S9
Carex rostrata swamp
Caricetum rostratae Rübel 1912

Synonmy
Carex ampullacea consocies Matthews 1914; *Caricetum inflatae* Tansley 1939; *Carex rostrata* 'reed-swamps' Holdgate 1955*b p.p.*; *Carex rostrata* sociations Spence 1964 *p.p.*; *Carex rostrata* reed-swamps Proctor 1974; *Carex rostrata* nodum Daniels 1978; *Caricetum rostratae* Birse 1980 *p.p.*

Constant species
Carex rostrata.

Rare species
Eriocaulon septangulare.

Physiognomy
The *Caricetum rostratae* is generally dominated by *Carex rostrata* which characteristically forms a somewhat open cover of tufted shoots usually 50–60 cm tall. No other species is frequent throughout and the vegetation is typically species-poor.

Sub-communities

***Carex rostrata* sub-community.** Open *Carex rostrata* sociation Spence 1964. This sub-community includes pure and very species-poor stands overwhelmingly dominated by *C. rostrata*. *Equisetum fluviatile*, *Polygonum amphibium* and *Potamogeton natans* occur occasionally.

***Menyanthes trifoliata-Equisetum fluviatile* sub-community:** *Carex rostrata-Menyanthes* sociation Spence 1964; *Carex rostrata-Menyanthes trifoliata* Association Birks 1973. Here, the vegetation comprises mixtures of *C. rostrata*, *Equisetum fluviatile*, *Menyanthes trifoliata* and *Potentilla palustris* sometimes developed as a floating mat. Although the sedge is generally dominant, each of these associates may be locally abundant, the bulky foliage of *M. trifoliata* and *P. palustris* often appearing particularly prominent among the thinner sedge and horsetail shoots. *Eleocharis palustris*, *Carex nigra*, *Ranunculus flammula*, *Caltha palustris* and *Potamogeton polygonifolius* are occasional. *Lobelia dortmanna* and *Littorella uniflora* are uncommon, though sometimes abundant and, on Skye, *Eriocaulon septangulare* occurs in this vegetation.

Habitat
The *Caricetum rostratae* is typically a swamp of shallow to moderately deep, mesotrophic to oligotrophic, standing waters with organic substrates. Although found down almost to sea-level, it is one of the few swamp communities that makes a major contribution to the vegetation of upland lakes where stands may be extensive. It also occurs more fragmentarily in peat cuttings.

Although the community can be encountered on silty or sandy substrates, it is more typical of an organic base, often being rooted directly in firm peat (as where the *Carex* sub-community is colonising existing underwater deposits) or spongey peat ooze (especially under the *Menyanthes-Equisetum* sub-community which produces abundant litter). pH values of 5.0–6.8 have been recorded but the waters may be nutrient-poor and the *Caricetum rostratae* includes stands which extend the occurrence of swamp vegetation into highly oligotrophic situations.

The two sub-communities are associated with different ranges of water depth, the *Carex* sub-community occurring in as much as 1 m of water and rarely in less than 10 cm (mean about 30 cm), the *Menyanthes-Equisetum* sub-community in 2–40 cm (mean about 20 cm).

Zonation and succession
Sometimes, especially in the more oligotrophic upland lakes, the community represents the limit of swamp vegetation. Frequently, however, it occurs behind a front of the *Scirpetum lacustris* and/or *Phragmitetum australis*. The two sub-communities are themselves commonly zoned, with the *Carex* sub-community extending

out into deeper water and giving way behind to the *Menyanthes-Equisetum* sub-community. This may grade laterally to the *C. rostrata* sub-community of the *Equisetetum fluviatile* with a switch in dominance to *E. fluviatile* and, in shallower water around some Scottish lakes, to the *Caricetum vesicariae* in which *C. vesicaria* is dominant with many of the same associates.

In some cases, this kind of transition continues above in a gradual switch to the *Potentillo-Caricetum* with an increase in poor-fen herbs and larger *Calliergon* spp. (see also Matthews 1914) and there seems little doubt that this represents a standard kind of succession in fairly base-poor waters over organic substrates. Sometimes, however, this kind of smooth zonation is complicated by local variation in water throughput and enrichment around inflows and along seepage lines. Then, the *Caricetum* may be part of a complex patchwork of poor fens in which *C. rostrata* remains prominent but where the understorey varies in response to an increase in calcium and base-status, as in the *C. rostrata-Sphagnum squarrosum* community and certain types of *Carex rostrata-Calliergon* mire vegetation. This kind of rich local variation has been well described from some basin mires on Carboniferous Limestone, such as Malham Tarn in North Yorkshire (Proctor 1974, Adam *et al.* 1975) and Sunbiggin Tarn, Cumbria (Holdgate 1955*b*). It is also seen at the margins of some of the Scottish lakes (Spence 1964). In such situations, other sedges such as *C. lasiocarpa* and *C. aquatilis* may attain local prominence in standing water alongside *C. rostrata*.

Where the *Caricetum rostratae* occurs in pools within non-calcareous basin mires or in peat cuttings in ombrogenous mires, it may grade to the more oligotrophic vegetation of the *C. rostrata-Sphagnum recurvum* community of the stagnant bog-pool margins.

Distribution

The *Caricetum rostratae* is very much a community of the north and west with a very few outliers in the southern and eastern lowlands.

Affinities

There are two difficulties in characterising *C. rostrata* vegetation of this kind. The first is to decide whether and how to separate a *Caricetum rostratae sensu stricto* from other vegetation in which *C. rostrata* and, to a lesser extent, *Menyanthes trifoliata* and *Potentilla palustris* remain frequent and abundant. This question is complicated by the fact that the development of a floating mat in various of these vegetation types means that there is sometimes no hard and fast physiognomic distinction between swamp and fen. Here the absence of any prominent bryophyte layer, whether of larger *Calliergon* spp., Sphagna or 'brown mosses', and the general infrequency of poor-fen herbs such as *Cardamine pratensis*, *Galium palustre* and *Epilobium palustre*, are taken as distinguishing features of a *Caricetum rostratae*. Other workers (e.g. Birse 1980) have included in a *Caricetum rostratae* vegetation which is here placed in the *Potentillo-Caricetum*.

Second, there is the problem of marking off a *Caricetum rostratae* from vegetation in which *Equisetum fluviatile*, *M. trifoliata*, *P. palustris* and, to a lesser extent, *C. rostrata* remain frequent with a variety of other dominants such as *Carex vesicaria*, *C. aquatilis*, *C. lasiocarpa*, *Scirpus lacustris* ssp. *lacustris*, *Typha latifolia* and *P. australis*. Here, the dominance of *C. rostrata* is taken as a distinguishing feature of the *Caricetum rostratae*, although there are situations where it is difficult to allocate stands on this basis. Separations between this community and the *Equisetetum fluviatile* are particularly problematic.

Floristic table S9

	a	b	9
Carex rostrata	V (5–10)	V (6–9)	V (5–10)
Polygonum amphibium	II (1–4)		I (1–4)
Potamogeton natans	II (2–7)	I (3–6)	I (3–7)
Mentha aquatica	I (1–2)		I (1–2)
Juncus effusus	I (2–3)		I (2–3)
Equisetum fluviatile	II (1–4)	IV (1–6)	III (1–6)
Menyanthes trifoliata	I (1–5)	IV (1–8)	II (1–8)
Potentilla palustris	I (1)	III (1–6)	II (1–6)
Eleocharis palustris	I (1–4)	II (3–4)	I (1–4)
Potamogeton polygonifolius		II (1–8)	I (1–8)
Caltha palustris		II (1–4)	I (1–4)
Ranunculus flammula		II (1–4)	I (1–4)
Carex nigra		II (1–5)	I (1–5)
Cardamine pratensis		I (1–2)	I (1–2)
Agrostis stolonifera		I (1–3)	I (1–3)
Epilobium palustre		I (1–3)	I (1–3)
Calliergon giganteum		I (1–3)	I (1–3)
Juncus acutiflorus		I (1–7)	I (1–7)
Lobelia dortmanna		I (3–5)	I (3–5)
Pedicularis palustris		I (1–4)	I (1–4)
Littorella uniflora		I (4–5)	I (4–5)
Eriocaulon septangulare		I (2–5)	I (2–5)
Juncus bulbosus		I (1–3)	I (1–3)
Utricularia vulgaris		I (1)	I (1)
Hydrocotyle vulgaris	I (1–2)	I (1–2)	I (1–2)
Juncus articulatus	I (1)	I (1–2)	I (1–2)
Nymphaea alba	I (7)	I (2–4)	I (2–7)
Myosotis laxa caespitosa	I (3)	I (1)	I (1–3)
Galium palustre	I (3)	I (1)	I (1–3)
Number of samples	21	31	52
Number of species/sample	4 (1–10)	7 (3–17)	6 (1–17)
Vegetation height (cm)	63 (25–83)	57 (25–90)	60 (25–90)
Vegetation cover (%)	70 (35–100)	69 (30–100)	69 (30–100)

a *Carex rostrata* sub-community
b *Menyanthes trifoliata-Equisetum fluviatile* sub-community
9 *Caricetum rostratae* (total)

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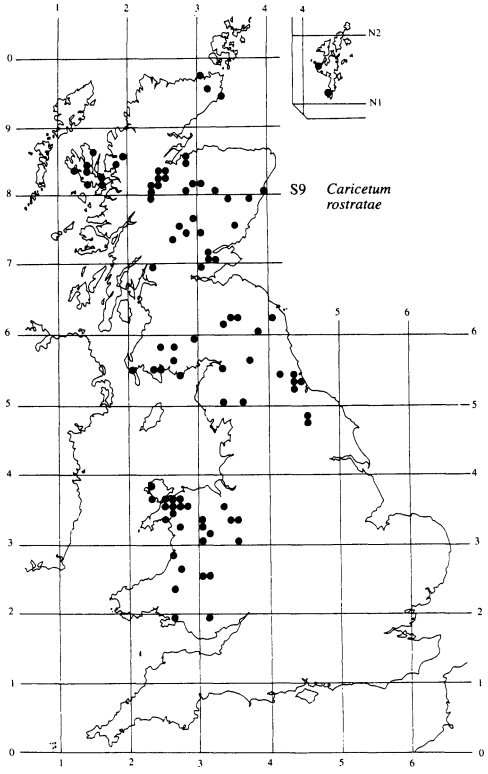

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Carex lasiocarpa in swamps and fens

Carex lasiocarpa has a widespread distribution to the north and west of Britain with some records for lowland England, mainly in East Anglia (Jermy *et al.* 1982). It is most characteristic of wet, mesotrophic conditions but, although it has sometimes been described as forming pure stands in open-water transitions (e.g. Spence 1964, Jermy *et al.* 1982), very few samples are available to form the basis of a *Caricetum lasiocarpae* swamp. Published descriptions of vegetation dominated by this sedge (e.g. Spence 1964, Birse 1980) are based on rather heterogeneous data which is here considered best allocated to a number of other communities.

Swamp vegetation in which *C. lasiocarpa* is locally prominent is accommodated in this scheme in the *Phragmitetum australis* and the *Menyanthes* sub-community of the *Cladietum marisci*. The species is also an important component of some stands of the *Cicuta* sub-community of the *Peucedano-Phragmitetum* rich fen. In general, however, the locus of this species in Britain, as on the Continent, is not within the swamps and fens of the Phragmitetea but in the small-sedge mires of the Parvocaricetea, particularly in the brown-moss mires of the Caricion davallianae. *C. lasiocarpa* is abundant in some stands of the *Carex rostrata-Calliergon* fen and occurs occasionally in a number of other communities in that alliance.

Carex aquatilis in swamps and fens

Carex aquatilis has an Arctic–Subarctic distribution, being limited in Britain to Scotland and a few outlying stations in the Lake District and Wales (Matthews 1955, Jermy *et al.* 1982). It is characteristic of two distinct kinds of vegetation. The first is swamp or very wet fen in open-water transitions around more mesotrophic lakes to the north and west. Here it often occurs with, or is a local replacement for, *Carex vesicaria* and *C. rostrata* and stands in which it is locally prominent in this way have here been allocated to the *Caricetum vesicariae* swamp and the *Potentillo-Caricetum rostratae* fen. A separate *Caricetum aquatilis* has not been distinguished and the *Lysimachio-Caricetum aquatilis* described from Scotland by Birse (1980) can be accommodated comfortably within the *Potentillo-Caricetum*.

The very different montane *Carex curta-Sphagnum russowii* small-sedge mire in which *C. aquatilis* occurs with *C. rariflora*, *C. curta* and a variety of small herbs in a *Sphagnum* carpet is described among the mires of Volume 2 of *British Plant Communities*.

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