

Short Notes

THE DISTRIBUTION OF *CAREX DIGITATA* L. IN BRITAIN

Carex digitata L. and *C. ornithopoda* Willd. (section *Digitatae*), like *C. montana* L. of the related section *Montanae*, are Eurasian sedges that in England reach the north-western limit of their range. The centre of that range, however, is more northern and eastern (i.e. more continental) than that of *C. montana*. *C. digitata* and *C. ornithopoda* are found in Norway, Finland, and northern Russia, and penetrate further into Siberia, while not approaching the Atlantic or the Mediterranean so nearly.

The distribution of *Carex digitata* in Britain is as disjunct as that of *C. montana* (David 1977) but is more easily explicable, for the requirements of this sedge may be precisely defined: a soil with a high calcium content (pH so far measured ranges between 7.29 and 7.99, with one reading at 6.32), and good drainage yet with some protection against drying out. These conditions are exactly met in the beechwood 'hangers' on the Gloucestershire oolite, where the plant is widespread and plentiful in a narrow band from Birdlip in the north-east to Dursley in the south-west, and again, at least formerly, on the southern edge of the North Yorkshire moors from Thirsk eastwards to Scarborough. It is also frequent on shaded pavements of the mountain limestone, for example in the Wye valley and in Silverdale, and occurs, very sporadically, here and there on the limestone ridges of the Midlands. There is a single record from the southern chalk.

In most of its British stations *Carex digitata* is at risk. Jackdaw Crag at Boston Spa, Aysgarth 'Freeholds', and the Avon gorge at Bristol have become public scrambling-grounds. The pavements of Silverdale have been (and still are being) broken up to supply profitable rockery stone. In North Yorkshire, afforestation with conifers, and still more the widening of tracks to facilitate access for the foresters, have reduced the area available to the sedge. Even under natural conditions the crumbling banks favoured by it are a precarious habitat, while the trees or scrub whose shade prevents it from drying out may at last so overshadow it that it cannot flower, or may choke it altogether. It would seem that in any case the individual plants are short-lived as compared with the steadily maturing tussocks of *C. montana* or of *C. humilis*, but set seed more certainly and more freely than the former and much more so than the latter. The seed may lie dormant until the appropriate conditions reappear, and this may partly explain the variations in the estimates of particular populations from one year to another and the reappearance of the sedge in localities where it has been given up for lost. The results of the present survey indicate that *C. digitata* is commoner in Britain than is usually believed. The reason for this belief is that the sedge is easy to overlook when not in flower; even where it flourishes it may be confined to one or two isolated colonies, and such a colony, containing perhaps over a hundred plants, may occupy no more than a few square metres in a terrain that is often difficult to explore. *Carex digitata* should be looked for on banks and cleared slopes, usually but not invariably south-facing; a favourite habitat is the steep side of a woodland ride where rather more light penetrates than in the wood itself. The plant is best observed in early April when the new shoots, emerging from the overwintered crown, present a characteristic fountain-like outline resembling the green tufts on the heads of the pineapples so beloved by the Rococo decorators. They also show a striking colour-contrast between their pale olive-green and the dark bronzy green of the old leaves. At that season, too, the commoner sedges of the habitat, *C. flacca* and *C. sylvatica*, have made no such pronounced growth.

The known British stations are listed below. All that can be located have been surveyed since 1970, and letters indicate the present size of each population: A = 1 to 20, B = 21 to 100, C = 101 to 1000, D = over 1000. Estimates are approximate, for a reason opposite to that which makes a census of *C. montana* difficult: *C. digitata* never makes the composite mats of that species, but the individual plants are often scattered and small so that some are likely to be missed. Where the sedge has not been refound, the date of the last known sighting and the location of herbarium specimens whose authenticity has been confirmed are given.

N. Somerset, v.c. 6: 31/5.7, Leigh Woods (B); 31/7.5, Hinton Abbey, 1838, **CGE**.

N. Wilts., v.c. 7: 31/8.6, Box, 1869, **BM**; 31/8.7, Lucknam, 1861, **BM**; Colerne Park, extinct c 1960 (Horton 1975), **BM**, **CGE**, **K**; Slaughterford, 2 places (B, B). 'Box' and 'Lucknam' may refer to one of the other stations, but there is still suitable ground for the sedge at least at Box.

- Dorset, v.c. 9: 30/8.8, Wool, 1912, **BMH**.
- E. Gloucs., v.c. 33: 32/8.0, Toadsmoor Valley, 2 places (B, C); Slad Valley, 2 places (C, C); Painswick (D); 32/8.1, Cranham (C); 32/9.0, 'between Bisley and Daglingworth, 1955', record in Biological Records Centre, no specimen traced; 32/9.1, near Cranham, 2 places (B, D); 32/9.2, Thrift Wood, and 42/0.2, Whittington Wood (Notcutt 1862). Specimens from 'near Cheltenham' in **BIRM, K, OXF**. Thrift Wood is much denuded since cattle had access and Whittington Wood was largely grubbed c 1900.
- W. Gloucs., v.c. 34: 31/5.7, Clifton (A); 31/5.9, Pen Moel, 4 places (A, A, B, B); 31/7.9, Dursley (C); 31/8.9, Nailsworth (A); 32/5.9, Symonds Yat (B); 32/8.0, Woodchester, 3 places (C, C, C); Roborough, Amberley (Riddelsdell *et al.* 1948), no specimens traced.
- Mon., v.c. 35: 31/5.9, Wyndcliff (B); Blackcliff (B); Itton, 1852, **BM, K**. Itton is off the limestone and the record may refer to one of the two preceding stations.
- Hereford, v.c. 36: 32/5.1, Dowards, 2 areas (C, D); Coppet Hill (Purchas & Ley 1889), no specimen traced; 32/5.3, Capler (B).
- Worcs., v.c. 37: 32/7.7, Bewdley North Wood (Lees 1867), **MANCH** 'Bewdley 1857'. Wood grubbed c 1970.
- Salop, v.c. 40: 33/6.0, Tickwood (B).
- Notts., v.c. 56: 43/5.6, Pleasley Wood, 1838, **CGE, K**.
- Derbys., v.c. 57: 43/1.7, Monsal (B); Taddington (B); 43/2.7, Calver (B).
- W. Lancs., v.c. 60: 34/4.7, Cringlebarrow, 1904 (Wheldon & Wilson 1907), no specimen traced; Eaves Wood, 2 places (A, C); Gaitbarrows, 2 places (A, C); Leighton Beck (B, not seen by R. W. D.).
- N. E. Yorks., v.c. 62: 44/5.5, Clifton Ings, 1860, **BM**, may be the same as 'near York, N. Jacke' in **OXF**. This water-meadow is an impossible place for *C. digitata* but the second York record suggest that there may be something other than a mislocation behind the first; 45/5.8, Hawnby (B); Rievaulx (B); Ouldray (A); 45/5.9, Laskill, 1860, **BM**, now intensely afforested; 45/6.8, Sleightholme Dale, 2 places (A, C); 45/9.8, Ayton (C); 45/9.9, 'Hackness', record in Biological Records Centre, is probably the same as the last, for Hackness itself is off the limestone.
- S. W. Yorks., v.c. 63: 43/5.8, Anston Stones (A); 43/5.9, Roche Abbey, 1949 (Sledge 1950), **BM, CGE, K**; 44/5.0, Levitt Hagg Wood, 1844, **CGE**.
- Mid-W. Yorks., v.c. 64: 34/7.7, Settle, 1834, **OXF**, 1859, **BM**; 44/2.6, Mackershaw (C); 44/2.7, Tanfield (A); 44/4.4, Thorp Arch (Boston Spa), 1927 (W. A. Sledge *in litt.* 1977), **BIRM, BM, CGE, K**.
- N. W. Yorks., v.c. 65: 44/0.8, Aysgarth, 1887, **BM**.
- Westmorland, v.c. 69: 34/3.8, Roudsea Wood (C); 34/4.7, Eggarslack (A, not seen by R. W. D.); Arnside Knott, 1894 (Wilson 1938), no specimen traced; Middlebarrow, 2 places (B, C); Slackhead, 3 places (A, B, B); Beetham Fell, 5 places (A, A, B, B, C); 34/4.8, Sandside (B); Witherslack, 2 places (B, B); 34/4.9, Scout Scar (Wilson 1938) and 34/5.7, Hutton Roof (Baker 1885), no specimens traced. In both localities *C. ornithopoda* Willd. may have been taken for *C. digitata*. The finder at Scout Scar, G. E. Martindale, reported that both species were present, but his specimens in **LIV** and **MANCH** are all *C. ornithopoda*, correctly named. I. Hindson's record from Hutton Roof is pre-1872 and *C. ornithopoda* was not identified in Britain until 1874. On the other hand, all but one of the records from Slackhead, Beetham, and Sandside were first reported as *C. ornithopoda* in a survey of limestone pavements recently carried out by the Institute of Terrestrial Ecology.

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R. W. DAVID

CYTISUS STRIATUS (HILL) ROTHM. IN BRITAIN

A few shrubs subsequently identified by B. E. Smythies as *Cytisus striatus* (Hill) Rothm. were found by me in July 1973 growing with *C. scoparius* (L.) Link on a roadside bank by the village of Milton, near Drumnadrochit, Easternness, v.c. 96. They differ from the latter species chiefly in the less flattened pods which are densely covered with greyish hairs. Flowering specimens, collected in May 1976, were quite difficult to distinguish from *C. scoparius* except for the slightly paler yellow corolla and the remains of last year's pods still persisting here and there. Specimens have been deposited in BM.

C. striatus is a native of Portugal and Spain and has almost certainly been planted at Milton. A. O. Chater (*in litt.* 1977) reports that this species (det. B. E. Smythies) was planted on a new earth slope above the A487 road between Aberystwyth and Penparcau, Cards., v.c. 46, about 1970, and has since spread so that it is scattered along c 400m of the length of the slope. It flowers and fruits there abundantly.

It is possible that *C. striatus* has been overlooked in this country and has become naturalized in similar habitats elsewhere.

U. K. DUNCAN

CEPHALANTHERA DAMASONIUM (MILL.) DRUCE × C. LONGIFOLIA (L.) FRITSCH

This hybrid has been recorded in France and Germany under the name *Cephalanthera* × *schulzei* Camus, Berg. & A. Camus (Camus *et al.* 1908); the purpose of this note is to record what appears to be its first known occurrence in the British Isles.

Two plants apparently of this hybrid were found in May 1974, growing on the borders of eastern Hampshire in a woodland site which carries a thriving population of both *Cephalanthera damasonium* (Mill.) Druce and *C. longifolia* (L.) Fritsch. The plants were of a similar size, equal in height to surrounding plants of both putative parents. The lower leaves resembled those of *C. damasonium*, being borne in two ranks, ovate and well ridged, but the upper stem leaves were more elongated. These graded into the bracts, which in the upper flowers were narrow, linear and equalled the ovary.

The larger plant bore ten well-spaced flowers carried more or less parallel to the stem. The flowers were pure white in colour, like those of *C. longifolia*, with long pointed outer perianth segments, and tended to open fairly well, exposing the yellow epichile of the labellum. This yellow colour closely resembled the colour of the labellum of *C. damasonium*, but the epichile had three ridges on it, whereas in *C. damasonium* there are usually five.

One of the most marked features was the conformation of the ovary. In the flowers of *C. damasonium* examined, the ovary averaged 20mm in length, being broader just before its distal end. The ovary itself was not twisted. In the flowers of *C. longifolia* the ovary averaged 12mm in length, being narrow and more or less cylindrical. It was twisted anticlockwise through 180°. In the flowers of the putative hybrid the ovary averaged 20 mm in length, being narrow and cylindrical. It was twisted anticlockwise through 180°.

Measurements were taken of the ovary and outer perianth segments of ten flowers each of both the species and of the putative hybrid:

- C. damasonium*— Ovary 20 mm, broader near tip, untwisted; outer perianth segments 22 mm × 9 mm maximum;
C. longifolia— Ovary 12 mm, narrow and cylindrical, twisted through 180° anticlockwise; outer perianth segments 16 mm × 5 mm maximum;

Putative hybrid— Ovary 20 mm, narrow and cylindrical, twisted through 180° anticlockwise; outer perianth segments 25 mm × 7 mm maximum.

The two plants recorded here flowered again in May 1975, when a third plant of similar morphology was found nearby. A set of coloured photographs of the hybrid plants is preserved by us.

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SPINELESS-FRUITED *CERATOPHYLLUM*

An investigation of the genus *Ceratophyllum* in the Ouse levels above Newhaven, E. Sussex, v.c. 14, has revealed some curious features. The Spineless Hornwort, *C. submersum* L. (leaves obscurely denticulate, 3 or 4 times forked), is rare there, but where it does occur it fruits freely and its fruits are warty and spineless and easily recognizable. In contrast the very abundant Hornwort, *C. demersum* L. (leaves spinose-denticulate, twice forked), seems to fruit hardly at all, even in the hot summer of 1976 when the plants of these ditches did so well. Eventually, however, in September, a short stretch of water, a few yards long, produced *C. demersum* with well-ripened fruits; these were scarcely warty and smaller than those of its relative, but without the spines at the base which, most of the literature says, are their distinguishing feature. It seemed curious, too, that only the one small area produced plants with fruit.

Inspection of the material of *Ceratophyllum* in **BM** confirmed these observations. Specimens of *C. submersum* there bear plenty of fruits, but those of *C. demersum* bear relatively few. Among these, a number are cracked and crumbling, and it is impossible to distinguish the character of the fruit; one or two appear to be spined and one collected by E. Milne-Redhead in Beds., v.c. 30, in 1946, is clearly so. But the majority, like those from the Ouse ditches, while corresponding with the description of *C. demersum* in every other way, have fruits which are totally lacking in spines.

One such specimen, collected at Castle Morton, Worcs., v.c. 37, in August 1914, has attached the following comment by C. E. Moss: 'This plant is in my opinion *C. demersum* var. *apiculatum* = *C. apiculatum* Cham. . . . The var. *apiculatum* is intermediate between *C. demersum* and *C. submersum* and it is somewhat arbitrary to refer it to one of the species rather than the other.' In a way more revealing is an undated page of a letter from R. Brown to A. Bennett on a sheet of *C. demersum* from Lydiat, 10 miles north of Liverpool, S. Lancs., v.c. 59: 'Last July. . . it was fairly well in fruit but with only a specimen here and there with the two spines developed at the base. Last Tuesday I paid another visit . . . expecting to find any quantity of ripe fruit but to my astonishment found matters asleep as if no progress had been made in the two months. In fact I hardly could find any fruit with the developed spines. The plant agrees in all particulars with *C. demersum*.' This letter evidently refers to a meeting of the Liverpool Naturalists' Field Club; their Proceedings (Brown 1888, p. 25) says: 'A very small quantity of the fruit appeared to develop the two basal spines. In most cases it seemed to ripen without these appendages.' The writer remarks further that in 1887 a third *Ceratophyllum* 'has been added to the British flora by Mr Alfred Fryer who has discovered *C. apiculatum* in a ditch by Earith Stanch in Huntingdonshire . . . The peculiarity of its fruit is that at the base are two minute blunt tubercles instead of spines.'

The note by Scannell (1976) on the fruiting performance of *C. demersum* in the Grand Canal near Dublin in the summer of 1975 states that, at the end of that warm season, 'the canal fruits were not in accord with the published descriptions "warty, beaked with spines",' and goes on to suggest that the reason for this may be that the fruits were not properly matured. She also quotes the remarks of H. B. Guppy, referring to the hot summer of 1893, to the effect that the plant needs heat to mature its fruits and only does so in 'the superheated water of shallow pools'.

The fruiting specimens of *C. demersum* from the Ouse washes, of which I have deposited a voucher specimen in BM, were not in shallow water, but in water 2–3 feet deep. Nor did they show the basal tubercles which are suggested as distinguishing characters of *C. apiculatum*.

While there is an obvious need for further investigation of fruit production and morphology in *Ceratophyllum*, one may conclude that the presence or absence of spines is clearly not a good character to use in separating *C. demersum* and *C. submersum*.

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 E. G. NORMAN

ISOETES ECHINOSPORA DURIEU NEW TO NORTHERN ENGLAND

Isoetes echinospora Durieu was located for the first time in Cumberland, v.c. 70, on December 29th, 1974, when some detached leaves and uprooted plants were recognized in strand-line drift at Cogra Moss reservoir (GR 35/09.19). This is also the first record from England north of Dorset. The identification was confirmed by A. C. Jermy. *Isoetes lacustris* L. is abundant there and counts of drift samples suggest a relative abundance of about 10:1, assuming equal susceptibility to dislodgement. *I. echinospora* grows under 10 cm or more of water, with *I. lacustris*, either in patches with plants almost touching, or singly among the abundant *Juncus bulbosus* L. and *Eleogiton fluitans* (L.) Link. Most of the plants in shallow water are small and stocky, with spreading, curved leaves up to 5 cm long; others have straight, erect leaves up to 13.5 cm long. Accompanying plants of *I. lacustris* are similar in size, but reach 23 cm in deep water.

Since 1974, most of the lakes and tarns in Cumberland and Westmorland, v.c. 69, have been visited without any further sites for *I. echinospora* having been found. It is clear that the plant is extremely scarce in this area and may well be confined to this single station. Whether this is so or not, its presence there presents an interesting problem. The nearest known locality for *I. echinospora* is in North Wales*, 150 km to the south; the Scottish Highland sites are 200 km or more to the north (Perring & Walters 1962). The reservoir is completely artificial and is the result of a dam built in about 1880 across what then was a boggy valley through which Moss Beck flowed. The nearest standing water was and is 3 km distant at Ennerdale Water to the south and Loweswater to the north-east.

Isoetes spreads by the dissemination of the spores and this is clearly an efficient method of ensuring transport between waters. Birds, such as swans and the vegetarian ducks, and fish eat the leaves and many spores must be ingested. Spores could also be carried externally by birds. The megaspores of both species are covered with rough protuberances and cling readily to feathers, particularly to the downier body feathers. Most waterfowl on the Cumbrian tarns are winter visitors, so that if *I. echinospora* was brought in by birds it is likely to have come from the north. It is relevant that the plant is widespread in Scandinavia, whence come many of our wintering ducks, and frequent in Iceland and the Scottish Highlands, on the route of our wintering swans.

I. echinospora may be overlooked because of inadequate or inaccurate descriptions in British Floras, and a note on field characters may be useful. Most works describe *I. lacustris* in some detail and then give the differentiating features of *I. echinospora*, usually in terms of plant size, number of leaves, leaf posture, and megaspore colour. Although *I. lacustris* is on average larger, and usually much larger, there is a considerable overlap. The posture of the leaves (spreading or erect) has no specific

* *Isoetes echinospora* has recently been found in Wigtown, v.c. 74. EDS.

significance, depending solely on the situation of the plant. The number of leaves is also variable and quite unreliable as a character. The megaspores, in their natural (wet) state, may be off-white or yellowish in either species, or darker if stained or muddy. When allowed to dry they suddenly turn white, a quality of the siliceous material in the spore walls, and I have found no specific colour difference. Lid (1963), in his excellent account, describes the megaspores as being greyish-white in *I. lacustris* and chalky-white in *I. echinospora*. The ornamentation, respectively of warty excrescences or of spines, is the best distinction, but is not a field character. They also differ in size and this is evident, with experience, even without optical aids.

A preliminary character for locating *I. echinospora* in the field is the grass-green colour of the leaves. The inner immature leaves of *I. lacustris* may be as pale a green, but most are much darker. The leaves of the latter species are stiff and brittle, while those of *I. echinospora* are supple—the one good character given in most descriptions. Lid (1963) describes the leaves of *I. echinospora* as being stiff at the base, but adhering like a brush when taken out of the water. Young slender leaves of *I. lacustris* may occasionally adhere and old, outer leaves of *I. echinospora*, if spreading, may not, but otherwise this is a valid and useful field character.

The best, and a definitive, character is the leaf-shape. This is mentioned by Lid, but not in any English text. The leaves of *I. lacustris* vary considerably in length, thickness and degree of ridging, but in all cases do not taper much for most of their length, narrowing in the last half centimetre or so to an asymmetric point. In contrast, the leaves of *I. echinospora* taper gradually and evenly throughout to a long, hair-like tip. This is easy to see and is absolutely distinctive in all fresh specimens examined, but not when the plant is dried.

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