Is *Carex maritima* extinct in England?

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Curved Sedge, *Carex maritima* Gunn., is an arctic-alpine species that might well be expected to retreat northwards as a result of climate change. It is widespread and abundant around the coasts of Canada, Alaska, Greenland and northern Eurasia, reaching its southern limits in Britain. It also occurs on high mountains, both in northern regions and further south in the Alps and possibly the Pyrenees and in the Pamirs and the Tien Shan mountains. In the southern hemisphere, it occurs in the Andes, down through Chile and Argentima to Tierra del Fuego (Hultén & Fries 1983).

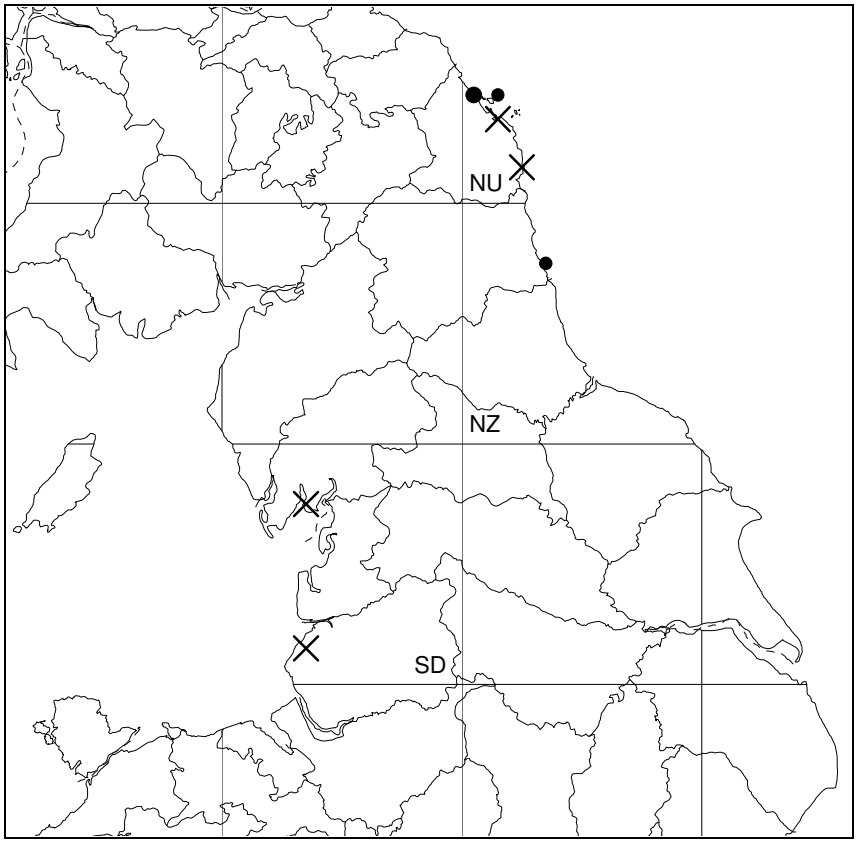

Fig 1. Distribution of *Carex maritima* in England, with dots size-scaled for the date of the most recent record (see text for actual dates). X = unconfirmed or erroneous records.

The distribution map of *C. maritima* in Britain (Fig. 1) shows a few populations in England but no recent records. It seems to be thriving in northern and western Scotland, but it has become rare towards the south of its range. Here is a listing of all the sites, confirmed and unconfirmed, where it has been recorded in England.

SD31. Southport (v.c. 59). A dot for this square is given in the New Atlas (Preston, Pearman & Dines 2002), which is derived from a herbarium specimen seen by R.W. David at the University of Birmingham herbarium (**BIRM**) in the 1980s. It was apparently anonymous, but dated 1877, and labelled, simply, 'Southport.' The sheet is no longer at **BIRM** and, in the absence of more conclusive evidence, it is not possible to confirm the record.

SD37. Humphrey Head. A single specimen was collected by E.J. Harling on the west side of Humphrey Head in 1971, at SD3874. Although this record is given as confirmed in the Flora of Cumbria (Halliday 1997), the specimen has subsequently been identified as a dwarf form of *C. otrubae*, False Fox-sedge (det. A.O. Chater, **BM**, 2000) and the record was rejected in Jermy *et al.* 2007.

NZ37. This site was apparently discovered in 1938 by K.B. Blackburn, in 'dunes between Blyth and Seaton Sluice' (Swan 1993). The site may have been Hartley Links, a dune system at NZ3277. It was subsequently seen at the same place by Blackburn again in 1945, by J.K. Morton in 1945, and by J.W.H. Harrison in c. 1950, but apparently not since.

NU04 & NU14. Holy Island. Known here since 1867 (Baker & Tate 1868) but last seen in 1984 (by A.J. Richards). Swan (1993) describes it in 'both 5x5km squares' on the island, specifically at NU098431 (1983) and NU136435 (1961). Thorough searches in 2007 and 2008 have failed to yield any plants, although it is not impossible that it is still present, as it is a very extensive dune system.

NU13 & NU21. Swan (op. cit.) gives unconfirmed records for Ross Links (ca. NU1437) in 1955 and Howick Links (ca. NU2517) in 1980. The former site in particular might be worth another visit.

In 2009 we intend to organise another search of the dunes at Holy Island. If it is not found then, we should conclude that it has become extinct in England – at least temporarily. It is quite possible that populations could recur from buried seed or via long-distance dispersal. But certainly it is a plant that appears to be dying out in this country.

As this is a plant in retreat at the southern edge of its range, is it possible that it is a casualty of climate change? If so, how would a climate change-driven extinction be manifest? Presumably not by any obvious and direct temperature effect – *C. maritima* can survive and fruit in warmer climates. Instead, it is subtle effects that would cause its gradual extinction – increased competition with other plants; predation by new species of invertebrates; or changes in land use. No-one has yet attempted to study such processes in any detail, so this could be a perfect species for such research.

Is there any point in trying to combat the decline by reintroducing *C. maritima* to some of its historical sites? In all probability such introductions might be successful in the short term, as it is such a ruderal species that it will grow well on disturbed soil and loose sand anywhere. However, this would be gardening it, not reinstating natural populations. There have already been several attempts to translocate it to new sites in Scotland, but there are no published reports yet.

Scientifically, one of the most interesting things about *C. maritima* is seeing how it responds to climate change. Thus, any introduction has the disadvantage of undermining scientific study to balance against any wildlife benefit. As *C. maritima* is not rare and is seemingly increasing in the north of its range, we would conclude that there is currently no good reason to introduce it.

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