Plant Crib

EPILOBIUM

Difficulties in identification of the species arise mainly through the great phenotypic plasticity of many characters, particularly the leaves and the quantity of the indumentum, and the failure to examine critically proven diagnostic characters, notably the quality of the indumentum.

1. Hybrids

With *Epilobium* there is a danger in supposing that, because it may be difficult to place a plant in a species, it is a hybrid. Often the difficulty may be one resulting from the plasticity of the species, not hybridisation. Where populations of different species meet, individuals which are intermediate may be found, and so are likely to be hybrids. However it is generally possible to establish that a plant is a hybrid, or at least a likely hybrid, before identifying which hybrid it is or, indeed, whether it cannot readily be placed within a species.

Common characteristics shown by hybrids are: free flowering over a long period, long willowy branches, semi-abortive capsules, seed at least in part shrivelled and sterile, and flowers perhaps flushed purple. These characteristics will be less apparent in young hybrids, and represent only part of the spectrum of hybridity. As the remainder of the spectrum may include dwarf, malformed and inviable plants, these characteristics are those most readily encountered and recognised in the field. When examining hybrids, it may be helpful to examine to following features:

HABIT
Hybrids are often 'inverted candelabra' shaped, with elongated waving branches, seemingly representing a prolonged attempt to set seed. Plants of this shape are not to be confused with *E. palustre* which is often well branched and nodding, but should be fully fertile.

FLOWERS
Deep purple flowers smaller than *E. hirsutum* may indicate an *E. hirsutum* cross. Irregular purple flushing often indicates a hybrid. The white flowers of *E. lanceolatum* and *E. roseum*, which go over to pink with age or after pollination should not be confused with purple flushing. Rarely, hybrid flowers are minute and abortive.

STIGMA SHAPE
This is critical to determination. Hybrids with 4-lobed stigmas should be a combination between any of *E. hirsutum*, *E. lanceolatum*, *E. montanum* and *E. parviflorum*. Note that adherent pollen can make it difficult to see the lobes. The stigma lobes of *E. lanceolatum* and *E. parviflorum* can be held upright, and so deceptive.

Hybrids with entire stigmas should be a combination between any of *E. ciliatum*, *E. obscurum*, *E. palustre*, *E. roseum*, *E. tetragonum*. In upland or montane areas, *E. alsinifolium* and *E. anagallidifolium* are possible parents. *E. brunnescens* also has entire stigmas (its hybrids are distinct, and treated separately below).

Plants with intermediate stigmas (bearing 'confused' or 'melted' lobes, often like a clenched fist) will be hybrids between the two previous groups. These are often the first ones that botanists learn to recognise.

HAIRS

The long, spreading hairs on stems and upper parts of *E. hirsutum* and *E. parviflorum* can be inherited in hybrids. Glandular hairs can also be inherited from *E. ciliatum* and *E. roseum*, and sometimes *E. montanum* and *E. palustre*. The effect of a cross between species with and without glandular hairs is to dilute the quantity of such hairs in the progeny (an observation which is an exception to the usual rule in examining hairs in *Epilobium*: rely on the quality, not the quantity, of hairs).
E. obscurum hybrids may show a clustering of glandular hairs on or just below the sepals, if not swamped by glandular hairs inherited from the other parent. Glandular hairs should not be confused with fungal hyphae on mouldy plants!

LEAVES

The following characters may be inherited by hybrids:
- half-clasping leaves with hooked teeth from *E. hirsutum*;
- sessile leaves with surface felting from *E. parviflorum*;
- cuneate leaf-bases from *E. lanceolatum*;
- rounded leaf-bases from *E. montanum*;
- cuneate leaf-bases with long petioles from *E. roseum*;
- narrow leaves from *E. palustre* and *E. tetragonum*.

Leaves can be very variable within species, so one should not assume hybridity from these characters alone. In particular, wet shade forms of *E. parviflorum* can have wide semi-glabrous leaves and may be mistaken for hybrids.

SEEDS

It is important to establish that suspected hybrids have limited fertility. Capsules of hybrids usually carry a mix of seeds; many small, shrunken and sterile, some fully formed, and intermediates with some distortion.

Seed surface architecture varies between species; but the most easily identifiable inheritance is that from *E. ciliatum*, whose surface ridging is inherited by hybrid seed (× 20 lens). *E. palustre* seed is the longest of British species (1.6-1.8 mm), followed by *E. alsinifolium.* Hybrids of *E. palustre* with other British species will generally bear occasional fertile seed with intermediate measurements.

PERENNATING STRUCTURES

These can supply characters, but generally confirm inheritance from species which could be ascertained from other characters. Weaker versions of the thick fleshy underground stolons of *E. hirsutum* can be found in its hybrids. The thread-like stolons of *E. palustre* with buds at the end are generally thicker and leafier in crosses (but are not to be confused with the late summer stolons of *E. obscurum*).

Hybridisation is widespread, though rather sporadic in occurrence, and hybrids are significantly under-recorded. The most frequently encountered hybrid by far is *E. montanum* × *E. ciliatum* (a 'confused stigma' cross). Comparative frequencies are set out in the Table below. VC = very common; C = common; F = frequent; R = rare; and O = very rare or unrecorded.

anagallidifolium	R											
brunnescens	O	O										
ciliatum	O	O	R									
hirsutum	O	O	O	R								
lanceolatum	O	O	O	R	O							
montanum	R	O	R	VC	F	R						
obscurum	O	O	R	C	R	R	C					
palustre	R	O	O	R	O	O	R	F				
parviflorum	O	O	O	C	F	O	F	C	F			
pedunculare	O	O	O	O	O	O	O	O	O	O		
roseum	O	O	O	R	R	O	F	R	O	F	O	
tetragonum	O	O	O	F	R	R	R	R	O	F	O	R
	alsin.	*anag.*	*brun.*	*ciliat.*	*hirsu.*	*lanc.*	*mont.*	*obsc.*	*palus.*	*parvi.*	*pedu.*	*rose.*

2. *Epilobium obscurum* / *E. tetragonum*

Both species have entire stigmas and appressed stem hairs. Confusion with *E. tetragonum* may arise over narrow-leaved forms of *E. obscurum* with inconspicuous glandular hairs, for which very close examination may be required. Glands are best seen in silhouette with a lens on the floral collar.

	Epilobium obscurum Schreb.	*Epilobium tetragonum* L.
Fruits	(3-)4-6(-6.5) cm long	(5.5-)6.5-8.5(-10) cm long, often appearing heavily massed together
Glandular hairs	Present at floral collar / lower sepals. Otherwise, few and scattered	Absent
Leaves	Ovate-lanceolate, normally wider than *E. tetragonum*	Narrowly lanceolate, somewhat parallel-sided
Stolons	Appearing in late summer, often above ground with small leaf pairs, not rosettes	Appearing in autumn, very short, with rosettes at stem base

3. *Epilobium alsinifolium* / *E. anagallidifolium*

The two alpine *Epilobium* species, though generally distinct, can look alike. *E. alsinifolium* is usually the larger plant, but may be as small as *E. anagallidifolium*. Both could be confused with *E. brunnescens*, which also creeps and roots at the nodes, but it has ± orbicular not ovate to narrowly elliptic leaves. They are more likely to be confused with *E. palustre* which may also have drooping flowers and grows in upland flushes but it lacks raised ridges on the stem.

E. alsinifolium occurs in hilly springs, stony flushes on rock ledges and by waterfalls, and may be declining due to grazing or more likely it is under-recorded. *E. anagallidifolium* tends only to occur in or by flushes and springs; it is commoner in Scotland than *E. alsinifolium*.

	Epilobium alsinifolium Vill.	*Epilobium anagallidifolium* Lam.
Plants	Strongly ascending from decumbent base	Usually more creeping, or more gradually ascending
Stems	5-20(-30) cm long, *c.* 1.5-3 mm wide	4-10(-20) cm long, *c.* 1-2 mm wide
Stolons	Below ground, yellowish, with distant pairs of yellowish scales	Above ground, with distant pairs of small green leaves
Leaves	Usually 1.5-4.0 × 1.0-2.5 cm, somewhat bluish-green, distantly sinuate-toothed	Usually 1.0-2.5 × 0.5-0.7 cm, often yellowish-green, entire, or faintly sinuate-toothed
Flowers	8-9 mm in diameter	4-5 mm in diameter

4. New Zealand Willowherbs

Three species of small, creeping willowherb have been found naturalised in Britain. They may be identified as follows (McClintock 1972):

1 Leaves (2.5-)6(-14) x (2.5-)8(-15) mm, serrate, rich purple with veins showing prominently beneath ***E. pedunculare*** A. Cunn.

1 Leaves usually smaller, sub-entire or at most sinuate, not or less purple beneath 2

2 Leaves (4-)5(-12) x (2-)4(-12) mm, thin, green or bronzy and smooth above, usually suffused purplish with veins showing faintly beneath; seeds papillose, 0.75-0.9 mm ***E. brunnescens*** (Cockayne) P. H. Raven & Engelhorn

2 Leaves (2-)5(-12) x (1.5-)3(-9) mm, thick, bronzy brown and rugose with prominent veins above, mostly green and veins not showing beneath; seeds smooth, 0.5-0.9 mm***E. komarovianum*** H. Lév.

E. brunnescens is by far the commonest species and is widely distributed, particularly in the uplands (a dwarf form with leaves (4.5-)5 x 2-3 mm is also known). *E. pedunculare* has been recorded from V.cc. 2, 17, 41, 45, 65, 74, 87, H16 & H27 and *E. komarovianum* from V.cc. 1, 2, 3, 57, 61, 66, 76, 77, 98, H38 & H39.

5. *Epilobium brunnescens* hybrids

These hybrids are distinct, and those which are known in Britain (Kitchener & Mckean 1998) are keyed out below. They are usually small, semi-prostrate plants, often with a radiating habit of growth, rising to flower and fruit (mostly sterile), and are usually reddish throughout. They are currently thought to be rare or occasional.

1 Stems semi-glabrous below, with lines of hairs descending from nodes; stigmas entire 2

1 Stems hairy all round below; stigmas ‘confused’ 4

2 Leaves generally narrow; seeds (when fertile) 1.0-1.3 mm long with distinct neck where the comal hairs are attached ***E. brunnescens ´ E. palustre***

2 Leaves ovate-lanceolate to elliptic; seeds (when fertile) 0.6-0.95 mm long, sometimes with neck 3

3 Glandular hairs present, often abundantly, along ovary at anthesis, extending at least to pedicel; fertile and sterile seeds with ridging on surface; seeds (when fertile) may have a slight neck where the comal hairs are attached ***E. brunnescens ´ E. ciliatum***

3 Occasional glandular hairs present along ovary at anthesis, not extending to pedicel; seeds without surface ridging or neck; fertile seed surface tuberculate, sterile seed surface reticulate ***E. brunnescens ´ E. obscurum***

4 Flowers whitish in bud, white or pale pink in flower ***E. brunnescens ´ E. lanceolatum***

4 Flowers purplish-pink in bud and in flower ***E. brunnescens ´ E. montanum***

References Kitchener, G. D. & Mckean, D. R. (1998). *Watsonia* **22**: 49-60.
McClintock, D. (1972). *Watsonia* **9**: 140-142.

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