

Notes

CAREX VAGINATA TAUSCH (CYPERACEAE): A SEDGE NEW TO ENGLAND

Carex vaginata (Sheathed sedge) has a Circumpolar Boreo-arctic Montane range (Preston & Hill 1997). It occurs in Northern Europe, locally in the mountains of central and southern Europe, in Siberia and in North America (Sell & Murrell 1996). In Greenland it is known from a single locality near the north-eastern coast (Gelting 1934). In the British Isles it was thought to be confined to Scotland, being mainly found in the Breadalbane and Cairngorm mountains of the Highlands, with the most southerly populations centred on the Moffat Hills in the Southern Uplands. Its altitudinal range is from 370–1150 m but it is usually found over 700 m (Preston *et al.* 2002). The first British record was from the Cairngorms by G. Don in 1802 (Druce 1932). J. T. Johnston first recorded it from the Moffat Hills in Dumfriesshire (v.c 72) in 1890 (Scott-Elliot 1896). More recently, further colonies have been discovered in the neighbouring Ettrick Hills in Selkirkshire (v.c 79) to the south and the Tweedsmuir Hills in Peeblesshire (v.c. 78) to the north (Corner 1978). It is a designated scarce species in Britain (Stewart *et al.* 1994).

In June 2002 an extensive colony of this species was discovered on Dufton Fell in the Westmorland (v.c 69) part of northern Pennines some 96.5 km south of the Southern Upland localities and new to England. This site lies 3 km south of the old Moor House field station and just outside the southern boundary of the Moor House National Nature Reserve. Later in the month with F. J. Roberts, another colony of this species was found on Dufton Fell 900 m to the west of the original colony. A further, much smaller colony was found some 10 km north of the original Dufton Fell site on Green Fell to the north of Cross Fell in Cumberland (v.c. 70). All the sites were on slopes below limestone outcrops in flushed grassland at altitudes from 700–720 m above sea level. Plants on the two sites on Dufton Fell were common over approximately 1300 and 300 m² of the south facing slopes and were similarly common over some 60 m² at the north facing Green Fell locality. The Dufton Fell sites for *C. vaginata* are relatively close to Upper Teesdale with its unique assemblage of relict species, so that it could be considered an important addition to the relict flora of that area. Voucher material for both vice-counties given to G. Halliday is in LANC and the remainder is in the author's personal herbarium.

Cumbria was the worst affected area in the British Isles during the foot and mouth disease outbreak in 2001 and sheep were culled from this area of the northern Pennines in early 2001 such that the area was ungrazed for two summers. The resurgence of *Alopecurus borealis* on the Cross Fell range had been observed in May 2001 and new populations discovered on Green Fell by L. Robinson (Robinson 2003). The remarkable abundance of flowering *Carex bigelowii* was also noted. In August 1991 an interesting flushed hillside on Dufton Fell had been found during the Flora of Cumbria survey. It contained *Euphrasia scottica*, *Juncus triglumis* and tiny sterile plants of *Trollius europaeus* which was previously unknown from high level sites in the area. The rare bryophytes *Cinclidium stygium* and *Onchophorus virens* also occurred very locally. In June 2002 the same flush, now ungrazed, was noted to have a thick grassy cover with only small open areas. *Trollius* remained as tiny-leaved sterile plants but thorough searching failed to reveal *E. scottica*, *J. triglumis* or the two bryophytes. Robust sterile plants of a sedge, thought at first to be rather lighter green *C. bigelowii*, were collected from the flush but were obviously not that species as they lacked the purplish rhizome scales and were difficult to dislodge. The next day these plants were compared with living garden material of *C. vaginata* collected from the Southern Uplands and found to be identical. In order to confirm beyond doubt that the plants were *C. vaginata* it was important to find plants with inflorescences and this was achieved with the help of F. J. Roberts the following week.

Table 1 gives the list of associated species on Dufton Fell with their relative frequency. Common associated bryophytes on Dufton Fell were *Hylocomium splendens*, *Mnium hornum*, *Pleurozium schreberi*, *Polytrichum formosum*, *Pseudoscleropodium purum*, and *Rhytidiadelphus squarrosus*. *Rhizomnium pseudopunctatum* was rare. In the wetter and bare areas *Palustriella commutata* and *Cratoneuron filicinum* occurred.

TABLE 1. ASSOCIATED SPECIES ON DUFTON FELL.
C = COMMON, O = OCCASIONAL, R = RARE.

SPECIES	C	O	R
<i>Achillea ptarmica</i>			X
* <i>Anemone nemorosa</i>		X	
* <i>Anthoxanthum odoratum</i>	X		
<i>Bellis perennis</i>			X
<i>Caltha palustris</i>		X	
* <i>Cardamine pratensis</i>	X		
<i>Carex binervis</i>			X
<i>C. dioica</i>			X
* <i>C. nigra</i>			X
<i>C. panicea</i>		X	
<i>C. pilulifera</i>		X	
* <i>C. viridula</i> ssp. <i>oedocarpa</i>			X
* <i>Cerastium fontanum</i>		X	
* <i>Cirsium palustre</i>			X
<i>Cochlearia pyrenaicum</i>			X
<i>Crepis paludosa</i>			X
* <i>Deschampsia cespitosa</i>			X
<i>Empetrum nigrum</i>			X
<i>Equisetum palustre</i>			X
<i>E. sylvaticum</i>			X
* <i>Festuca ovina</i>	X		
<i>Filipendula ulmaria</i>			X
<i>Galium saxatile</i>		X	
<i>G. uliginosum</i>			X
<i>Geum rivale</i>		X	
* <i>Juncus effusus</i>	X		
<i>J. squarrosus</i>			X
<i>Luzula multiflora</i>			X
<i>Lychnis flos-cuculi</i>			X
<i>Nardus stricta</i>	X		
<i>Persicaria vivipara</i>		X	
<i>Potentilla palustris</i>			X
* <i>Ranunculus acris</i>	X		
<i>R. flammula</i>		X	
* <i>Rumex acetosa</i>	X		
<i>Saxifraga hypnoides</i>		X	
<i>S. stellaris</i>		X	
<i>Sedum villosum</i>		X	
* <i>Selaginella selaginoides</i>			X
<i>Succisa pratensis</i>			X
<i>Taraxacum officinale</i>		X	
* <i>Trifolium repens</i>	X		
<i>Trollius europaeus</i>			X
<i>Vaccinium myrtillus</i>			X
<i>Valeriana dioica</i>		X	
<i>Veronica scutellata</i>			X
<i>Viola palustris</i>	X		
* <i>Viola riviniana</i>			X

*Also in the Green Fell flush which had the following additional associated species: *Alchemilla glabra*, *Carex flacca*, *C. pulicaris*, *Eriophorum angustifolium*, *Festuca rubra*, *Luzula campestris*, *Potentilla erecta* and *Thymus polytrichus*. Although *Carex bigelowii* approached the edges of the flushed ground in blanket bog at all the sites, it was not an actual associate.

It is, perhaps, not surprising that *C. vaginata* occurs in the northern Pennines which are climatically similar to the higher parts of the Southern Uplands. Conolly & Dahl (1970) give *C. vaginata* as occurring within the mean annual maximum summer temperature isotherm of 21° C for Highland Scotland. They do not give a figure for southern Scotland because of its restricted distribution there, but suggest that it is in excess of that. An adjusted isotherm map for the above parameters gives the Southern Upland sites falling within the 23°C isotherm and the northern Pennine sites within the 25°C isotherm, although a spot height in the latter gives a figure of 23.2° C. The Southern Upland sites therefore tend to be cooler in summer. This may partially explain why *C. vaginata* descends to lower levels there (down to 490 m in places; Corner 1978). The flora of the Moffat Hills described by Ratcliffe (1959) has several local montane species common to both areas, of which *Epilobium anagallidifolium* and *Alopecurus borealis* are restricted to the northern Pennines in England.

Ferreira (1959) included *C. vaginata* in a group of species that were both acidophilous and indifferent to soil reaction. Ratcliffe & McVean (1962) listed it in a group of local and rare calcicoles of the Scottish Highlands. In the Southern Uplands, *C. vaginata* occurs in moderately base rich flushed grassland, but is also tolerant of more acid conditions. In one of the Ettrick sites it was present in soils of pH 3.8–5.6 (Corner 1978). It has recently been given the arbitrary R (pH) soil reaction status of 6 on a scale of 1–9 (very acid to very basic) in Ellenberg's indicator values for British Plants (Hill *et al.* 1999). Certainly in these Pennine sites it behaves as a calcicole.

There appears to be little doubt that the discovery of *Carex vaginata* in the northern Pennines is partially due to the after-effects of foot and mouth disease. The grazing pressure on these fells over many years has been intense, so that the cropped leaves have rendered the sedge inconspicuous and likely to be confused with commoner species. It is known that inflorescences are rather sporadically produced and grazing would make them even less likely to be observed. The superficial similarity between sterile *C. bigelowii* and *C. vaginata* has not been made as clear in the British Floras as it has in those of Scandinavia, where Lid stated “sterile plantar kan likna *C. bigelowii*” (Lid 1963). The shape of the intact mature leaf apices, that are best seen early in the season, is one of the easiest ways of distinguishing the two species when sterile. In *C. vaginata* the leaves are lighter green with flat, blunt or abruptly acuminate apices, compared with the darker green leaves of *C. bigelowii* which have acuminate and trigonous apices. The leaves of *C. vaginata* are wintergreen whereas those of *C. bigelowii* die back completely in winter. The failure to detect the sedge in the same flush eleven years previously could be ascribed to the inconspicuous appearance of these heavily grazed plants at the end of August when any ungrazed leaves would be partially withered.

The performance of these Pennine populations is as yet unknown and although vegetative growth is vigorous, it is not known if they set viable seed. The utricles of the inflorescences examined were empty and poorly formed. This may be a result of reduced fertility, as the plants could be derived from single clones with inbreeding taking place, but more observations are needed. Plants from ungrazed parts of the Ettrick hills in Selkirkshire (v.c. 79) seem much more vigorous and fertile than the Pennine plants, but this may be the result of complete lack of grazing over many seasons. Given time and reduced grazing pressure, the production of similarly robust plants may appear in the Pennine sites. There does, however, remain the possibility that these disjunct Pennine populations could differ biotypically from the Scottish populations as has been shown for some of the other Upper Teesdale rarities (Elkington 1978).

C. vaginata and its habitats do not seem to be under any threat at present. The large number of plants found at two of the sites shows that they are well able to withstand heavy grazing. It seems likely that populations of this species will be found in other parts of the high northern Pennines where flushed grassland occurs below limestone outcrops. Already it has been reported from another flush on Green Fell (R. Groom pers. comm.). It is to be hoped that future sheep grazing levels will be markedly reduced so that the post foot and mouth flora graphically described from this part of the Pennines by F. J. Roberts (Roberts 2003) will be allowed to flourish.

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R. W. M. CORNER

Hawthorn Hill, 36, Wordsworth Street, Penrith, Cumbria CA11 7QZ.