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Cerastium sventenii Jalas, sp. nova, and the related Macaronesian taxa

Author(s): Jaakko Jalas

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Cerastium sventenii Jalas, sp. nova, and the related Macaronesian taxa

JAAKKO JALAS

Department of Botany, University of Helsinki

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In the most recent taxonomic treatments dealing with the *Cerastium* flora of the Canary Islands, Madeira, and the Azores (MÖSCHL 1951, 1964; JALAS, SELL & WHITEHEAD 1964), two perennial species have been recognized from this area, besides some annual species and the widespread *C. fontanum* ssp. *triviale* (Link) Jalas. Of these perennials, *C. arvense* has been indicated for the Canary Islands only (except for older erroneous records for Madeira), whereas the endemic Macaronesian *C. vagans* Lowe (incl. *C. azoricum* Hochst. ex Seub.) is mentioned from all three groups of islands. The list of checked specimens given by MÖSCHL (1964, p. 79) clearly shows, however, that the exact information available has been regrettably scanty, especially concerning the Canaries. Thus, no specimens of *C. arvense* from there have been available to him. The occurrence of *C. vagans* in the Canary Islands, on the other hand, is attested by no more than two sheets. Further, the lack or scantiness of fruiting material from Madeira has evidently hindered a thorough morphological analysis of and comparison between the populations of the respective groups of islands.

Having been able to examine a number of additional important specimens, especially from the Canaries and Madeira, preserved in the British Museum (Natural History), London (BM), in the Herbarium of Istituto Botanico, Florence (FI), and in the Botanical Museum, University of Helsinki (H), I am now in a posi-

tion to present some new facts and views concerning the delimitation and identity of the Macaronesian perennial *Cerastia*, which seem to be worth mentioning. I also had an opportunity to study the material of the Botany School, Cambridge (CGE), earlier revised by Dr. MÖSCHL.

Morphological comparison of material of different provenience

The herbarium material examined consists of 5 sheets from the Canaries, 9 sheets from Madeira, and 7 sheets from the Azores. As the material is still not large enough to allow any statistical analysis, the individual measurements made are given sheet by sheet in table 1. Additional information, including descriptions of some anatomical characteristics found to be of taxonomic value, is given in the text below.

Leaves

Even a superficial examination makes it clear that the leaf shape in the material from the Azores is different from that found in most of the Madeiran and Canarian plants. Whilst there are hardly any significant differences in leaf length between the three geographical groups, the Azorian plants have, in general, broader leaves than the others, with a length/breadth ratio of between 1.8 and 3.2, corresponding to ca. 3.5–6 in Madeiran and 4.7–6.8 in

Table 1. Morphological analysis of the specimens of Macaronesian perennial *Cerastia* studied.

	Leaf			Sepal length, mm			Petal length, mm	Capsule length, mm			Seed, mm		
	length mm	breadth mm	length/ breadth	min.	mean	max.		min.	mean	max.	min.	mean	max.
<i>Canary Islands (La Palma)</i>													
1. Webb, 1842 (FI 242)	—	—	—	5.5	6.3	7.0	—	6.7	7.0	7.2	1.1,	1.2	
2. Webb, 1845 (FI 241)	27.0	4.0	6.8	4.9	5.7	6.7	—	6.4,	7.0		0.9,	1.0,	1.1
3. Webb, 1846 (FI 240)	20.0	3.5	5.7	4.0	4.7	5.5	—	5.5			0.9	1.0	1.1
4. E. Bourgeau, Pl. canarienses 719, 1845 (BM)	21.0	4.0	5.2	4.2	5.1	6.0	—	5.0	5.1	6.0	1.1	1.2	1.3
5. Roque del Faro, 2100 m, 1963 (H)	14.0	3.0	4.7	4.2	6.1	6.8	—	5.0	6.1	7.0	—		
<i>Madeira</i>													
6. 567. Pico Grande, 1831 (BM)	19.0	4.0	4.8	4.8	5.2	5.7	—	5.2	6.7	7.8	1.1	1.3	1.1
7. 567.x. Pico Grande, 1847 (BM)	27.0	4.3	6.3	5.5	5.6	6.1	—	—			—		
8. Pico Grande, 1855, ex herb. Moniz (BM)	35.0	7.5	4.7	5.3	5.8	6.5	—	—			—		
9. Sta Luzia, Lowe, 1837, Möschl no. 3071 (CGE)	24.0	5.0	4.8	5.2	5.8	6.1	10.0	6.0			—		
10. Sine loc., Lowe, Möschl no. 3068 (CGE)	23.0	4.8	4.8	5.1	5.6	6.1	10.0	6.5			0.9	1.1	1.2
11. Sine loc., Mason, 1856, Möschl no. 3069 (CGE)	27.0	7.0	3.9	5.0	5.5	6.0	9.5	—			—		
12. Malhada Velha, Norman, 1865, Möschl no. 3067 (CGE)	22.0	6.0	3.7	4.8	5.2	6.0	9.0	—			—		
13. Pico dos Arrieros, Lowe, 1837, Möschl no. 3070 (CGE)	7.5	2.2	3.4	4.5	4.9	5.2	—	5.9			1.2,	1.2,	1.2
14a. Pico dos Arrieros, G. Mandon Pl. Madeirenses 1865-66, 29, (BM)	22.0	6.0	3.7	5.0	5.6	6.5	9.0	—			—		
14b. Funchall, Lemann, 1837 (BM)	23.0	4.0	5.8	4.5	5.1	5.7	—	—			—		
14c. Lowe (sine loc.) (BM)	21.0	4.5	4.7	5.0	5.6	6.0	—	—			—		
<i>Azores</i>													
15. Flores, Watson, 1842, Möschl no. 3072 (CGE)	28.0	16.0	1.8	5.6	5.9	6.2	8.0	6.5,	7.0		0.8	0.9	1.0
16. Garden specimen, Watson, 1842, Möschl no. 3073 (CGE, BM)	18.0	6.0	3.0	5.1	5.8	6.3	9.5	6.5,	8.0		0.7	0.8	0.9
17a. Flores, Watson, 1842, Möschl no. 3074 a (CGE)	19.0	6.5	2.9	6.0	6.2	6.5	10.0	—			—		
17b. Garden specimen, Watson, 1842, Möschl no. 3074 b (CGE, BM)	22.0	7.0	3.1	5.4	6.2	7.8	—	5.2	6.4	8.0	0.7	0.9	1.0
18. Flores, Trelease, no. 122, 1894 (BM)	15.0	5.0	3.0	5.0	6.0	7.0	—	5.5	6.1	6.6	—		
19. Flores, Ribeira Banqueiros, Storá, 1938 (H)	28.0	8.7	3.2	5.0	5.9	6.5	8.5	6.3	6.7	7.0	0.7	0.8	0.9
20. Corvo, Drouet, 1857 (BM)	7.0	3.3	2.1	6.0,	6.5		—	—			—		
21. São Jorge, Ravine near Coubres, E. F. Warburg & T. G. Tutin, 1929, Möschl no. 3078 (CGE)	24.0	5.5	4.4	4.7	5.5	7.0	—	—			—		

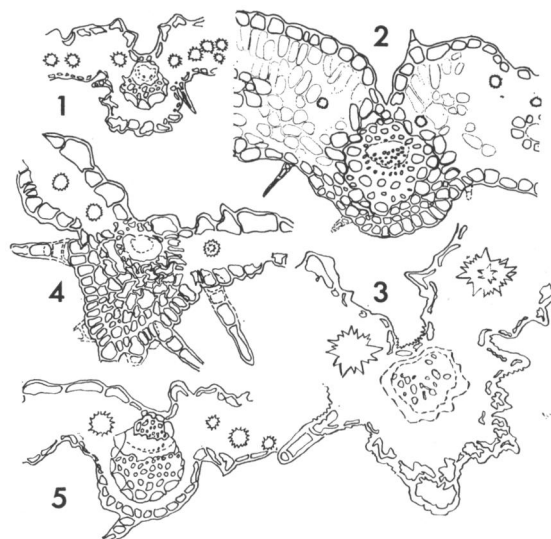
Canarian material. There is thus clearly no overlapping in this ratio between the Azores and the Canary Islands, nor between the Azores and Madeira (except for no. 21).

Most plants of the Azores also differ by the peculiar brownish tinge of their leaf colour from the pale to yellowish green seemingly characteristic of the plants of Madeira and the Canaries.

Leaf anatomy has been studied in transverse sections on material from sheets no. 3 and 5

(Canary Islands), no. 9 (Madeira), and no. 17 b (Azores).

The leaf studied was in each case the uppermost cauline leaf, from the stem node preceding the lowest branches of the inflorescence. Before sectioning and mounting for semi-permanent slides, the leaves were pretreated for ca. 12 hours in a softening medium consisting of 1 part phenol crystals, 1 part lactic acid, 2 parts glycerol, and 1 part water.



Figs. 1 – 5. Sketches showing epidermis and mechanical tissues in transverse sections of the midrib region of the cauline leaves. Clusters of crystals, common in these leaves, are also marked. 1 and 2: *Cerastium spaltenii* from the Canary Islands (specimens nos. 3 and 5 of Table 1). 3: *C. vagans* from Madeira (specimen no. 9; note the thickened outer walls of the epidermis and lack of mechanical tissue below the vascular bundle). 4: *C. azoricum* from the Azores (specimen no. 17 a). 5: *C. scaranii* from Italy (specimen f in the list on p. 132). Magnification ca. $\times 60$, except for fig. 3, which has been enlarged somewhat more owing to the very badly visible cell contours. Figs. 1, 3, 4, and 5 drawn by LIISA HEINONEN, Fig. 2 by KIRSTI KALEVA.

The anatomical features of most interest in this connexion seem to concentrate in the midrib region of the leaf (Figs. 1 – 5). Especially the difference in the shape of the midrib and in the type of mechanical tissue below (abaxially of) the vascular bundle are most probably of taxonomic value. The number of plants examined is, of course, very small, anatomical characteristics of this kind being, however, mostly quite stable, according to my experience of some other species groups of perennial *Cerastia*.

The leaf midrib of the Canarian plants (Figs. 1 and 2) is rounded below, just slightly projecting in no. 5, more prominently so in no. 3. In both cases, there is a deep adaxial furrow leaving but a few layers of mechanical tissue between the fairly large-celled upper epidermis and the vascular bundle.

In the Azorian material (Fig. 4) the picture is different, the shape of the midrib being acutely triangular (keeled) in transverse section, and showing no furrow above at all. The cells of the upper epidermis over the vascular bundle are much smaller than on either side.

As regards the shape of the leaf midrib, the Madeiran plant (Fig. 3) stands somehow midway between the two extremes just described. The furrow above is well developed, matching that of the Canarian plants, whilst the midrib is irregularly angular below, perhaps more like that found in the Azorian plant. Here it must be pointed out that the irregular leaf contours seen in some of the preparations, and especially the strongly contracted epidermal cells, are in all probability artefacts caused, it seems to me, by earlier use of mercuric chloride as a herbarium sheet insecticide. The differences between the two Canarian preparations, Fig. 1 (treated) and Fig. 2 (untreated), are instructive in this respect.

In the material from the Canary Islands the midrib below the vascular bundle consists mostly of mechanical tissue of cells with walls of considerable thickness and a narrow lumen. Close to the lower epidermis, however, there are a few layers of cells with less thickened walls.

In the leaf midrib of the Madeiran specimen there is no specialized mechanical tissue below the vascular bundle. In this respect the Azorian specimen occupies an intermediate position, showing a mechanical tissue of cells with somewhat thickened walls and a relatively wide lumen.

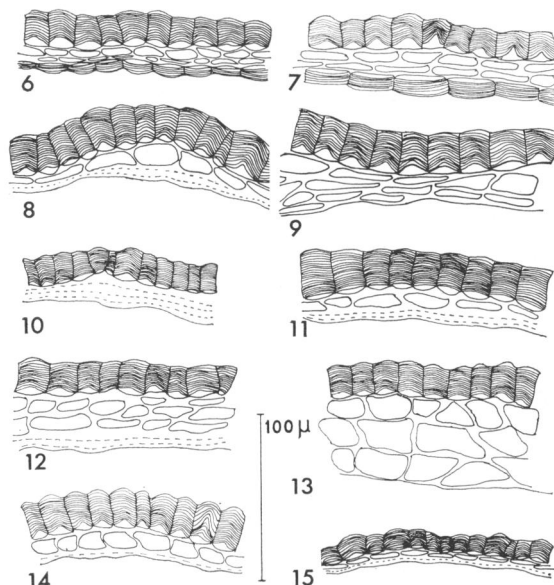
Sepals and petals

The number of individual measurements of sepal length is rather small, allowing, nevertheless, an approximate view of the variation within and between the three different groups. From the data given in Table 1 it is evident that the sepal length cannot be used as a differential character in this material, although there might be a slight tendency in the Madeiran material towards a somewhat shorter calyx than in the Azorian material from the islands of Flores and Corvo.

No special preparations were used to study the shape and size of the petals, as the material available is particularly small in this respect, most of the flowers present being in the withering or fruiting stage.

Capsules

In the material available from Madeira ripe or nearly ripe capsules are rare or absent. The



Figs. 6–15. Anatomy of capsule wall in transverse sections. In most cases the inner cell layers have degenerated into a compact material without any clear cell structure. 6 and 7: *Cerastium sventenii* from the Canary Islands (specimens nos. 4 and 5 of table 1). 8: *C. vagans* from Madeira (specimen no. 6). 9: *C. azoricum* from the Azores (specimen no. 19). 10–13: *C. arvense* (10 from Morocco, 11 ssp. *strictum* from Switzerland, 12 ssp. *ciliatum* from Roumania, 13 ssp. *arvense* from Sweden; see the list on this page). 14: *C. scaranii* from Italy (specimen f in the list on this page). 15: *C. fontanum* from Madeira (specimen g in the list on this page). KIRSTI KALEVA del.

few measurements made indicate, however, that there are no significant differences in capsule length within the entire Macaronesian material studied. The same apparently holds true for capsule teeth characteristics. In all three groups the capsules seem to be but slightly longer than the sepals in most cases.

Marked differences, on the contrary, were found in capsule wall anatomy, which was studied in material representing sheets nos. 4 and 5 (Canary Islands), no. 6 (Madeira), and no 19 (Azores). Consequently, Figs. 6–9 show that the transverse sections of the capsule wall of nos. 6 and 19 are similar to each other but differ from those of nos. 4 and 5 which show a thickened outer wall of both the outer and inner epidermis, instead of the outer epidermis only, as is the case in the material from Madeira and the Azores.

For the sake of comparison, the capsule wall anatomy was in this connexion studied additionally in some at least supposedly related taxa of perennial *Cerastia*, as follows.

Cerastium arvense L.

- a) Morocco, «Atlas magnum in convalle fl. Ait Messane, c. 2 200 m.», 1926 H. Lindberg (H); Fig. 10.
- b) Spain, Prov. Santander, Picos de Europa, c. 2 000 m., 1930 H. Buch (H).
- c) Switzerland, Kt. Graubünden, Zerner, 1923 E. Häyrén (ssp. *strictum*; H); Fig. 11.
- d) Roumania, Transylvania, distr. Turda-Aries, c. 1120 m. (Fl. Rom. Exs. no. 399) (ssp. *ciliatum*; H); Fig. 12.
- e) Sweden, Småland, Rogberga, 1880 K. Johansson (ssp. *arvense*; H); Fig. 13.

Cerastium scaranii Ten.

- f) Italy, Abruzzi, Monte Morrone, 1891 Profeta (FI 387); Fig. 14.

Cerastium fontanum Baumg.

- g) Madeira, Queimadas, Bank of levada in woodland (*Erica scoparia*), 3 000 ft., 1961 Coleridge 33 (ssp. *triviale*; BM); Fig. 15.

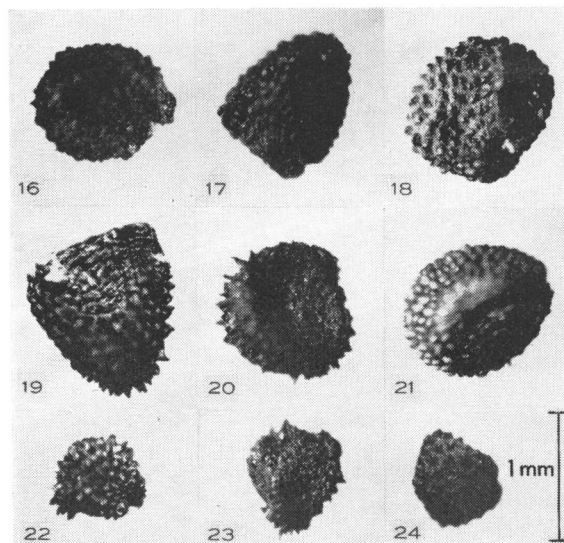
In all these cases (Figs. 10–15) the capsule walls examined were found to be of the same anatomical type as in the Madeiran and Azorian material (nos. 6 and 19), in that there are thickened outer cell walls in the outer epidermis only. The same feature was previously found in *C. arvense* by SCHELLMANN (1938) and in *C. biebersteinii* and *C. tomentosum* by KALEVA (1966), whereas in *C. julicum* SCHELLMANN (op. cit.) described and pictured a capsule wall corresponding to the type now found in the plants from the Canary Islands.

It might be worth noticing, by the way, that the capsule wall of *C. fontanum* (Fig. 15) is considerably thinner than that found in the true perennial species (see also MÖSCHL 1948, Fig. 8). It seems identical with that pictured for *C. atlanticum* by MÖSCHL (1964, Fig. 6 in Plate I).

Seeds

At least some mature seeds were available in sheets nos. 1–4 (Canary Islands), 6, 10 and 13 (Madeira), as well as 15, 16, 17 b and 19 (Azores) (Table 1 and Figs. 16–24). In all the cases examined the seeds proved to be chondrospermous, with a close testa. On the other hand, the material could easily be divided according to size of seeds and shape of seed coat tubercles into three different groups, corresponding to the geographical grouping.

The seed tubercles of the Canarian material are rounded, about as high as wide, of the same type as is characteristic of *C. arvense* and *C. scaranii* (Figs. 18, 21). The seed size is also about the same, 0.9–1.3 mm.



Figs. 16 - 24. Mature seeds. 16 and 17: *Cerastium sventenii* from the Canary Islands (specimens 3 and 4 in Table 1). 18: *C. scararii* (specimen f in the list on p. 132). 19 and 20: *C. vagans* from Madeira (specimens 6 and 10 in Table 1). 21: *C. arvense* (specimen a in the list on p. 132). 22 and 23: *C. azoricum* from the Azores (specimens 19 and 17 b in Table 1.) Photo 24: *C. fontanum* (specimen g in the list on p. 132).
Photo KIRSTI KALEVA.

The Madeiran plants hardly differ from those from the Canaries as to seed size, the tubercles however, being remarkably different. They are uneven in both size and shape, some of them protruding as narrowly acute small spines, others being lower and triangularly acute or almost rounded.

These peculiar types of seed tubercles were in fact previously depicted by MÖSCHL (1951, Fig. 9 on p. 26) who also used them as key characters in distinguishing between *C. vagans* on the one hand and *C. arvense* together with *C. alpinum* on the other. For *C. vagans* Lowe it reads (op. cit., p. 30): »Verrucae seminum nonnullae saltem vel multae conoideae et 0.05 - 0.1 mm altae». There is no information, however, as to whether the figure was based on Madeiran or Azorian material, since MÖSCHL includes *C. azoricum* in his *C. vagans*. Fortunately, such knowledge is not essential in the present context, since there is hardly any difference in seed tubercle character between material from Madeira and from the Azores. But the seed size is different, the Azorian plants having significantly smaller seeds (0.7 - 1.0 mm), with but little overlap in the material examined.

Taxonomic conclusions

The information that has accumulated concerning the perennial *Cerastia* of Macaronesia clearly indicates the existence of three different taxonomic entities within this particular area, each of the three groups of islands possessing, at least according to the material available for the present study, a major taxon of its own. On the basis of both the quality and quantity of the morphological differences demonstrated above, it also seems clear that the recognition of these taxa at species level is in good accordance with the taxonomic usage followed by most recent students of the genus *Cerastium*. It is hardly necessary, however, to stress the importance of obtaining additional, and especially cytotoxic, information even in the case of this group of taxa.

Key to the Macaronesian perennial species

1. Petals usually not more than $1\frac{1}{3}$ times as long as sepals; capsule curved
..... *C. fontanum* Baumg., ampl. Jalas
(Untreated in this context; see MÖSCHL 1951, 1964, JALAS 1963.)
1. Petals about twice (at least $1\frac{1}{2}$ times) as long as sepals; capsule straight
 2. Leaf midrib rounded below; both inner and outer epidermis of the capsule wall with thickened outer cell-wall; seed tubercles roundish and fairly low
..... *C. sventenii* Jalas
 2. Leaf midrib irregularly angular or acutely triangular below; outer capsule epidermis thick-walled; seed tubercles irregularly acute
 3. Leaves mostly 4 - 6 times as long as wide, with a median adaxial furrow; seeds 0.9 - 1.4 mm
..... *C. vagans* Lowe
 3. Leaves mostly not more than $3\frac{1}{2}$ times as long as broad, with no adaxial furrow; seeds 0.7 - 1.0 mm
..... *C. azoricum* Hochst. ex Seub.

Cerastium sventenii Jalas, spec. n.

Cerastium arvense auct. non L.: Webb in Barker-Webb & Berthelot, Phytographia Canar. 152 (1836-50).

Planta perennis caulibus ad 50 cm altis, basi nodosis, pilis patentibus glanduliferisque dense

obtectis. Folia lanceolata acuta, ad 27 mm longa et 4 mm lata, 4 $\frac{1}{2}$ –7plo longiora quam lata, rigida, pilis rigidis pubescentia (vel fere glabra), nervis medianis infra rotundato-prominentibus; cellulae sclerenchymaticae in nervo mediano abaxialiter locatae lumine parvo. Inflorescentia multiflora pedunculis pedicellisve fructiferis erectis. Sepala 5–6.5 (4–7) mm longa, obtusiuscula, glanduloso-pilosa, sat late scarioso-marginata. Petala, teste Webbia, sepalis duplo longiora, mihi ignota. Capsula (5–) 5.5–7 mm longa, recta, dentibus subrectis margine haud revolutis. Epidermis et exterior et interior capsularum maturarum parietibus crassis cellularum munita. Semina chondrospermia, 0.9–1.3 mm diam., verrucis leviter rotundatis, 20–50 μ altis.

Differt a *Cerastio arvensi* notis sequentibus: Pedunculi pedicellique erecti; capsulae rectae pariete utrimque epidermide crassa munita.

A *Cerastio vaganti* et *C. azorico* valde diversum est characteribus in clave artificiali dedicatis, etc.

Etiam a speciebus mediterraneis omnibus e grege *C. scaranii* distincte abhorret; cfr. JALAS (1963, p. 58), JALAS, SELL & WHITEHEAD (1964), et infra.

Typus (holotypus): »*Cerastium arvense* Linn. (Phyt. Canar. 1. pag. 152). Insul. Palma – ad rupes d. Sietefointes. Monte excelso rarissime. Le 11 Aout 1845» (E. Bourgeau, Plantae Canarienses, N:o 719). Fig. 25.

Locus classicus: »Hab. in insulis Canariensibus rarissime. Legimus in monte excelso insulae Palmae *El Lomo del Biscayno*, ad altitudinem 1 000 hexapodum super Oceanum, ubi *Etesiarum* flatu assiduo irroratum, cum *Viola Palmensi*, et *Arabide albida*, rupium fissuras caespitibus frondosis laete vestit.» (WEBB in BARKER-WEBB & BERTHELOT, loc. cit., p. 152).

Ethymology. Our new species has been dedicated to and named after Dr. ERIC R. SVENTENIUS, Curator of the Herbarium, Jardín de Aclimatación de la Orotava, Puerto de la Cruz, Tenerife, and an eminent student of the flora of the Canary Islands.

Distribution. All the specimens of *C. sventenii* seen (nos. 1 to 5 in Table 1) are from the westernmost island of the Canaries, La Palma. Even the two specimens of »*C. arvense*» in the Herbarium DeCandolle (in G; not seen), recently given as

C. vagans Lowe by MÖSCHL (1964, p. 79), originate from that particular island.

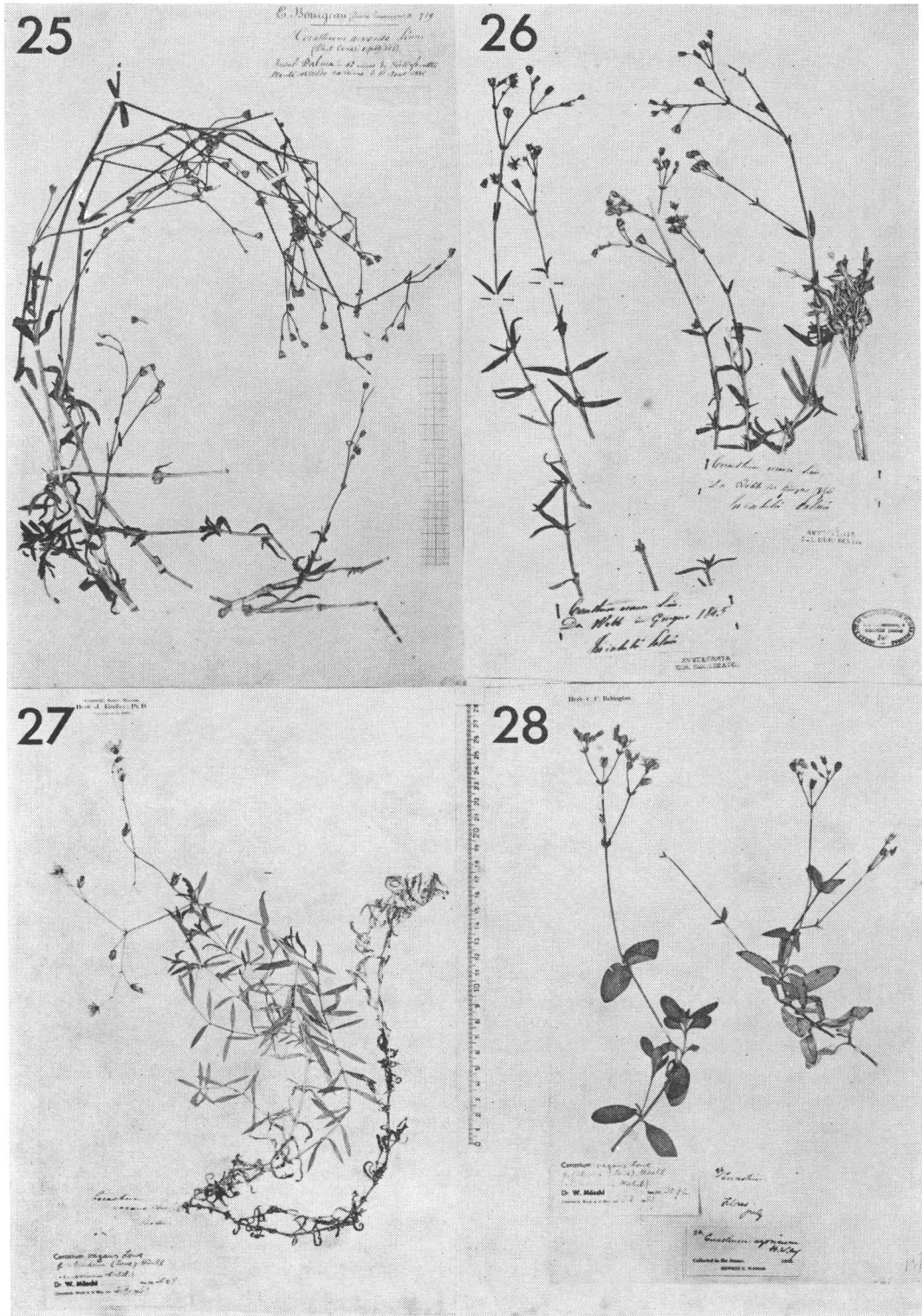
Some of the papers dealing with the flora of the Canary Islands list »*C. arvense*» from La Palma only, obviously on the basis of the old record by WEBB (e.g. PITARD & PROUST 1908, p. 122; LEMS 1960, p. 19). *C. arvense*, however, was additionally recorded for Tenerife by CHRIST (1885, p. 488). This notice again was recapitulated by SCHENCK (1907, p. 397) and MÖSCHL (loc. cit.), although not, as far as can be seen, corroborated by any herbarium specimens.

It thus seems safe, according to present knowledge, to state that *C. sventenii* is a local endemic of the island of La Palma of the Canary Islands. Most probably it is also the only representative on these islands of the group of perennial *Cerastia* concerned.

Habitat ecology. Not much can be added at present to the habitat description given by WEBB and cited in *extenso* above. The species occurs at about 2000 to 2100 m above sea level, i.e. clearly within the vegetation belt called »Gipfelregion» or »Region über den Wolken» by CHRIST (op. cit., p. 489), »Alpine Region» by SCHENCK (op. cit., p. 255), »zone subalpine» by PITARD & PROUST (op. cit.), and »étage subalpin» by DAVY DE VIRVILLE (1961, p. 204). This vegetation belt was included in the Mediterranean »Gebirgssteppengürtel» by SCHMID (1954, p. 39; 1955, p. 151, comparative scheme on p. 158), which again may correspond to the orohemiboreal zone, according to the terminology presented by AHTI et al. 1964 (see also JALAS 1965: cf. ZOLLER 1954, p. 54).

Taxonomic remarks. The description given by WEBB (in BARKER-WEBB & BERTHELOT, loc. cit.) on his »*Cerastium arvense* Linn.» is not a mere compilation of earlier descriptions. On the contrary, it is explicitly based on the Canarian plant itself. It also includes items useful in distinguishing between the Canarian taxon and *C. arvense* proper, as »floribus . . . fructiferis erectis», even though WEBB did not draw any taxonomic conclusions from them.

MÖSCHL (loc. cit.) was obviously the first to recognize the Canarian plant as different from *C. arvense*, as he determined the only Canarian specimens then available to him as *C. vagans* Lowe. The general appearance of *C. sventenii* is, in fact, not very different from that of the Ma-



Figs. 25 – 28. The Macaronesian species of perennial *Cerastium*. 25: *Cerastium sventenii* (holotype). 26: *C. sventenii* (sheet no. 2 in Table 1). 27: *C. vagans* (sheet no. 10 in Table 1). 28: *C. azoricum* (sheet no. 15 in Table 1). Photo S. HOLMSTRÖM.

deiran *C. vagans* so that a safe identification of the species concerned is perhaps not possible in all cases without using capsule and seed characters as given above. An opposite view is expressed, however, by LOWE (1857–68, p. 62–63). See Figs. 25–27.

Despite similarities in appearance, the Canarian and Madeiran taxa are probably not particularly closely related to each other, although they are both obvious members of the *scaranii* group (see BUSCHMANN 1938). But it is pointless to discuss the mutual phylogenetic connections within the group until more information has been gained.

Cerastium vagans Lowe, Transactions Cambridge Philos. Soc. 6: 548 (1838)

I reproduce the excellent complementary characterization of the species given by LOWE (1857–68, p. 62) himself:

»Habit and foliage of a *Stellaria*. St. 6 to 18 in. or 2 ft. long, slender, and with long internodes upwards, but decidedly shrubby below and thickly jointed, the joints swollen, with short internodes, never rooting, and although branched, and often crowded, not at all cespitose. L. more or less pubescent but never ciliate, stiffish and sharp-pointed, very like those of *Stellaria Holostea* L. but shorter, scarcely an inch long and 2 or 3 lines wide, usually tapering gradually from the base to the point, sometimes more or less lanceolate. Cymes erect forked subcorymbose 7–14– or more flowered. Even the minute uppermost bracts are very slightly if at all scarious at the tips or margins; but the sep. are broadly so. Pedic. before and after flowering always perfectly erect, not bent beneath the cal., but with buds, fl. and fr. alike erect. Styles 5. Caps. usually concealed by the cal., with 10 short blunt valves . . .».

Type (lectotype): MÖSCHL (1951, p. 40) selected the type to be a Madeiran specimen *sine loco*, collected by LOWE (K; Möschl rev. no. 3059; not seen).

Distribution. In contradiction to the view of MÖSCHL (1951, 1964), also followed by JALAS, SELL & WHITEHEAD (1964), I am now convinced that *C. vagans* is a species endemic to Madeira, with the exception of var. *ciliatum* described from São Jorge, Azores, by TUTIN & WARBURG (1932, p. 8); see below.

Habitat ecology. According to LOWE (loc. cit.) on »dry rocks from 4500 to 5500 ft.». The species thus belongs to the upper parts of the zone of »Laurel and Heath», which, according to LOWE (op. cit., p. iv), extends from 2500 to 5500 feet. In the zonation scheme given by SCHMID (1954,

1955) it largely corresponds to the subtropical »Laurocerasus-Gürtel», i.e. to the vegetation of the »true Mediterranean» zone (cf. SCHENCK, op. cit., p. 363–365). This means that the Madeiran *C. vagans* and the Canarian *C. sventenii* are clearly different as to their climatic requirements also.

Taxonomic remarks. Within *C. vagans* two infraspecific taxa were recognized, *a. fulva* and *β. subnuda* (LOWE 1838, sec. MÖSCHL 1951, p. 40). Later on (LOWE 1857–68, p. 62) they were given under the following varietal epithets.

»*a. fulva*; altogether densely clothed with tawny glandular hairs.

»*β. calva*; altogether smoother, the lower l. nearly or quite smooth.»

According to the typification given by MÖSCHL (loc. cit.) var. *subnudum* Lowe (with a later synonym var. *calvum* Lowe) represents the type variety, and it is consequently to be called var. *vagans*.

The idea of the conspecificity of *C. vagans* and *C. azoricum* seems to be based mainly on the following two assumptions (MÖSCHL loc. cit.).

1. The Azorian *C. vagans* var. *ciliatum* Tutin & Warb. is a synonym of var. *vagans*.

2. *C. azoricum* Hochst. ex Seub. is a synonym of *C. vagans* var. *fulvum* Lowe, or *C. vagans* f. *fulvum* (Lowe) Möschl.

Some doubts about the synonymy of var. *ciliatum* Tutin & Warb., as given by MÖSCHL (loc. cit.), are caused by the respective original descriptions:

C. vagans (LOWE 1857–68, p. 62): »L. more or less pubescent but never ciliate»

C. vagans var. *ciliatum* (TUTIN & WARBURG loc. cit.): »A typo differt foliis margine ciliatis; inflorescentia floribus paucioribus».

The type material of *C. vagans* var. *ciliatum* was examined in this context (no. 21 in Table 1). It consists of two shoots about 30 cm long and with withered flowers without ripe capsules, and of two smaller additional shoot fragments. This rather miserable sheet thus hardly allows a definite identification. There are, on the other hand, some characteristics clearly pointing towards *C. vagans*: sepal size, shape of the leaves and leaf midrib, and presence in the leaves of an adaxial furrow. The plant of São Jorge, Azores, thus obviously belongs to the Madeiran *C. vagans*, as a variety not identical with var. *vagans*.

The correctness of the second assumption, again, has been checked by examining the type

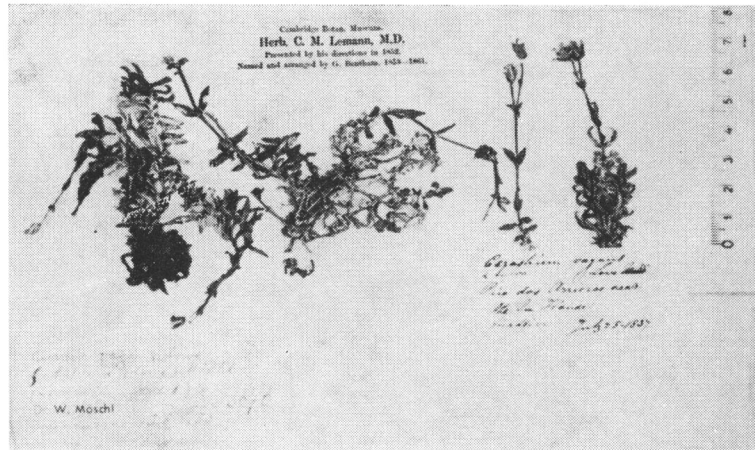


Fig. 29. Holotype material of *Cerastium vagans a. fulva* Lowe: «Pico dos Arrieros near the Ice House, Madeira. July 25—1837» (CGE, Möschl rev. no. 3070; sheet no. 13 in Table 1). Photo S. HOLMSTRÖM.

material of *C. vagans* var. *fulvum*, specimen no. 13 in Table 1, as compared with nos. 15—17, all considered identical with each other by MÖSCHL.

The type specimen of *C. vagans* var. *fulvum* differs from the remaining Madeiran as well as Azorian material in its remarkable dwarfishness, the flowering stems being not more than 6—7 cm high (Fig. 29). Nevertheless it has a seed size typical of the Madeiran *C. vagans* and clearly different from all material of *C. azoricum*. The second assumption above is thus proved to be incorrect. On the typification of *C. azoricum*, see below.

Cerastium azoricum Hochst. ex Seubert, Flora azorica 45 (1844)

Cerastium vagans auct. pro parte non LOWE: MÖSCHL (1951, 1964); JALAS, SELL & WHITEHEAD (1964).

C. vagans f. *fulvum* auct. non LOWE: MÖSCHL (1951).

«*Cerastium azoricum* (Hochstetter msc.) caulibus ramosis ascendentibus foliisque spathulato- vel ovato-lanceolatis dense (flavescenti-) pubescentibus, panicula dichotoma viscido-puberula pedicellis fasciculato-congestis calycem superantibus, bracteis sepalsisque anguste membranaceo-marginatis, petalis bifidis calyce duplo longioribus, capsula calycem aequante. — *Ic. Tabul. nostr. XIV. fig. super. — Hab: in graminosis ad vias ins. Flores. Coll. nr. 88.*»

«Tres adsunt formae, nempe: *pumila* (fig. 1.) caulibus basi prostratis caespitosis; *maior* (fig. 2. caulis apex), 1 ½—2 pedalis; et *maior latifolia*, foliis ovato oblongis 1 ½—2 pollicaribus. Semina (fig. 2. a.) triquetra aculeato-hispidissima. A reliquis sectionis (Sect. II. §. 2. DC. l.c I. p. 417) notis allegatis satis distat.» (SEUBERT, loc. cit.)

Type (holotype?). According to MÖSCHL (1951, p. 40) the type is a Hochstetter specimen (K; Möschl rev. no. 3046; not seen) from »in grami-

nosis ins. 'Flores' et 'Corvo'. As far as the original material includes several specimens, those from Flores (and tallying with the figure in SEUBERT's table XIV) ought to be given preference, as being in full accordance with the description.

Distribution. There are no indisputable records from outside the islands of Flores and Corvo, Azores. See p. 136.

Ecology. All the information available indicates that *C. azoricum* is restricted to the cultivated lowest niveaux of the islands, from sea level up to some few hundred metres (cf. TUTIN 1953, p. 54). It is thus, like *C. vagans*, a plant of the Mediterranean «Laurocerasus» zone, but of a still more extremely oceanic region or section of it, «characterized by a moderate rainfall spread evenly throughout the year, high relative humidity, and small temperature range» (TUTIN op. cit., p. 53; see also SCHENCK, op. cit., p. 365—366).

In Table 1 attention is drawn to the herbarium sheets containing garden specimens from cultivation experiments performed in 1842 with Azorian material in England by H. C. Watson. As a result of these experiments, WATSON (1870, p. 138, see also p. 274) stated *C. azoricum* to be «almost equally hardy with *Cardamine caldeirarum* in respect of bearing cold. But seeding less freely, and ill-fitted to bear dryness, it soon became extinct in my garden in Surrey.» It seems to be worthy of consideration that the corresponding herbarium specimens do not differ significantly from specimens collected in the wild.

Taxonomic remarks. Although somewhat inadequate, the original description of *C. azoricum*, as reproduced above, includes some happy observations of true diagnostic value. Especially the narrow fasciculate inflorescence is typical of *C. azoricum*, in contradistinction to the broadly divaricate and gauzy inflorescence of well-grown specimens of *C. vagans* (Figs. 27 and 28). Attention has also been drawn to the peculiar leaf colour and to the prickly seed tubercles («semina aculeato-hispidissima»), the last-mentioned character being in common with *C. azoricum* (Figs. 22 and 23) and *C. vagans* (Figs. 19 and 20) but otherwise unique in the whole *scaranii* group, except, in a way, for the Balkan *C. banaticum* (see JALAS 1963, p. 58).

Cerastium azoricum is without any doubt a close relative of *C. vagans*. Although they are here given as two different species it would not be surprising if more intensive study of their mutual relationships proved them, later on, to be potentially interfertile although allopatric and readily distinguishable races (subspecies) of a single species. No nomenclatural changes should be made, however, until conclusive data are available.

Summary

The taxonomy of Macaronesian perennial *Cerastia* has been revised, especially considering some material not examined by earlier authors.

The morphological scrutiny performed indicates that three different species exist within the Macaronesian area, each group of islands (the Canary Islands, Madeira, and the Azores) possessing a taxon of its own.

The Canarian plant, restricted to the island of La Palma only, has been described as *Cerastium sventenii* Jalas, nova spec. It has previously been identified as *C. arvense* L., differing from it, however, in its erect pedicels and peculiarities of capsule wall anatomy. From the Madeiran and Azorian taxa it differs in the leaf and capsule wall anatomy, as well as seed characters.

The Madeiran and Azorian taxa, although undoubtedly morphologically close to each other, have been treated as two different species, *C. vagans* Lowe and *C. azoricum* Hochst. ex Seub. Differential characteristics include shape of leaves and inflorescence, and seed size.

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