

## THE AZOREAN SPECIES OF EUPHRASIA

With 2 figures

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The first of the two species of *Euphrasia* to be described from the Azores was *E. grandiflora* Hochst. A second species, *E. azorica* Watson, was reduced to the synonymy of *E. grandiflora* by Bentham (1846) and by Wettstein (1896), but was accepted as distinct by Drouet (1866) and by Pugsley (1936, p. 276-7). Pugsley's account is, however, curiously confused, because he remarks that material from Terceira in the British Museum (Natural History) (BM) «shows the plant's features more completely» than Hochstetter's original material of *E. grandiflora* from Pico, but then goes on to say that the Terceira material is *E. azorica*. In addition, although Pugsley twice mentions the existence of Azorean material at Kew (K), he did not annotate any of the Kew specimens, and he seems to have based his account only on those at the British Museum which do not include any material from the islands of Flores and Corvo, whence *E. azorica* was described. Watson's material from Flores is well-represented at Kew and Cambridge (CGE), and is quite distinct from the Terceira plant.

The Terceira specimens, unlike those from Pico, have well-developed capsules, and these are bilobate. This character of the fruit, together with the «perennial habit, suffruticose stem, and distinct foliage and inflorescence» led Pugsley to describe his Section *Atlanticae* for the two Azorean species.

The taxonomic situation as I see it will now be described, but first the reader may like to be reminded that the Azores form three groups, as follows (islands from which *Euphrasia* has been reported are italicised):

Eastern group	Central group	Western group
Sta. Maria	<i>Faial</i>	<i>Corvo</i>
São Miguel	<i>Pico</i>	<i>Flores</i>
	<i>São Jorge</i>	
	<i>Graciosa</i>	
	<i>Terceira</i>	

A distance of 125 miles separates the Central and Western groups.

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On Pico there occurs *E. grandiflora*, which has glabrous leaves with up to 10 pairs of obtuse teeth with scarcely horny tips. I have seen no fruiting material of this form. On Terceira there is a plant of similar habit, of which the leaves are glabrous above and coarsely hairy beneath with up to 12 pairs of apparently subacute teeth with revolute margins and more distinct horny tips, and of which the capsules are bilobed. In both these plants the leaves appear to be leathery (as described by Hochstetter for *E. grandiflora*) and turn black on drying, while numerous branches appear on the stems, though only the few uppermost pairs flower at the same time as the main axis. The *Euphrasia* of Terceira therefore appears to be conspecific with that of Pico, though not identical with it.

On Flores there occurs *E. azorica*, which has the leaves finely strigose above and finely hirsute beneath with up to 12 pairs of subacute to acute teeth, and whose capsules are acuminate and twisted. The leaves of this species appear membranous and remain green on drying, while as a rule only one pair of branches flowers at the same time as the main axis. Although *E. azorica* was reported by Watson from Corvo, I have seen no specimens. (The acuminate capsules of *E. azorica* were evidently noted by Bentham, for this is the shape which he gives for his inclusive species *E. grandiflora* (Bentham, 1846)).

There is some doubt whether the *Euphrasia* from Faial is the same as that from Pico or that from Terceira. The record of *Euphrasia* from Faial is based on a mixed sheet in Kew but there is some evidence of mis-labelling. The label in the lower left-hand corner of the sheet reads as follows: «*Euphrasia* — spec./in humidis/in I. Fayal (Azores)/ (*E. grandiflorae* forma esse videtur)/ (B. do Castello de Paiva)». (The last line is the name of the collector; B. stands for Barão. The Baron collected his specimens about 1865 according to Godman (1870, p. 121)). In the lower right-hand corner of the sheet is another label, thus: «*Euphrasia* — *grandiflora*/in herbidis/in I. Pico/ (B. do Castello de Paiva)». Between these two labels are three specimens, the two on the left being alike, and agreeing with *E. grandiflora*, and that on the right being identical with the Terceira specimens in BM, and bearing fruit. A pencil line, drawn between the two identical specimens was probably added when the sheet was recently cut up, as a result of my having erroneously determined the right-hand piece as *E. azorica*. Since the two pieces on the left are *E. grandiflora* in the strict sense it might seem most likely that the label on the *right* applies to them, and that the label on the *left*, which expresses doubt as to the identity of the plant, belongs to the distinct plant on the right. In that case it must be concluded that the *Euphrasia* of Faial is identical with that of Terceira and thus somewhat different from that of Pico. Geographically speaking, however, it would seem much more probable for Faial and Pico to share the same variant, as they are much less isolated from one

another, both by distance and depth of ocean, than either is from Terceira. However, it could be that the less horny teeth and less hairy leaves represent deviations induced by climatic differences connected with the higher altitude of Pico, for the plants from São Jorge are like those of Terceira, and it may be that it was plants of this kind that initially populated all the islands.

Apart from the characters mentioned by Pugsley for Section *Atlanticae*, and the acuminate capsule of *E. azorica*, the type of leaf venation and distribution of foliar hairs and glands is distinctive. In the Section *Atlanticae* there is a reticulum of veins visible on the underside of the leaf between the main veins, and this reticulum is beset with sessile glandular hairs; eglandular hairs, if present, are confined to the main veins and the islets of the reticulum. In the rest of the genus this pattern cannot be made out, and sessile glands are usually present as patches between the main veins. This character of the leaf in Section *Atlanticae* is, however, found in the related genera *Odontites*, *Pedicularis*, *Rhinanthus*, *Parentucellia*, *Bellardia* and *Bartsia*.

A new taxonomic account of the Section *Atlanticae* follows.

*Euphrasia* L., Section *Atlanticae* Pugsley in Jour. Bot. London 74: 284 (1936). Lectotype species: *E. grandiflora* Hochst. in Seub., Fl. Azor. 39 (1844).

Perennial species of the Azores, branching from the base; under-surface of leaves with a reticulum of small veins between the main ones, the veins of this reticulum lacking hairs but beset with sessile glands; corolla very large; loculi of the two shorter posticous stamens unequally spurred; capsule deeply emarginate, or entire and acuminate, glabrous on the surfaces, ciliate on the margin.

### 1. *Euphrasia grandiflora* Hochstetter

*E. grandiflora* Hochst. in Seub., Fl. Azor. 39 et t. 8 (1844); Wettst., Mon. Gatt. *Euphrasia* 79 et t. 5, fig. 361-365, t. 13, fig. 3 (1896) p.p.; Benth. in DC., Prodr. 10: 552 (1846) p.p.; Drouet in Mém. Soc. Acad. Agric., Sci. Aube, sér. 3, 3: 187 (1866); H. C. Watson in Godman, Nat. Hist. Azores 201 (1870) p.p.; Trelease in Ann. Rep. Missouri Bot. Gard. 8: 138 (1897) p.p.; Pugsley in Jour. Bot. London 74: 276, 284 (1936); Palhinha, Cat. Pl. Vasc. Açores 111 (1966) p.p.

*Stems* erect or ascending, up to c. 40 cm, rooting below, purplish, simple or with several to many pairs of short branches from the upper

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Fig. 1. — *Euphrasia grandiflora*, LISU: «*Euphrasia grandiflora*. Il. de St. Jorge: Grutas do Pico da Esperança onde é muito comum. Leg. Dr. Gonçalves da Cunha & Luís G. Sobrinho, det. Luís G. Sobrinho. 21.VIII.938.» The outline of the capsules can be seen in the smallest piece.

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*Euphrasia grandiflora*

Herb. de Lisboa: Jardim de Botânica de Lisboa  
 1. de 1880: Jardim de Botânica de Lisboa  
 2. de 1880: Jardim de Botânica de Lisboa  
 3. de 1880: Jardim de Botânica de Lisboa



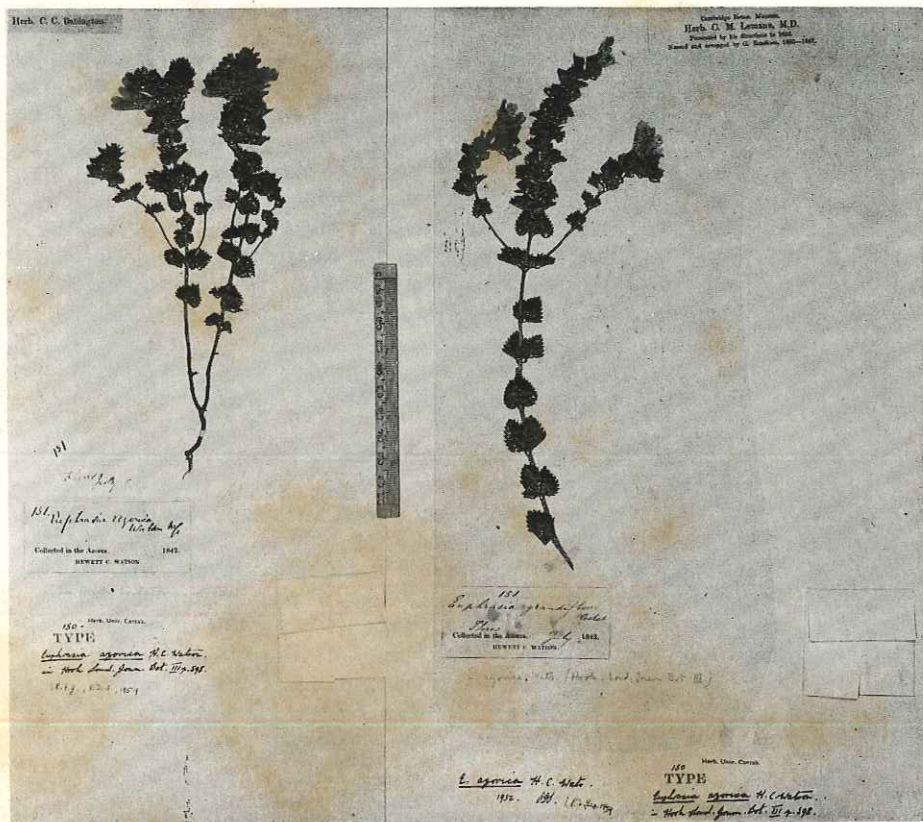


Fig. 2. — *Euphrasia azorica*, isotypes, CGE. Left: «*Euphrasia azorica* Watson n. sp. 151. Collected in the Azores 1842. Flores, July, Hewett C. Watson.» Right: «*Euphrasia grandiflora* Hochst. Collected in the Azores, July, 1842. Flores. Hewett C. Watson, 151.»



nodes, only the uppermost (1-)3-5 pairs of branches flowering at the same time as the main axis. Cauline internodes 0.5-1.5 times as long as the subtending leaves, the floral shorter than the subtending leaves. Lowest flowers above the 20th node. *Leaves* mostly 4-16 mm long, coriaceous, blackening on drying, broadly oblong, suborbicular or obovate, becoming relatively broader at higher nodes, contracted into a shortly cuneate base, margin crenate or crenate-serrate, with 2-10(-12) pairs of obtuse or subacute, often incurved, teeth, reaching their maximum number just below the inflorescence, sinuses shallow and obtuse or acute, teeth more or less distinctly horny-tipped, their margins often recurved, terminal lobe broadly obtuse or subacute, sometimes exceeded by the distal pair of lateral teeth, veins beneath scabrid or more or less densely clothed with coarse hairs, hairiness decreasing at higher nodes, upper surface glabrous or occasionally scabrid. Upper floral leaves sometimes with acute basal teeth. *Calyx* 5-7.5 mm long, glabrous, or villous in the dorsiventral sinuses, teeth ovate, acute or acuminate, the lateral sinuses 0.5-1.5 mm long, the dorsal and ventral about  $\frac{1}{2}$ - $\frac{3}{4}$  the length of the calyx. *Corolla* 13-16 mm long, purplish with yellow spots on the lower lip, hairy with fine eglandular and glandular hairs outside, tube funnel-shaped. *Capsule* 6-7.5 mm long, longer than or sometimes slightly shorter than the calyx, broadly to narrowly obovate, with an apiculus in the sinus, blackish. Fig. 1.

Pico: *Hochstetter* 54, 1838 (BM, K); *Castello do Paiva*, c. 1865 (K); *Warburg et Tutin*, 1929 (CGE. K, LTR) (cf. Tutin, 1953).

Faial: *Castello do Paiva*, c. 1865 (K).

Terceira: (?*Drouet*) 88, and *Drouet* 1868 (BM) (vide infra).

São Jorge: Grutas do Pico da Esperança, *da Cunha et Sobrinho*, 21.viii. 1938 (LISU); margens da Ribeira do Salto, *da Cunha et Sobrinho* (LISU); *Carreiro* 992, vi.1903 (COI).

*Drouet* was apparently the first person to record *Euphrasia* from Terceira, and it seems from the account of his expedition of 1857 (*Drouet*, 1866), that the specimens attributed to him above must have been collected by the other members of his expedition, *Hartung* and *Morelet*, in that year.

## 2. *Euphrasia azorica* H. C. Watson

*E. azorica* H. C. Wats. in *Hook. London Jour. Bot.* 3: 598 (1844); *Drouet* in *Mém. Soc. Acad. Agric., Sci. Aube*, sér. 3, 3: 187 (1866); *Pugsley* in *Jour. Bot. London* 74: 277, 284 (1936) p.p.

*E. grandiflora* Hochst. sensu auctt., p.p.

*Stems* erect, up to c. 30 cm, pale greenish, with one to several pairs of branches arising from the middle or above, only the uppermost pair, or rarely all, flowering at the same as the main axis. Cauline internodes 1-2 times as long as the subtending leaves, the floral much



shorter than the subtending leaves. Lowest flowers at 11th-15th node. *Leaves* up to 9-19 mm long, not coriaceous, not blackening on drying, the cauline deltoid, the floral broadly deltoid-ovate or broadly rhomboidal, all contracted into a shortly cuneate base, margin crenate-serrate to serrate, with a maximum of 9-12 pairs of subacute to acute, often incurved, distinctly horny-tipped teeth, sinuses shallow, subacute to acute, terminal lobe acute, lower surface hispid, especially on the veins, increasingly so at higher nodes, upper surface finely strigose-scabrid. *Calyx* c. 9.5 mm long, villous, teeth deltoid, acuminate, lateral sinuses c. 2 mm long, the dorsal and ventral apparently reaching nearly to the base. *Corolla* 15-17 mm long, white with two yellow spots on the lower lip, hairy with fine eglandular and glandular hairs on the outside, tube funnel-shaped, lower lip distinctly larger than in *E. grandiflora*. *Capsule* c. 10 mm long, longer than the calyx, c. 3 times as long as broad, elliptic-oblong, cuspidate, at maturity brown, horny and strongly twisted. Seeds c. 2 mm long and 1.5 mm wide, slightly flattened; testa saccate on one edge, with 2 wings 0.3-0.4 mm wide on the opposite edge and with one or two very much smaller wings on either surface. Fig. 2.

Flores: *Watson* 151, vii. 1842 (CGE, K); *Hunt* (K) (vide infra); *Trelease* 678, 2. viii. 1894 (K). Caldeira da Picada, Blick nach Fajã Grande, feuchter Felsen, 470 m., 19. vii. 1972, *Lüpnitz* AC 586, AC 587, AC 588 (Hort. Bot. Univ. Mogunt.); Weg zum Pico da Burrhina, beweidete Moorvegetation, 760 m., 17. vii. 1972, *Lüpnitz* AC 605, (Hort. Bot. Univ. Mogunt.); Rocha des Bordres, 250 m., 15. vi. 1963, *Pickering* AC 616 (Hort. Bot. Univ. Mogunt.).

Corvo: reported by *Watson* (1844); reported by *Trelease* (1897) ? collected (679) (vide infra).

*Watson* was doubtful about the distinctness of this species when he described it, and later (in *Godman*, 1870) presumed that it was conspecific with *E. grandiflora*. This is also evident from some of his herbarium labels (see Fig. 2).

*Hunt's* undated specimen from Flores must have been collected about the middle of the 19th century; *Thomas Carew Hunt* was British Consul at the Azores and sent a collection of plants from São Miguel to *Watson* who wrote it up in 1847 (*Watson*, 1847). His visit to Flores was presumably later.

*Trelease* (1897) reported having collected *Euphrasia* on both Flores and Corvo, and cited two of his own numbers, 678 and 679, without saying which was from which island. As 678 is from Flores, 679 ought to be from Corvo but I have not seen a specimen. *Miss S. G. Davis*, Supervisor of the Herbarium at the Missouri Botanical Garden, has kindly informed me that there are no specimens of *Euphrasia* from the Azores there.

The seeds of *E. azorica* differ from those of most species of the genus in having the testa unequally 5-6-winged instead of about equally

10-ribbed. Although the seeds of *E. azorica* are thus distinctive, they have not been mentioned in the sectional description because those of *E. grandiflora* are still unknown.

## SUMMARY

*Euphrasia azorica* is regarded as distinct from *E. grandiflora*. Descriptions containing new information are provided for both species and for the Section Atlanticae to which they belong. Some errors are corrected in the most detailed of previous discussions of these plants (that of H. W. Pugsley).

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