Plant Crib

UTRICULARIA

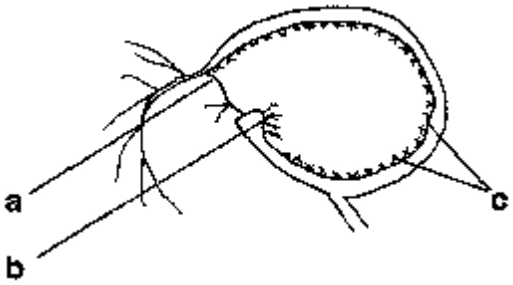
Critically determined herbarium specimens are essential for assessing the distribution of these taxa in Britain and Ireland. Stace's *New Flora* contains a key with illustrations of the flowers and quadrifid hairs; the following notes may be useful.

Collecting notes

Identification is easiest on fresh flowering material but material sent for determination in water in plastic bags usually arrives rotten. A 50:50 water-alcohol mixture (e.g. neat gin/vodka) or 70% alcohol with a few % of glycerine (this makes the material softer and more easy to work with) is much better if adequately sealed for posting, but some herbaria may be unable to curate such material adequately. Dried specimens of flowering material are also acceptable, preferably with close-up photographs of flowers. Be sure that you are only collecting from one plant each time as different species may grow intermingled in bogs. Press flowers carefully sideways.

Examining quadrifid hairs

The quadrifid hairs may be useful for identifying vegetative material as flowers are rarely produced in some taxa (see key below). The hairs should be looked for under a microscope on the inside of the bladder away from the trap mouth (quadrifid hairs near the bifid hairs immediately below the trap entrance have a larger angle between the arms). The relative lengths of the arms and the angle between them should be carefully examined on at least five traps. The angle between the arms may get distorted in pressed material or if pressure is applied under a cover-slip.



T.S. though a bladder. (a) trap opening, (b) bifid hairs, (c) quadrifid hairs.

Key based on quadrifid hairs

The following key using the quadrifid hairs alone is taken from Thor (1988). Note that the distinction between *U. vulgaris* and *U. australis* using quadrifid hairs alone is unsatisfactory and intermediates occur.

1 Angle between longer arms (3°-)4°-12°(-18°) and between shorter arms (2°-)6°-21°(-37°) ***U. intermedia*** Hayne

1 Angle between longer arms (4°-)14°-56°(-90°) and between shorter arms (30°-)52°-300°(-324°) 2

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2	Angle between shorter arms (212°-)243°-300°(-324°); width of the arms 7-9 µm	***U. minor*** L.
2	Angle between shorter arms (30°-)52°-197°(-228°); width of the arms 9-14 µm	3
3	Quotient between longer and shorter arms (1.3-)1.8-2.8(-3.9)	4
3	Quotient between longer and shorter arms (1.0-)1.3-2.0(-3.1)	5
4	Angle between shorter arms (48°-)86°-131°(-175°) (but see below)	***U. vulgaris*** L.
4	Angle between shorter arms (52°-)101°-157°(-174°)	***U. australis*** R. Br.
5	Angle between shorter arms (30°-)52°-97°(-140°), angle between longer and shorter arms (80°-) 106°-139°(-175°)	***U. stygia*** G. Thor
5	Angle between shorter arms (117°-)146°-197°(-228°), angle between longer and shorter arms (34°-) 60°-93°(-123°)	***U. ochroleuca*** R. W. Hartm.

Examining glands inside spur

The distribution of glands inside the spur can be seen in dried material in flowers which have been carefully pressed laterally. Examine the spur under a low power microscope with a strong light underneath.

Utricularia vulgaris / *U. australis*

These two species are the most robust (20-100 cm) with bladders on all leaves and no colourless shoots, and typically occur free-floating in lakes, ponds, canals, fens and lowland ditches. *Utricularia vulgaris* is thought to occur mainly in base-rich water and *U. australis* mainly in base-poor waters, but more study is needed.

The most reliable characters for distinguishing *U. vulgaris* from *U. australis* are the arrangement of glands inside the spur. The corolla lower lip character (flat in *U. australis*, deflexed in *U. vulgaris*; cf. illustrations in Stace's *New Flora*) works well in the field but is distorted in pressed material. The length of the pedicels (cf. Perring 1962) is a useful secondary character, but is not diagnostic on its own (it becomes long and sinuous after flowering in *U. australis*, recurved and neither elongated nor sinuous in the other species). If the plant sets seed it has to be *U. vulgaris.*

The differences between the quadrifid hairs for this pair are now considered to be much smaller than previously thought and are of relatively little use for distinguishing the species (Thor 1987, 1988). Vegetative material has been determined in the past on the presence of much more pronounced lateral teeth on the leaf segments (Figs. a, b; cf. *Plant Crib* 1988) but this is now considered unreliable too.

Utricularia intermedia aggregate

This group of species is easily distinguished from the others in being intermediate in size (5-40 cm long) with green, flattened leaves without or with few bladders and whitish shoots with bladders which descend into the substratum. They typically occur in very shallow water, bogs, in runnels and quagmires.

All species have been recorded historically as *U. intermedia*, and old records must be re-checked. It is now known that *U. ochroleuca* is widespread in Scotland and Ireland, and *U. stygia* is commoner in some areas (e.g. Scotland) than *U. ochroleuca*. *Utricularia intermedia* s.s. now appears to be a rare plant in Britain.

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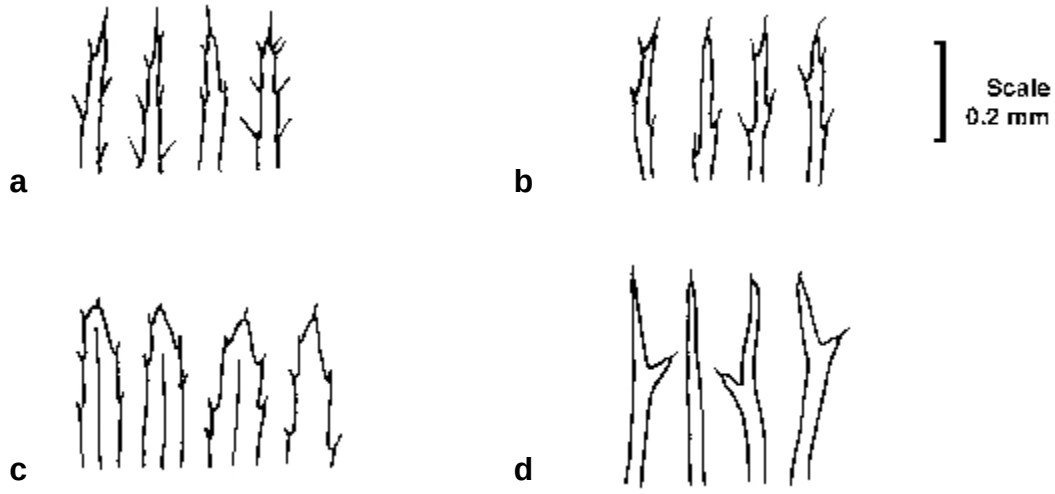
Utricularia minor aggregate

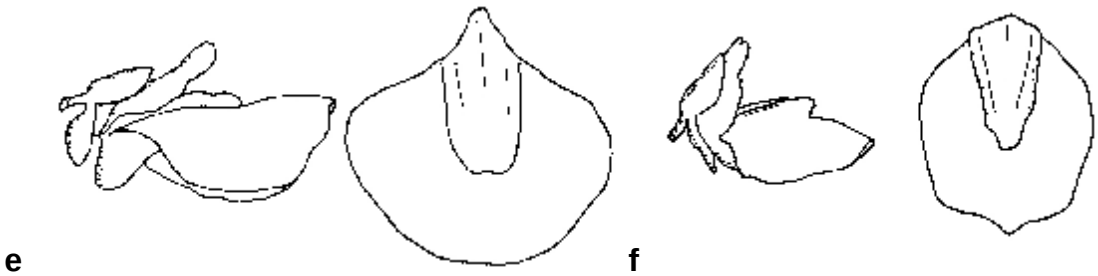
These slender (2-30(-40) cm long) species can be found free-floating or weakly embedded on the bottom of peat pools, runnels, quagmires, small lochs and ponds, often with members of the *U. intermedia* agg.

The lack of lateral spines on the leaves of *U. minor* (Fig. d) and the very short spur of the flowers (Fig. f) are diagnostic. The quadrifid hairs are also diagnostic to this group.

Utricularia bremii Heer ex Koell. is a widespread European species, rare in Britain. It is very like *U. minor* but is more robust with taller inflorescences with more flowers. The most obvious difference is in the flowers, which are larger with a relative wider corolla and a flat lower lip (Fig. e). The quadrifid hairs are similar to those of *U. minor* (Taylor 1989). Specimens of *U. bremii* with close up photographs of the flowers are required.



Leaf segments showing hair types (after Thor 1979). (a) *U. vulgaris*, (b) *U. australis*, (c) *U. intermedia* agg., (d) *U. minor* (note leaves lobed).



Flower (side view) and lower lip (front view) (after Taylor 1989). (e) *U. bremii*, (f) *U. minor.*

References Perring, F. H. (1962). *Proc. BSBI* **4**: 359-383.
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Author Largely based on pers. comm. with P. Taylor, 1988-1998, updated T. C. G. Rich, 1998.

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