

## The reintroduction of *Cirsium tuberosum* (L.) All. in Cambridgeshire

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### ABSTRACT

The Tuberous Thistle (*Cirsium tuberosum* (L.) All.) became extinct at its only locality in Cambridgeshire in 1974. A plant from the population was transferred to the University Botanic Garden at Cambridge in 1954 and has been used to provide plants which, in 1987, were planted in grassland dominated by *Arrhenatherum elatius* and *Festuca rubra* close to the original locality.

### INTRODUCTION

The Tuberous Thistle (*Cirsium tuberosum* (L.) All.) is a sub-Atlantic species with its main area of distribution at altitudes below 1450 m in southern and south-western Germany, northern Switzerland and eastern and central France (Hegi 1928; map in Schönfelder 1970). There are a few localities in adjacent parts of Austria and northern Italy, and scattered localities in northern France and northern Belgium to latitude 50°20'N (van Rompaey & Delvosalle 1972). The localities in Glamorgan and Wiltshire are now the northern limit of the species, but the most northerly locality was that in Cambridgeshire at latitude 52°09'N.

### THE LOCALITY IN CAMBRIDGESHIRE

*Cirsium tuberosum* was discovered in Cambridgeshire by Dr W. H. Mills in July 1919. In their report of the discovery Mills & Evans (1922) refer to the possibility that the species had been found much earlier, but confused with *C. pratense* Hudson (= *C. dissectum* (L.) Hill). At that time these two species were not distinguished. The record in Professor C. C. Babington's manuscript, to which they refer, though from the "Wimpole District" was, in fact, from Hayley Wood and it seems unlikely that this could be the same locality.

In 1919 there were many plants of the thistle growing on an ancient grassy trackway and on the grassy headland of an adjacent field, but already by 1922 some of the plants in the field had been destroyed by ploughing (Mills & Evans 1922). The precise position of the original locality was for many years kept a closely-guarded secret; it was, in fact, on the Mare Way above Little Eversden, and in the adjacent field on the northern side at GR 52/363.519. The Mare Way is an ancient ridge-way, forming the boundaries between parishes (mere, a boundary), and this with the upper edge of the field were regarded by Mills & Evans (1922) as original downland that had escaped being ploughed after enclosure at the beginning of the nineteenth century, when so much pasture was lost to "the rapacity of modern agriculturists" (Babington 1860, pp. xiv–xv). In 1925 two other populations of the thistle were found on the southern slope of the hill about 750 m from the original locality, probably at GR 52/356.520 on the edge of a small plantation (Sharp Hill Plantation) and on the boundary between the fields north of this plantation (unpublished records of Dr W. H. Mills).

During the second World War and in the years immediately after, the Mare Way became choked by scrub and brambles spreading in from the two hedges, and ploughing encroached further on the headland of the adjacent field. By the 1950s the thistle had disappeared from the trackway and was greatly reduced in the field, and, by the 1960s, only two patches of the plant remained. These were

almost in the base of the broad hedge of *Crataegus monogyna* and *Prunus spinosa* in a grassland composed of the following species: *Arrhenatherum elatius*, *Dactylis glomerata*, *Deschampsia cespitosa*, *Festuca rubra*, *Lolium perenne* and *Trisetum flavescens*. It also contained scattered plants of: *Agrimonia eupatorium*, *Cirsium arvense*, *C. vulgare*, *Galium verum*, *Knautia arvensis*, *Picris echinoides*, *Primula veris*, *Senecio erucifolius* and *Sison amomum*. This represents a well-defined regional variant, containing such species as *Picris* and *Sison*, of the *Festuca rubra* subcommunity of the *Arrhenatherum elatius* community recognised by the National Vegetation Classification. The soil at the site was a heavy clay containing small pebbles of erratic rocks over broken chalk.

The two remaining plants were seen year after year until 1973 when, in spite of strenuous efforts to conserve the site, the whole area was ploughed and even the hedge on the north side of the Mare Way was destroyed. The leaves reappeared in 1974, but thereafter no plants were seen and now so little suitable land remains, even though the trackway has been reinstated, that it seems certain the original population is lost.

No information about the thistle at the localities discovered in 1925 has been recorded, but a search in 1987 revealed neither the plant, nor any suitable grassland in or beside the plantation. The field boundary to the north has disappeared and crops entirely cover it. At the western end of Sharp Hill Plantation a narrow bank of suitable grassland remains between two arable fields. This is dominated by *Arrhenatherum elatius* and *Festuca rubra* and contains such species as *Primula veris*, *Viola hirta*, *Blackstonia perfoliata* and *Clinopodium vulgare*, but a search failed to discover any sign of *C. tuberosum*.

In 1954 a small lateral shoot of one of the plants was taken to the University Botanic Garden in Cambridge by Dr S. M. Walters and has been propagated vegetatively. This plant is hermaphrodite and, in 1986, capitula were bagged and selfed by V. Morgan and produced a few fertile achenes from which two plants were successfully raised.

The gift of the Wimpole Estate to the National Trust in 1976 made it feasible to consider re-establishing the Tuberous Thistle close to the original sites on land in ownership favourable to conservation. Most of the Park is grazed by sheep or cattle and, although the thistle might survive in a stunted vegetative state, it would be unlikely to flower in these conditions. The *Arrhenatherum elatius* community in which it originally grew is characteristically a lightly grazed or mown grassland. A search of the estate disclosed a few small areas of grassland which are not grazed by stock. One such area carried a community similar to that at the original site. In 1986, after detailed discussions, the National Trust agreed to the thistle being planted on this site.

The site selected is a low bank facing west on the gentle south-facing slope. The grassland is composed of the species shown in Table 1 and belongs to the same subcommunity as did the original site; there are scattered bushes of *Acer campestre* and suckers of elm.

By midsummer the sward has an average height of 20–35 cm with an ill-defined mosaic of slightly shorter patches. Although there is a risk of the site being affected by drift of herbicides or fertilisers, the present composition of the grassland suggests that the area has until now escaped significant damage.

The soil is Brown Calcareous Soil with a variable depth (20–35 cm) of ochre-coloured, heavy clay, overlying a horizon containing fragments of chalk, flints and small erratic rocks derived from the Great Chalky Boulder Clay. In summer the upper horizon cracks vertically into columns; part of the area is kept moist by seepage of water. Although in Britain *C. tuberosum* normally grows on free-draining soils, in Germany it is also characteristic of seasonally wet soils which support vegetation containing *Molinia caerulea* (Oberdorfer 1981).

#### METHOD OF REINTRODUCTION

Six plants of *C. tuberosum*, four of the original stock and two grown from achenes produced by selfing, were washed clean and repotted in 1986 in soil obtained from the site at Wimpole. On 7 May 1987, these plants and the soil were planted into holes cut in the turf and their exact positions recorded on a plan. The plants were heavily watered at planting and ten days later; they showed no sign of wilting in a short drought in July and thereafter the summer of 1987 was exceptionally wet. By June two of the plants had been damaged by slugs and some of the developing inflorescences

TABLE 1. SPECIES COMPOSITION AND PERCENTAGE COVER-ABUNDANCE OF THE SITE OF REINTRODUCTION OF *CIRSIIUM TUBEROSUM*

<i>Arrhenatherum elatius</i>	50	<i>Galium verum</i>	3
<i>Brachypodium sylvaticum</i>	5	<i>Glechoma hederacea</i>	5
<i>Bromus erectus</i>	1	<i>Heracleum sphondylium</i>	3
<i>B. sterilis</i>	5	<i>Knautia arvensis</i>	1
<i>Carex flacca</i>	3	<i>Mercurialis perennis</i>	5
<i>Dactylis glomerata</i>	10	<i>Picris echioides</i>	1
<i>Festuca rubra</i>	30	<i>Rumex conglomeratus</i>	1
<i>Holcus lanatus</i>	2	<i>Taraxacum officinale</i>	3
<i>Phleum nodosum</i>	1	<i>Veronica chamaedrys</i>	3
<i>Poa pratensis</i>	5	<i>Viola hirta</i>	3
<i>Trisetum flavescens</i>	2		
<i>Cirsium arvense</i>	3	<i>Brachythecium cf. rutabulum</i>	10
<i>C. vulgare</i>	1	<i>Eurhynchium swartzii</i>	10
<i>C. eriophorum</i>	2	<i>Fissidens cristatus</i>	1
		<i>Pseudoscleropodium purum</i>	1
		<i>Weissia cf. microstoma</i>	1

were bitten off, probably by hares (*Lepus capensis* L.). By August four plants were vigorous and well established, one was weak and one had been lost after being undermined by a run of field vole (*Microtus agrestis* L.). This plant will be replaced.

#### DISCUSSION

In general, plants should not be introduced into sites where they appear to be native because it may confuse knowledge of their natural distribution, of their natural genetic variability and of their ecology. There may also be unforeseen and undesirable consequences. The decision to attempt to return *C. tuberosum* to the wild was not taken lightly and was felt to be justified on the following grounds:

- 1) The species is very rare in Britain and the original localities in Cambridgeshire were isolated and far removed from the nearest localities in Wiltshire.
- 2) The population was probably long-established and apparently not hybridised with other species, particularly *C. acaule*, as is the case in some populations in Wiltshire and the population at Nash Point, Glamorganshire.
- 3) The destruction of the population and its habitat was witnessed and now so little suitable ground remains that it is almost certain that the plant is extinct.
- 4) As the population was reduced and increasingly threatened, an off-shoot was transferred to the University Botanic Garden where it has been propagated vegetatively, so that there has been no possibility of hybridisation. An individual from the original population was thus available.
- 5) Even with a plant grown as easily as *C. tuberosum* there is a risk in a large collection that it could be lost, or its origin confused. Maintenance of pure stocks in gardens requires constant care, is labour-intensive and therefore expensive.
- 6) In a garden a plant is isolated from its natural environment and not subject to selection imposed by that environment. *C. tuberosum* is gynodioecious, but the particular plant is hermaphrodite and self-fertile. Allowing it to reproduce by seed in a garden may lead to selection for garden conditions and, for this reason, fruiting heads have normally been cut off before maturity.
- 7) It has been possible to find a site which closely resembles the original as judged by the plant community and soil, and which is under sympathetic ownership and treatment.
- 8) Establishment of a population from one individual is no different from natural establishment from a single fruit.
- 9) If successfully established the species becomes a member of a community of plants and animals including its natural pollinators and predators. Not least, the plant of local origin is preserved and may be seen and enjoyed in as near as possible its natural habitat.

Introductions must be adequately recorded. The exact locality is not given in this report to allow the plants to become established without disturbance. Those who chance upon the plants are asked to avoid disturbing them. The progress in establishment will be recorded and, when appropriate, the precise locality published.

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[Editors' note: the B.S.B.I. Panel for Introductions should be consulted before similar projects are undertaken; contact the Conservation Committee in the first instance.]