (1892) and with *S. multicaulis* by Rohrbach (1868), Nyman (1878) and Fiori (1924), before it fell into oblivion, being omitted in all recent floras (Zangheri 1976, Pignatti 1982, Greuter & al. 1984, Chater & al. 1993).

The present study aims at a re-evaluation of *S. notarisii*. We wanted to investigate, whether the populations of the so-named central Italian taxon are specifically distinct from *S. saxifraga*, and to point out the morphological differences to *S. multicaulis*, *S. parnassica*, with which the taxon has been confused so frequently, and to *S. hayekiana* Hand.-Mazz. & Janch.

## Material and methods

**Material.** – The present study is based on both herbarium specimens (from APP, BEOU, CAME, FI, NAP, PESA, PI, RO; herbarium abbreviations according to Holmgren & al. 1990) and field observation of living plants of the four species involved.

Searching for reliable diagnostic features among those previously used for this group (Fiori 1898, 1924, Lacaita 1921), we selected five populations represented in APP with at least 10 specimens and analysed them biometrically. A total of 56 herbarium specimens were included. Among those were 30 specimens of *Silene saxifraga*

- Mt di Viggiano: (Potenza), rupi calcaree, c. 1600 m, 29.7.1999, Conti, D. Lakušić & Küpfer (APP, BEOU) (10 specimens),
- Sirino: M. del Papa (Potenza), vers. E, rupi calcaree, 1800-2000 m, 25.7.1999, Conti, D. Lakušić & Küpfer (APP, BEOU) (10 specimens),
- Pollino: Pollinello-M. Pollino (Potenza), rupi calcaree, c. 1900 m, 26.7.1999, Conti, D. Lakušić & Küpfer (APP, BEOU) (10 specimens).

and 26 specimens of *Silene notarisii*:

- Monti della Laga: da Macchie Piane verso Pizzo di Sevo (Rieti), c. 1600 m, 4.7.1998, Conti (APP) (10 specimens),
- Gran Sasso: Vallone dallo Scoppaturo a Fonte Cupa (L'Aquila), pendii rupestri, 1480-1580 m, 20.7.1999, Conti, D. Lakušić & Küpfer (APP; BEOU) (10 specimens); Fondo della Salsa, Castelli (Teramo), pendii rupestri, 1100-1200 m, 22.7.1999, Conti, D. Lakušić & Küpfer (APP; BEOU) (6 specimens)

Flowers were rehydrated by boiling in water for few seconds before measuring. 16 quantitative continuous and discontinuous characters for the two species were measured (Table 1).

**Statistical analysis.** – The significance of the differences between *Silene notarisii* and *S. saxifraga* was tested using one-way analysis of variance. Normality of the data was verified and the not normally distributed variables were transformed to achieve normality before ANOVA was applied (Sokal & Rohlf 1995).

## Results and conclusions

The statistical comparison of *Silene notarisii* and *S. saxifraga* in 16 quantitative characters is summarized in Table 1. The variance analysis revealed that 11 of the 16 characters analysed show significant differences between both taxa.

The most discriminative features are the number of nodes (lower in *S. notarisii*), the length of the claw, anthophore, carpophore (which is not elongating in *S. saxifraga* and *S. notarisii*), calyx and capsule (all are longer in *S. notarisii*). These results have been further confirmed by the analysis of herbarium specimens and living plants from other central and southern Italian localities. The differences in the dimensions of the seeds (Fig. 3) were not statistically analysed due to a lack of material, but the seeds appear also be larger in *S. notarisii*.

Geographical distribution of the two taxa overlaps only in the regions of Abruzzo, Lazio and Marche. There *S. notarisii* takes the place of *S. saxifraga* exclusively on the highest mountains; *S. saxifraga* is present only on Mt Nerone, Mt Viglio, Pizzo Deta, Velino and in the Abruzzo National Park.

Table 1. Mean and standard error for the characters investigated in *Silene saxifraga* and *S. notarisii*, and the significance of their differences between both taxa according to ANOVA: n.s. = not significant; \* =  $P \leq 0.05$ ; \*\* =  $P \leq 0.01$ ; \*\*\* =  $P \leq 0.001$ ; all measurements are given in [mm].

| Variable          | Significance | <i>S. saxifraga</i> | <i>S. notarisii</i> |
|-------------------|--------------|---------------------|---------------------|
| Number of nodes   | ***          | 7.7 ± 0.2           | 5.6 ± 0.2           |
| Number of flowers | n.s.         | 1.6 ± 0.2           | 1.2 ± 0.1           |
| Plant length      | ***          | 106.7 ± 4.8         | 151.8 ± 7.4         |
| Peduncles length  | ***          | 21.9 ± 1.9          | 38.5 ± 3.2          |
| Basal leaf length | **           | 12.6 ± 0.5          | 15.3 ± 1.1          |
| Basal leaf width  | n.s.         | 1.9 ± 0.1           | 1.9 ± 0.1           |
| Claw length       | ***          | 6.7 ± 0.1           | 11.1 ± 0.1          |
| Claw width        | n.s.         | 1.8 ± 0.1           | 1.7 ± 0.1           |
| Petal limb length | ***          | 5.1 ± 0.2           | 6.5 ± 0.2           |
| Petal limb width  | n.s.         | 4.4 ± 0.2           | 4.2 ± 0.2           |
| Anthophore length | ***          | 4.5 ± 0.3           | 7.2 ± 0.2           |
| Calyx length      | ***          | 10.0 ± 0.2          | 15.6 ± 0.3          |
| Calyx width       | n.s.         | 3.6 ± 0.1           | 3.7 ± 0.1           |
| Carpophore length | ***          | 3.9 ± 0.1           | 6.3 ± 0.1           |
| Capsule length    | ***          | 6.4 ± 0.2           | 11.9 ± 0.1          |

The result that *Silene notarisii* and *S. saxifraga* can clearly be distinguished morphologically allows the conclusion that it is justified to treat them as separate species.

Our comparison of *Silene notarisii* with other taxa of *S. sect. Saxifragoides* (*S. parnassica* Boiss. & Spruner subsp. *parnassica*, *S. parnassica* subsp. *serbica* (Vierh. & Adamović) Greuter, *S. hayekiana* Hand.-Mazz. & Janch., *S. multicaulis* subsp. *multicaulis*) confirmed both the reliability of our selected characters and the autonomy of *S. notarisii* from these taxa (compare Fig. 2). Among them, *S. hayekiana*, from the E Alps and NW Illyria, probably has to be considered another subspecies of *S. parnassica* (Greuter 1997), which is indicated, in particular, by the carpophore length.

*S. parnassica* s.l. (incl. *S. hayekiana*) can reliably be distinguished from *S. notarisii* by the anthophore, which is clearly elongating during anthesis (but not elongating in *S. notarisii*), and the capsule, which is completely exserted from the calyx (but only partly exserted in *S. notarisii*).

*S. multicaulis* s.l. and *S. notarisii* can be reliably distinguished from each other by the following features of *S. notarisii*: leaf base ciliolate without long cilia; basal and lower cauline leaves present at anthesis; teeth of sepals expanded at or above base into a ± orbicular, broadly membranous appendage (at least the inner); petal claw not ciliate; carpophore only slightly puberulent at base; calyx and capsule larger.

*Silene notarisii* Ces. in Bibl. Ital. 91: 346. 1838. – Lectotypus (designated here): “*Silene saxifraga* Linn. / ex M. Cornu / Orsini” (RO-Cesati; isolectotype: FI)  
– *Silene rupicola* A. & E. Huet du Pavillon, nom. ined., in sched. 285, “*Silene rupicola* Nobis / Ad rupes, in elatis montis Coccia, / supra Campo-di-Giove. Aprutii. / Aug. 1856, E. & A. Huet du Pavillon” (FI, RO-Cesati)  
– *Silene parnassica* auct. fl. ital. p.p., [non Boiss. & Spruner in Boissier, Diagn. Pl. Orient., ser. 1, 2(8): 91. 1849].

The protologue of *Silene notarisii* is based on a specimen collected by Orsini in Monte Corno and sent for identification to Cesati by De Notaris. This specimen, selected here as lectotypus, has not well preserved petals, but shows some important features such as the clavate calyx and solitary large flowers on long peduncles. The specimen has the original labels of De Notaris, Cesati [“*Silene Notarisii* / Mihi / Caulibus simplicibus erectis caespitosis basi pubescen = /

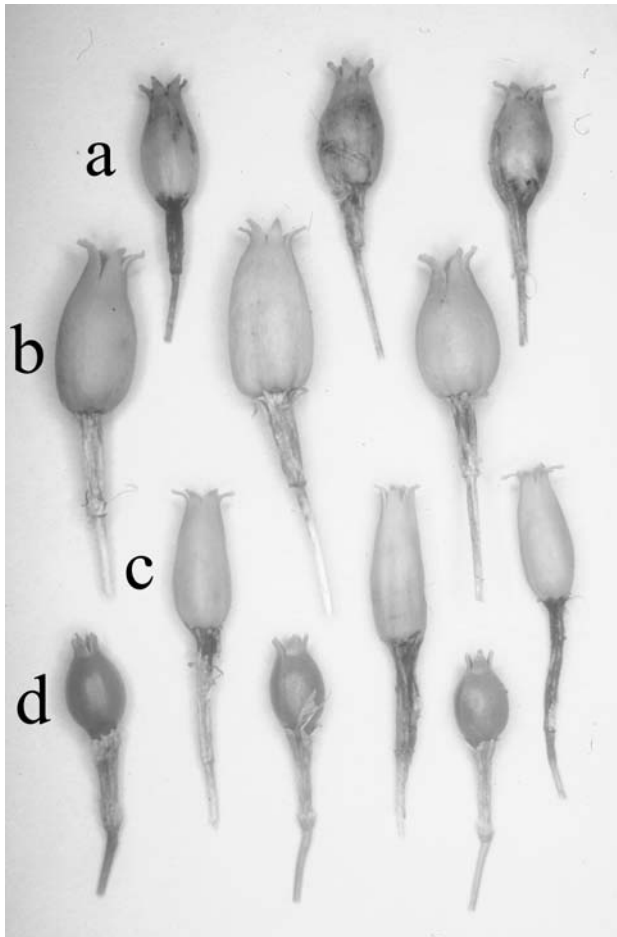


Fig. 2. Capsule shape – a: *Silene saxifraga*; b: *S. notarisii*; c: *S. multicaulis*; d: *S. hayekiana*. – Vouchers: a: M. Nerone, Il Cimaio, Gubellini (PESA); b: M.ti Sibillini, dintorni di Bolognola, Gubellini (PESA); c: M.ti Sibillini, Valle del Fargno, Gubellini (PESA); d: Val di Fassa, Gruppo del Catinaccio, Val d'Udai, Brilli-Cattarini (PESA).

tibus; foliis omnibus lanceolato-spathulatis ciliatis, sub = / tus ad nervum puberulis; floribus terminalibus longissime / pedunculatis solitariis; calycibus clavatis. / Foliis dentibusque calycinis elongatis item longitud. pedunculo et ciliis foliorum / a *S. saxifraga*; floribus majoribus, setis nullis et foliis spathu = / latis a *S. petraea*; calyce non campanulato et pubescen = / tia a *S. campanula* differt. An *S. fruticulosa* (Sieb.) varietas a quae tamen foliis amplioribus et calycibus / (teste De Notaris) profundius dentatis differt?"] and Orsini. On the sheet there is also the revision label of Lacaita, who identified the specimen as *S. multicaulis* (Lacaita 1921).

*Description.* – *Caespitose* perennial, 8-24 cm high; stems numerous, usually simple, shortly eglandular and reflexed-pubescent below, glabrous in the middle and upper part. *Nodes* 4-8. *Leaves* mostly crowded in the lower part of the stem, 1-veined, lanceolate to linear, 0.8-3.5 × 6-27 mm, ciliolate at the margins and on the keel. *Flowers* 1(-2), on straight, erect, 18-85 mm long pedicels. *Calyx* 3-4.1 × 13-18 mm, glabrous, veins 10, separated by membranous bands; teeth ciliolate, expanded into a ± orbicular, broadly membranous appendage (the outer sometimes acute). *Anthophore* not elongating during anthesis, 7-8 mm long, slightly puberulent at

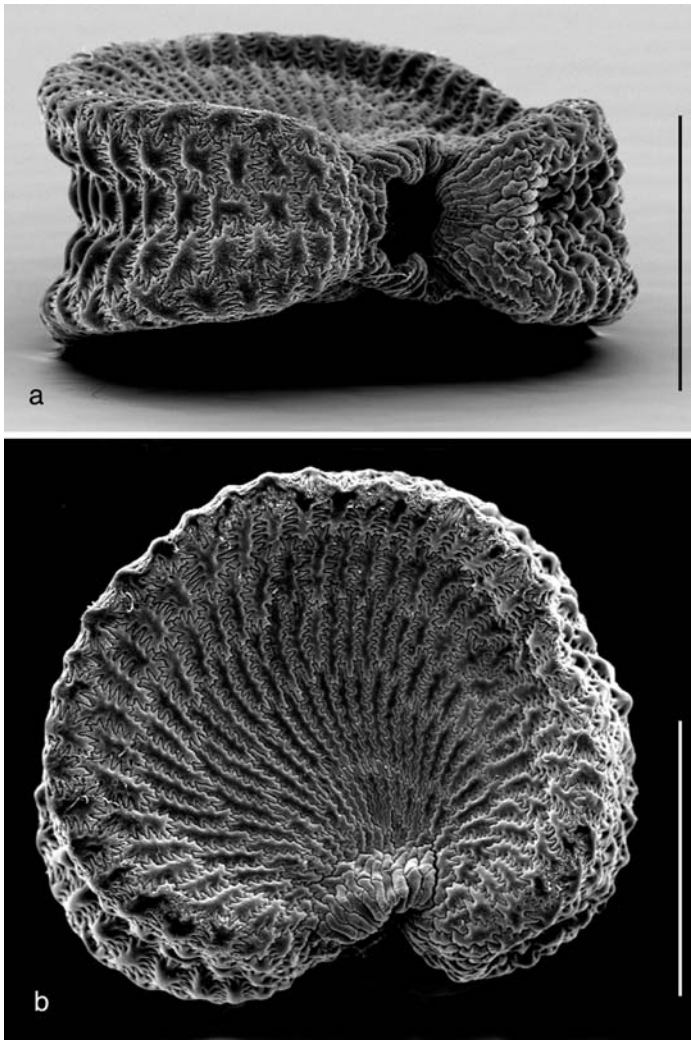


Fig. 3. Seed of *Silene notaristii*. – Voucher: Gran Sasso, Vallone di Cretarola, *Conti 6198* (APP); scale = 500  $\mu$ m.

base. *Petal* claw glabrous, 1.2-2  $\times$  9.5-12.1 mm, usually distinctly exserted, 1-1.3 mm, not or indistinctly auriculate; coronal scales 0.6-0.9 mm; limb 3.2-6  $\times$  4.5-8 mm, white or cream to pale pink on upper surface, purplish beneath, bifid to halfway into linear lobes; claw length from the base to the filament insertion 2-5 mm. *Capsule* 5-7  $\times$  9-14 mm, ellipsoid, slightly exceeding the calyx, which sheaths its base and is torn irregularly at maturity (Fig. 2). Seeds 0.8-1.1  $\times$  1.2-1.5, brownish grey (Fig. 3).

*Karyology*. –  $2n = 24$  on plants from Gran Sasso (Favarger 1973 [sub *Silene saxifraga* var. *parnassica* (Boiss. & Spruner) Fiori]).  $2n = 24$  is the most common number in *S.* sect. *Saxifragoides*.

*Phenology*. – Flowering from June to July (-August).

*Ecology*. – Stony slopes, rocky outcrops, rock ledges and crevices of cliffs in the montane and subalpine belts, on limestone and sandstone, at altitudes of 800-2300 m.

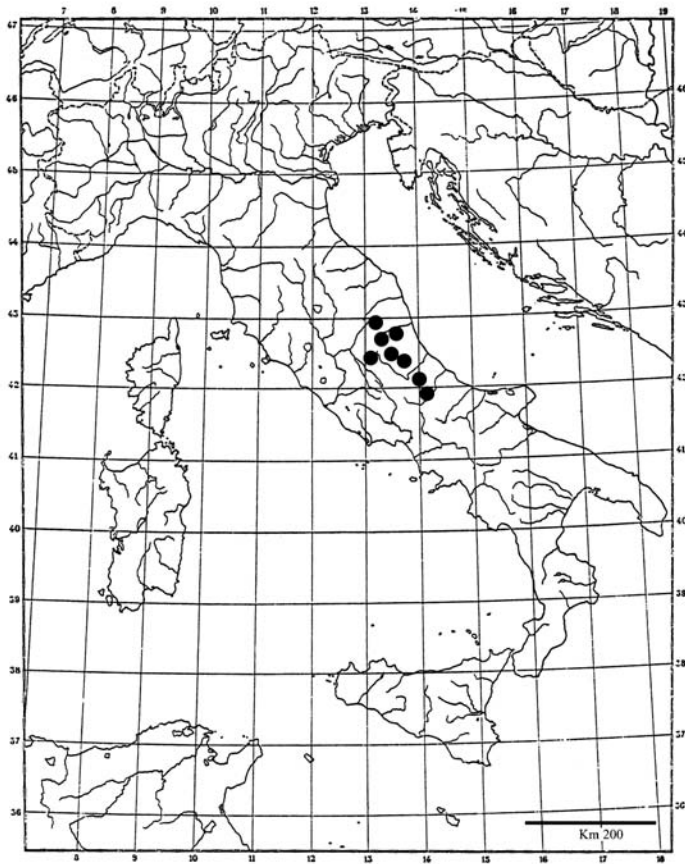


Fig. 4. Distribution of *Silene notariisii*.

*Distribution.* – Central Apennines, known from Marche, Umbria, Lazio and the Abruzzo regions (Sibillini, Terminillo, Monti della Laga, Monti dei Fiori, Gran Sasso, Majella, Monti Pizzi and Mt Secine) (Fig. 4)

*Specimina visa selecta.* – See electronic supplement of “Willdenowia” at <http://www.bgbm.fu-berlin.de/bgbm/library/publikat/willd33/conti&al.htm>

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