

## LARGE RIPARIAN SEDGES

### Identification notes, or what the books don't tell you!

Many Irish recorders, even experienced ones, find large riparian sedges (LRS) "difficult". There is evidence that some records in the BSBI database are questionable or wrong. One reason for this may be that existing keys and identification guides are awkward to apply unless the specimens are typical and at peak season. Depending where you botanise, you may not see them very often and need to look them up each time. These notes and the associated table are designed to help botanists identify them more reliably, and to understand the limitations of the main characters. They will probably work better if you use them in conjunction with a standard flora, but be careful in your interpretation of any diagrams as they may be foreshortened to accommodate the tall slender shapes of these sedges. Feedback would be very welcome: these notes are a "work in progress" so please send any suggestions for improvements to John Faulkner at [jsf@globalnet.co.uk](mailto:jsf@globalnet.co.uk).

**What is included in the table?** Six of the larger sedges found in Ireland on the margins of lakes and rivers, and occasionally in other damp habitats. Four are members of the section *Phacocystis* (formerly known as the *Acutae*, and perhaps more easily understood as the "*nigra* group"), ie *C. acuta*, *C. aquatilis*, *C. elata* & *C. nigra*. The other two belong to section *Paludosae*, ie *C. acutiformis* & *C. riparia*. Some other riparian sedges are not included as they rarely present ID problems (eg *C. vesicaria*, *C. pseudocyperus*, *C. rostrata*, *C. lasiocarpa*). All six are in the subgenus *Carex*, and have separate - usually very dissimilar - male and female spikes. The male spikes are distal to the female ones. Middle spikes typically have a male terminal region and a female proximal one.

**Plasticity.** LRS can be very variable, eg in the size of vegetative parts and in some inflorescence characters. In practice this means that it is often advisable to assess several shoots from different plants, and to be certain that you are not trying to base your identification on an extreme specimen (eg a depauperate or a late season one). Look around to assess the population as a whole. In lush habitats, the plants will be taller (more than a metre high) and larger with wider leaves and longer bracts and spikes. In shade, they may be reluctant to produce flowering shoots.

**Hybrids.** Various hybrids do occur, but with the exception of *C. elata* x *nigra* (*C. x turfosa*) they are relatively uncommon and are normally found in the presence of both parents. Failure to set seed (see nutlets below) is not diagnostic of hybrids. These plants are largely cross-pollinated and self-incompatible, so failure to set seed may be due to lack of cross-pollination. On the other hand, the presence of good seed does not rule out hybridity either, as hybrids within the *nigra* group are partially fertile.

**Tussocks vs tufts.** *Tussocks* are impressively dense clumps of shoots, typically raised above the water table with the shoots inclined outwards from the centre. Tussock-forming plants do not have long pioneering rhizomes. All the shoots in one tussock are likely to have arisen from one seedling, and will be more alike to each other than to neighbouring tussocks. *Tufts* are groups of a few

shoots, with neighbouring tufts often connected by rhizomes up to 30 cm in length. I find it more helpful to describe the species with tufts as “creeping” rather than tufted, as they tend to produce even stands, sometimes dominating many square metres. The difference between tussock-formers and creeping species is usually very obvious, but hybrids of *C. elata* are intermediate and have shortly-creeping rhizomes. Occasionally the creeping species may appear to develop tussocks, apparently when the rhizomes grow upwards in very wet conditions in search of oxygen.

**Longevity.** These sedges are long-lived perennials, though exactly how long would be very interesting to know. Tussocks may collapse eventually, but clones of creeping species may last for decades or longer.

**Male spikes.** The number of male spikes is not particularly consistent or diagnostically valuable, although *C. riparia* tends to have more than the others. Their shape, colour and texture is more helpful although it changes as the spikes mature and become more untidy. In *C. riparia*, they are chunky and brown at first and tapered to both ends, becoming rather rough and loose. In contrast, the *nigra* group has slender blackish neat spikes, especially when young. *C. acutiformis* is more or less intermediate, rather variable, but seldom as neat and slender as in the *nigra* group.

**Female spikes.** Numbers and point of insertion are not very useful because of the underlying variability. In many species of *Carex*, the lower female spikes are occasionally inserted low down on the stem and will tend to have long, sometimes pendulous, peduncles. The lowest spike of *aquatilis* tends to be lower down the stem, and of *elata* tends to be higher, but there will be many exceptions. Mature female spikes of *riparia*, and to a lesser extent *acutiformis*, are wider than those of the *nigra* group, reflecting the length of the utricles, their glumes, and the wider angle at which these are held in relation to the rachis.

**No. of stigmas.** This is a diagnostic and clear-cut character, but very problematic in mid to late summer. When the stigmas first emerge from behind the female glumes, it is obvious whether there are two (*nigra* group) or three (*Paludosae*) on each flower. As they develop they can become an entangled mass. Look for the least mature female spikes. If you can definitely see three stigmas emerging from one utricle, that is totally diagnostic. If you think the maximum is two, bear in mind that one may have fallen off. By mid-season, they will all have disappeared.

**Utricles.** *Riparia* stands out as having inflated utricles with long beaks with a clearly bifid tip. *Acutiformis* may have a short and notched beak but this is not always distinct enough to separate it clearly from the tiny beaks of the other four.

**Nutlets.** Sedge seeds are contained singly within a hard brown nutlet, which is within the utricle (a modified bract). Mature nutlets of *riparia* and *acutiformis* should be trigonous, ie triangular in cross-section, reflecting their 3 stigmas. Those of the *nigra* group are bi-convex and 2-angled, reflecting the 2 stigmas. That at least is the theory, but I have not yet tested this character rigorously enough to be sure how easy it is to apply in practice.

**Flowering time.** As a broad rule, *riparia* and *elata* flower on average somewhat earlier than the others, with their male spikes emerging before the end of March in a favourable year and situation. *C. aquatilis* flowers rather later than the others by a similar margin.

**Leaf dimensions.** Most of the larger riparian sedges have leaves more than 3mm wide. The exception is *C. nigra*. but beware of plasticity. Typical *nigra* has narrow leaves and is much shorter than the other species, but in rich ungrazed conditions it can grow much taller.

**Stem and Leaf section.** These characters go hand-in-hand. Stems (culms) are triangular in section, as is normal in sedges. In most species, they are acutely so, with a margin that may be distinctly rough, notably in *riparia*. *Aquatilis* is the odd one out, with stems that are smooth, bluntly angled, and tending towards terete below. Well-grown leaves of most species are plicate, but *aquatilis* is again distinctive. *Aquatilis* leaves tend to a keeled form - like a V - but with each arm of the V tending to curve inwards. In some leaves, the angle of the V is flattened such that the sectional profile is more like a shallow rounded U, a shape described as channelled. In this respect, *aquatilis* resembles the much commoner species *C. rostrata*. *Rostrata* differs by being soft and spongy at the base of the shoots.

**Bracts.** Each spike is subtended by a single leaf-like bract. The length of the bracts in relation to the inflorescence is important in the *nigra* group. *Elata* has short bracts, with even the lowest one falling well short of overtopping the inflorescence. *Nigra* also has relatively short bracts, but the lowest may just exceed the top of the inflorescence. *Acuta* and *aquatilis* have long bracts, with two or more usually exceeding the inflorescence, sometimes greatly so. In *aquatilis*, the lowest bract forms a very narrow angle with the stem, so that the lowest spike may be partially ensheathed within the bract. Both *riparia* and *acutiformis* have at least one bract longer than the inflorescence. The bracts of *acutiformis* may form a noticeably wide angle (ca 45°) with the stem - a useful distinction from *aquatilis*.

**Stomata and leaf colour.** Stomata can be seen with a x10 lens as small whitish dots in rows on the surface of leaves and bracts. (Technically, these may be silica bodies associated with the stomata, but the difference is immaterial here). In most sedges, the stomata are found on the lower (ie abaxial) surface, and the leaves are described as hypostomous. In *aquatilis* and *nigra*, however, the majority of stomata are on the upper (adaxial) surface, a state described as epistomous. The upper surface of both species is matt and blue-green to glaucous, as is the lower surface of *nigra*. *Aquatilis* has a lower surface that is shiny and of a deeper greener shade. The contrast between upper and lower surfaces can readily be seen by placing a leaf upside down across the face of another. This colour and texture contrast is also seen in *Carex rostrata*, another epistomous species.

**Leaf sheaths.** Leaf sheaths persist, to varying degrees and in various colours, as dead tissue around the base of a shoot. In *aquatilis* and *acutiformis*, if you examine several shoot bases, you will normally be able to find a distinctly reddish tinge on the sheaths of at least some of them. Other LRS do not show this character. As the shoot grows, the sheaths split along the inner side. In *elata*,

the two sides of the split may remain connected by fibrillae, but this is not always an easy character to see.

**Habitats.** The habitats occupied by these species overlap, but as a general rule *acutiformis* and *elata* tend to be found in base-rich waters, notably around the limestone lakes of the Midlands. *Nigra* is found in a wide range of situations and can tolerate impoverished acid conditions. *Aquatilis* can also tolerate acid waters, but I have seen it on turloughs and in the Shannon in the company of *elata*. In Ireland, but possibly not in Britain, *riparia* appears to be more frequent within reach of the coast, where it will tolerate brackish estuarine conditions. With improved recording of these species, their ecological preferences in Ireland should become more apparent.

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