



EUPHRASIA

General

Euphrasia is a genus which cannot easily be divided into well-behaved species. Considering the European representatives of the genus, we find a considerable range of variation, more than seems sensible to lump into a single species. Many of the distinctive variants are recognisable across much of Europe and have their own defined habitat preferences. Yet, for the most part, these individual 'species' are capable of cross-fertilisation and, when two taxa have the same chromosome number, they may be completely inter-fertile. Effectively, they often remain distinct because they occur in separate habitats rather than because they cannot interbreed.

Other forms are more local, sometimes restricted to a single locality. Often, localised forms seem to be derived from hybrids between the wider ranging taxa. Others have no such obvious origin. How then should these forms be treated? There is no easy answer.

It would seem most sensible to recognise just a few species, with many subspecies, but deciding on those few species would still be a matter of opinion and the number of subspecies would reach cumbersome proportions. Instead, the current European classification (Yeo 1978) recognises 48 microspecies, some with additional subspecies; 21 of these microspecies occur in the British Isles. Many other forms occur, recognisable but restricted to small areas, a few of which have been named but are now regarded as being local hybrid populations not meriting recognition at species level (e.g. *E. eurycarpa* and *E. rhumica*).

An adequate synthesis of Yeo's classification and a useable key to this species are provided in Stace's *New Flora*. A helpful account with illustrations is also given by Silverside (1990-1991).

A habitat guide to British species

As already stated, the species are characteristic of different habitats. The following notes may be of value not merely for suggesting possibilities for a given population, but also for indicating other taxa that might exist, or have formerly existed, in the vicinity. The possibility of recent or ancient hybridisation is often worth consideration. The notes apply primarily to Great Britain, but those species which occur in Europe appear to show the same distributional trends and ecological preferences there too.

Widespread taxa

E. arctica Lange ex Rostrup. subsp. *borealis* (F. Towns.) Yeo - a very variable taxon of hay-meadows and rough grassland, primarily in the north and west. Often in damper and less basic sites than *E. nemorosa* which it largely replaces in Scotland.

E. confusa Pugsley - well-drained, acid or calcareous, grazed turf, especially in upland areas of the north and west. Occasional on sandy soils elsewhere.

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- E. micrantha* Rchb. - the commonest plant of heathland and heather moorland, primarily in the north and west.
- E. nemorosa* (Pers.) Wallr. - a species of short grassland, widespread and often common in S England but becoming more local northwards. Largely coastal and more restricted to basic habitats in Scotland.
- E. officinalis* L. subsp. *anglica* (Pugsley) Silverside (*E. anglica* Pugsley) - damp heaths and pastures, mainly in Wales and S England, extending to SW Scotland.
- E. officinalis* L. subsp. *rostkoviana* (Hayne) F. Towns. (*E. rostkoviana* Hayne subsp. *rostkoviana*) - local in hay-meadows, damp pastures and on riversides in Wales, N England and S Scotland, extending very locally further north to the C Highlands.
- E. pseudokernerii* Pugsley - in herb-rich turf on chalk downland in south and east England; very rare on limestone in SW England, Wales and W Ireland; in fens in East Anglia.
- E. scottica* Wettst. - by moorland streams and in non-calcareous hill flushes, often with *Molinia*, restricted to the north and west.
- E. tetraquetra* (Breb.) Arrond. - mostly on coastal cliffs, widespread but most abundant and most typical in Wales and SW England. Often confused with condensed forms of *E. nemorosa*.

More geographically or ecologically restricted taxa

- E. arctica* Lange ex Rostrup subsp. *arctica* - a characteristic plant of wet meadows in Orkney and Shetland, apparently absent from the mainland and the Western Isles, though a variant of *E. arctica* in ancient hay meadows may belong here.
- E. foulaensis* F. Towns. - wet, coastal turf and edges of saltmarshes in N & NW Scotland.
- E. frigida* Pugsley - an arctic-alpine of wet, basic mountain ledges in the Lake District and Scotland.
- E. heslop-harrisonii* Pugsley - edges of estuarine saltmarshes north from Argyllshire northwards.
- E. marshallii* Pugsley - heathy cliff-tops in N Scotland.
- E. officinalis* subsp. *monticola* Silverside (*E. montana* Jord.; *E. rostkoviana* Hayne subsp. *montana* (Jord.) Wettst.) - an early-flowering plant of upland hay-meadows, often in wetter sites, mostly in the Lake District and N Pennines.
- E. ostensfeldii* (Pugsley) Yeo - exposed, gravelly places on sea-cliffs in N Scotland and on a few western mountains south to Snowdonia, formerly in Teesdale.
- E. rivularis* Pugsley - by mountain streams in N Wales and the Lake District.
- E. salisburgensis* Funck - widespread in Ireland, was mistakenly reported from Yorkshire.
- E. stricta* D. Wolff ex J. F. Lehm. - dry grassland, presumably native in Guernsey, also once reported from Buckinghamshire as an introduction.

Extremely localised endemics

- E. atroviolacea* Druce & Lumb - taxon of uncertain status in thin turf on shell-sand in a few localities in Orkney
- E. cambrica* Pugsley - in short, basic turf on few mountains in N Wales; a record from the Lake District appears to be an error.
- E. campbelliae* Pugsley - probably a good species of complex hybrid origin, occurs in damp oceanic heathland on the west coast of Lewis.
- E. rotundifolia* Pugsley - another apparent hybrid taxon, is restricted to a very few, periodically damp, basic cliff tops on the north coast of the Scottish mainland (invariably accompanied by *Primula scotica*?) and is probably mis-recorded elsewhere.
- E. vigursii* Davey - also of hybrid origin, is characteristic of damp heathland and cliff-tops in Cornwall and Devon, now lost from a number of sites

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[Recent fieldwork suggests the existence of another, undescribed taxon in NW Scotland. Provisionally being recorded under the working name "*E. fharaidensis*" (a name which must not yet be used in any formal publication), it shows a superficial resemblance to *E. micrantha* but differs in its fleshy, glabrous, rather squarrose, often petiolate upper cauline and lower floral leaves, with the basal pair of teeth remote from the leaf-base and often with sinuous proximal margins. It has a characteristically vivid coloration:- deep green leaves, a deep purple stem and white flowers with bright purple upper lips. The calyx-tubes tend to be papery and whitish. Now recorded from a number of localities from Skye and W Ross to Orkney, it occurs in wet flushes on cliff-tops and at the back of saltmarshes and has also been found in mesotrophic flushes and on stony loch-shores inland. An almost constant associate is *Carex pulicaris*.]

Hybrids

The small-flowered species are normally self-fertilised and so may not form hybrids too readily, but any hybrids will also self-fertilise to produce very local, uniform populations. This causes great problems in the north, particularly in Shetland. The larger-flowered grassland species, *E. arctica*, *E. confusa* and *E. nemorosa*, are more often insect-pollinated and will cross readily with other species around them, including one another. This means that these three species create particular problems and form extensive intermediate populations wherever their range overlap, sometimes involving all three species or crossing further with other taxa. The widespread diploid species, *E. officinalis*, does not readily form hybrid swarms with the tetraploid taxa, but can still form distinctive and locally uniform hybrid populations. Hybrids can be expected at habitat boundaries, along roadsides, or extensively where patterns of land use have changed (e.g. conversion of moorland to grazing land).

The following are among the more important hybrids that may persist in the absence of one or both parents:

- E. arctica* × *E. confusa* - apparently common in upland grassland in Scotland, but not always separable from depauperate upland forms of *E. arctica*.
- E. arctica* × *E. micrantha* - often abundant on moorland roadsides.
- E. arctica* × *E. nemorosa* - forms extensive hybrid swarms, notably in coastal areas of NW Scotland. Populations of 'glandular *E. nemorosa*' tend to have broad floral-leaves and study in the field suggest that they should be assigned to this hybrid.
- E. confusa* × *E. micrantha* - forms locally uniform populations in heathy hill-turf, e.g. on Exmoor and the Scottish border country. Often a very attractive plant.
- E. confusa* × *E. nemorosa* - widespread and often more common than the parents in many parts of N and W Britain.
- E. confusa* × *E. scottica* - replaces *E. scottica* in the more calcareous hill-flushes.
- E. confusa* × *E. tetraquetra* - locally replaces *E. tetraquetra* on limestone cliffs and dunes in SW England
- E. frigida* × *E. scottica* - occurs as hybrid zones in damp turf below mountain cliffs.
- E. micrantha* × *E. nemorosa* - occasional in heathy lowland grasslands.
- E. micrantha* × *E. scottica* - largely replaces the parents on the wet moorlands of NW Scotland and the Western Isles. Sometimes on moorland stream banks elsewhere, but not common.
- E. nemorosa* × *E. pseudokernerii* - forms hybrid swarms in rough grass on chalk downs.
- E. officinalis* subsp. *anglica* × *E. nemorosa* - occurs locally in heathy grassland in S England.

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Collecting *Euphrasia* for expert determination

The person collecting *Euphrasia* in the field has significant advantages over the person who ultimately receives a few dried specimens for naming. He/she is able to see the living plants in all their variation, to fully appreciate the habitat conditions, to see if other *Euphrasia* species are in the vicinity and, if so, to assess the occurrence of hybrids and possible hybrid zones. It is the duty of the collector to pass on as much of this information as possible to the referee.

For each population, 5 or more representative plants should be selected. If the population is so small that removing 5 plants represents a significant threat, then it would be better to collect none at all; single specimens are of little value. Plants should be undamaged, with the main stem intact (i.e. ungrazed) and should have both flowers and some fully formed capsules. Younger specimens will not have developed their characteristic branching and specimens fully in fruit will have undoubtedly lost most of their stem leaves. Ideally, each individual plant is put in a small polythene bag so that leaves which fall off can be kept and pressed with the plant. All bags from one gathering are kept together in a larger bag. Never mix plants from different gatherings loose in one bag.

Make a careful note of the habitat. 'Roadside' is not very informative; better is, 'In short turf on roadside adjacent to heather moorland.' Make a note of any other *Euphrasia* species seen in the vicinity, or collect further samples from nearby populations if their identity is in doubt. Remember that hybrids are common in this genus and particularly prevalent on roadsides and in other disturbed situations.

Before plants are pressed, make notes on the colours of flowers and leaves, particularly when leaves are differently coloured above and beneath. Mould sets in readily so plants should be pressed without delay and drying papers changed at least daily. Well dried plants retain their leaf colour, though in some species, notably *E. foulaensis*, leaf-blackening is still to be expected and can be an aid to identification.

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