

## The current distribution and abundance of *Orchis ustulata* L. in northern England

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### ABSTRACT

*Orchis ustulata* L. was formerly thinly scattered over many of the calcareous grasslands of northern England. One hundred and eighteen previously recorded sites have been identified, and a survey of the present status of the species at these shows that in recent years it has become extinct at many, and that there are now only 15 colonies which definitely survive. The past and present distribution of *O. ustulata* is illustrated and the causes of decline discussed. An indication is also given of current colony strengths.

### INTRODUCTION

*Orchis ustulata* L. is distributed throughout most of central Europe, extending northwards to southern Scandinavia and southwards to the Mediterranean area (Summerhayes 1968). In Britain it is confined to England, increasing in abundance to the south and east, and in the past was thinly scattered mainly in the limestone and few chalk grassland areas of northern England. Here it is usually found on old calcareous pastures which have been subject to light grazing. It is a plant which has an extended period between seed germination and maturity (Summerhayes 1968).

The area covered in this survey includes the whole of northern England, namely v.cc. 54 and 56–70. The species is unrecorded for v.cc. 58, 59 and 68, nor is it recorded for Scotland; the only record for Wales was in 1953 for Caerns., v.c. 49 (de Vesian 1982) and is almost certainly an error.

The following account of the distribution and status of *O. ustulata* is based upon field work carried out by the author during the period 1982–86 and from investigation into old records.

### DISTRIBUTION

118 records for *O. ustulata* have been traced for the survey area. These have been categorised into periods of last known occurrence, viz. pre-1930, 1930–59, 1960–81, 1982 onward, and shown in Figure 1 on a 5 km-square basis. The progressive extinction of the species from many sites can be seen and there are now only twelve 5-km squares (15 sites) at which the species definitely survives. The relationship between numbers of 5-km square records and those for individual sites for the appropriate periods is shown in Table 1, where the assumption has been made that later recorded sites were also present earlier and are given in the cumulative totals.

The great majority of records are at sites where calcareous rocks underly. These include the Carboniferous limestone areas of Derbyshire, Yorkshire, Cumbria, and northern Lancashire, and also the Magnesian limestone belt running from Nottinghamshire to Durham, where the species seems to have become extinct at many sites only recently. The chalk Wolds of northern Lincolnshire and eastern Yorkshire also have several records.

The main strongholds for the species in northern England in present times are the upland pastures of Derbyshire, v.c. 57, where the ground is difficult to work agriculturally, and in certain of the riverside pastures of N.W. Yorks., v.c. 65.

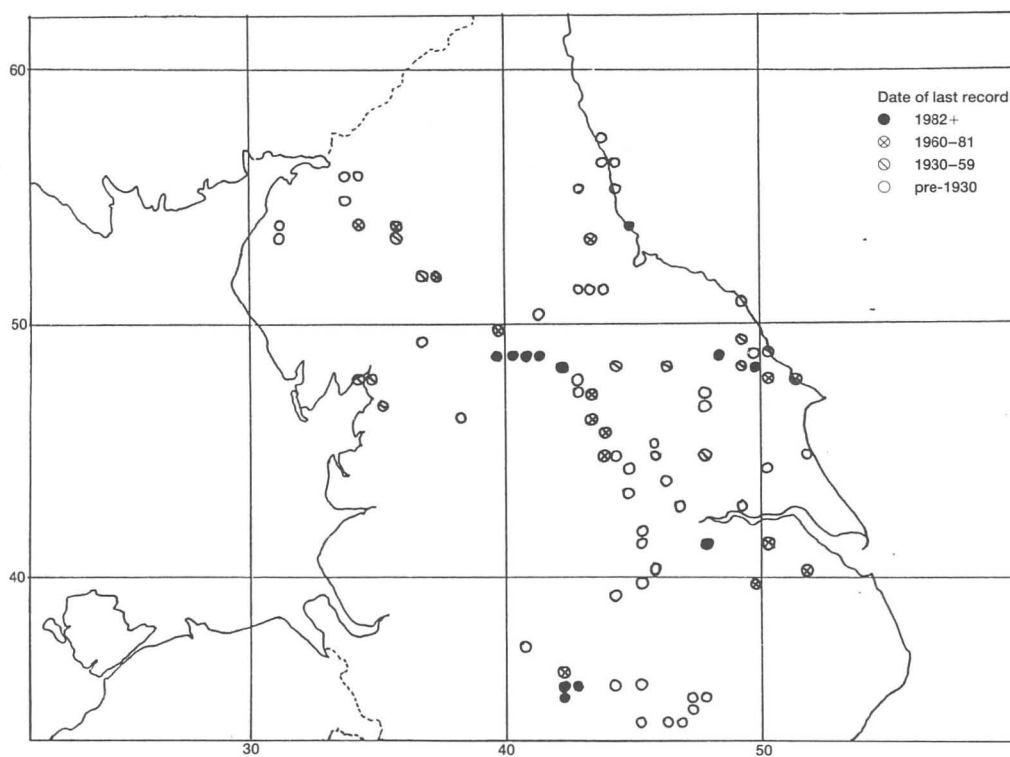


FIGURE 1. The distribution of *Orchis ustulata* in northern England, v.cc. 54, 56-70. Plotted in 5-km squares.

TABLE 1. NUMBER OF 5-KM SQUARE RECORDS AND NUMBER OF SITES FOR THE PERIODS OF LAST KNOWN OCCURRENCE OF *ORCHIS USTULATA*; CUMULATIVE TOTALS ARE BRACKETED

Date of last record	5-km square records	Number of individual sites
1982 onward	12 (12)	15 (15)
1960-81	15 (27)	29 (44)
1930-59	11 (38)	19 (63)
pre-1930	46 (84)	55 (118)

#### CURRENT STATUS

The current status of *O. ustulata* at each site is denoted overleaf (Records) by the letters: A = typically 1-10 flowering spikes; B = 11-25; C = 26-50; D = 51-200; E = 200+; PX = possibly extinct; X = extinct. Whilst numbers of flowering plants fluctuate annually it is felt that the above scale gives a reliable reflection of abundance, although the balance between numbers of flowering and vegetative plants is difficult to quantify. Studies of populations where plants in the vegetative state are relatively easily detected suggest that well over half flower in a good season, but noticeably less in a poor season. All existing sites and many other recent and less recent ones have been visited by the author since 1982, and estimates of status are usually based on observations made over several seasons. For old records, the authority for the last sighting is given

TABLE 2. ABUNDANCE OF *ORCHIS USTULATA* IN EXTANT COLONIES IN NORTHERN ENGLAND

10-km square	Number of colonies	Colony status*
34/9.8	1	B
43/2.5	5	A,A,B,D,E
44/0.8	2	A,A
44/1.8	2	C,C
44/2.8	1	A
44/7.1	1	C
44/8.8	1	B
44/9.8	1	B
45/4.3	1	A

\* using the code described on p. 410.

wherever possible, and often, from knowledge of the site, extinction or otherwise is inferred. For relatively recent records, it is difficult to ascribe extinction unless the site has been physically destroyed, since prolonged over-grazing and the somewhat intermittent flowering of the plant may give a false impression of reduced status, and flowering plants may reappear when grazing pressures relax or other factors change. This is particularly true for small colonies which in fact comprise the bulk of recent records for the area. Overgrown, ungrazed habitats probably also lead to ultimate extinction by crowding out, although in at least two currently ungrazed situations, plants have survived by adapting to compete with tall surrounding vegetation, and have resulted in spike heights of 15–25 cm compared to the more normal heights of 9–12 cm. At one heavily grazed colony, small plants of only approximately 5 cm survive. During this survey a very few plants of the rare white-flowered var. *albiflora* Thielens were found at two sites in Derbys., v.c. 57.

At least 118 sites have been recorded for *O. ustulata* in northern England, but only 15 surviving colonies, most of them small, have been refound in this survey. It is possible that there may be a few further sites at which the species survives, but this will only be apparent if and when excessive overgrazing is reduced. At two of the 15 extant colonies, there were respectively 200+ and 69 flowering plants in 1985 (a good flowering year); however three other colonies rarely have more than 35 spikes, and the rest are very much smaller and, in unfavourable seasons, numbers of spikes will be at least halved in all colonies. One of the smallest is in Durham, v.c. 66, and is the most northerly surviving in Britain. The species is now only to be found with certainty in nine 10-km squares of northern England, compared to the 17 post-1930 10-km squares given by Perring & Walters (1962), and to records for 32 10-km squares identified for the same period in the course of this survey. The colony strengths of the 15 extant sites are shown in Table 2, and details of past and present records are listed at the end. In order to protect the sites from over-attention, precise grid references are not given, but full details have been lodged with the Nature Conservancy Council, York, and the Biological Records Centre, Monks Wood.

#### CAUSES OF DECLINE

In northern England, *O. ustulata*, here at the limit of its range, is steadily decreasing as its habitat is gradually destroyed. Table 3 shows the causes of loss for the majority of extinct sites. Agricultural upgrading of pastures is the main cause – the application of inorganic fertilisers and ploughing appear to be fatal to the plant – and the effects of over-grazing also probably lead ultimately to extinction. Sites have also been lost to building and industrial encroachment, and a few to incidental causes such as quarrying and afforestation, and at least one site was deliberately destroyed in order to counter the attention shown it by botanists. Information received from recorders of *O. ustulata* sites in southern England also reflects a similar decline usually through agricultural causes.

Of the 15 extant sites covered by this survey, one has the protection of a nature reserve whilst

TABLE 3. CAUSES OF LOSS OF 103 RECORDED SITES OF *ORCHIS USTULATA* IN NORTHERN ENGLAND

Cause of loss of site	Number of sites lost
Definite or suspected agricultural improvement	35
Building and industrial encroachment	18
Ploughed out	7
Overgrazed	4
Scrub colonisation	4
Afforestation	2
Quarrying	1
Overgrazed but may possibly still survive	12
Unknown causes	20

four others are at sites having S.S.S.I. status and a further site is in the process of being so designated. One other site is in a permanent amenity area, which may in itself provide some degree of protection, but the remainder appear to be unprotected in any way. Other than protection as described above, the best chance of survival appears to lie where the ground is difficult to work agriculturally because of its configuration or the presence of outcropping rocks, but this is the case at only a few of the extant sites.

It is quite clear that the species is now very scarce in northern England, where maybe fewer than 500 flowering plants survive. Although in the past *O. ustulata* has been recorded from 13 vice-counties in the survey area, it now survives with certainty in only five of these, and is considered to be extinct in Notts., v.c. 56, W. Lancs., v.c. 60, S.W. Yorks., v.c. 63, S. Northumb., v.c. 67, and Cumberland, v.c. 70. It may yet be refound in S.E. Yorks., v.c. 61, Mid-W. Yorks., v.c. 64, and Westmorland, v.c. 69.

#### RECORDS

- N. Lincs., v.c. 54: 43/9.9, Waddingham, pasture with *Orchis morio*. Often overgrazed, last recorded in 1980 but still thought to be extant with status probably (A/B) (I. Weston pers. comm.); 44/7.1, Eastoft, hay meadow with *O. morio*. Tall plants in ungrazed situation (C); 44/9.1 or 54/0.1, Worlaby, formerly in three small meadows which were combined and destroyed by ploughing in the 1970s (X); 54/1.0, Swallow, pasture with *Coeloglossum viride*. Known here for many years but not seen recently (PX).
- Notts., v.c. 56: 43/5.4, Bulwell (Howitt & Howitt 1963) (X); 43/5.5, near Sutton-in-Ashfield (Howitt & Howitt 1963) (X); 43/6.4, 43/7.4, 43/7.5, Trentside, between Newark & Nottingham (Howitt & Howitt 1963) (X).
- Derbys., v.c. 57: 43/0.7, Ashwood Dale (Clapham 1969) (X); 43/2.5, Hipley Hill, south and west-facing slopes but not seen since 1960s although site still intact. Searched for in 1985 but not refound (PX); near Hipley Toll Bar, limestone pasture (Clapham 1969), not found recently, including searches in 1985 and 1986 (PX); near Ballidonmoor, (B), with a possible second small site; west of Longcliffe, two sites on heavily grazed limestone pasture near pond, status possibly (A/B) but not seen recently; east of Rainster Rocks, pasture, two small sites (A,A); near Brassington, grazed limestone pasture (D); head of subsidiary valley, Griffie Grange area, heavily grazed, not refound (PX); south-east of Harboro' Rocks, formerly possibly (C) but heavily grazed and not refound (PX); south-east of Ibale, scrubby south-facing slopes now appreciably overgrown and not refound (PX); Hopton/Via Gellia area, south-west facing well-grazed slope, extensive colony possibly the strongest in northern England (E); 43/2.6, Winster, not seen recently but formerly (A) (F. Horsman pers. comm.); 43/4.5, Alfreton (Clapham 1969) (X); South Normanton (Clapham 1969) (X).
- W. Lancs., v.c. 60: 34/4.7, Silverdale area (Wheldon & Wilson 1907) (X); 34/5.6, Over Kellett, believed to survive here until 1940s but not seen since (L. Livermore pers. comm.) (X).

- S. E. Yorks., v.c. 61: 44/6.3, Barby (Robinson 1902) (X); 44/7.4, Allerthorpe, recorded in 1932 (*Naturalist*, p. 14, 1932), presumably at Allerthorpe Common but now afforested (X); also recorded for this 10 km-square, post 1950 (Biological Records Centre records) (X); 44/7.6, Kenneythorpe (Robinson 1902) (X); 44/9.2, Brantingham Dale (Robinson 1902) (X); Brough (Robinson 1902) (X); 54/0.4, Arram (Robinson 1902) (X); 54/0.7, near Fordon, chalk grassland, three plants in 1965 (F. E. Crackles pers. comm.) (PX); Cottondale, formerly on the south facing slope of an earthwork with *O. morio*, *Coeloglossum viride*, and *Spiranthes spiralis*, but site destroyed in 1965 when ploughed out because of interest shown by botanists. Formerly 30–60 plants (T. F. Medd pers. comm.) (X); 54/1.4, Hornsea Mere (Robinson 1902) (X); 54/1.7, Hunmanby, single plant seen in 1973 (F. E. Crackles pers. comm.) (PX).
- N. E. Yorks., v.c. 62: 44/4.8, Sowerby Ings (X); Spittal Hill (X); South Kilvington (X), all described by W. Foggitt (c. 1880); South Villa, specimen collected June 1937, (**herb. G. Foggitt**) (X); Woodend, “abundant”, (Baines c.1840) (X); 44/5.5, Clifton Ings (Auden 1906) (X); 44/6.8, Helmsley, near railway station in 1945 (T. F. Medd pers. comm.) (X); 44/7.7, near Malton in 1896 (B.S.B.I. records) (X); 44/8.8, Haugh Rigg, grazed pasture with *Ophrys insectifera* (B); 44/9.8, Snainton, field ploughed out in the 1940s (J. H. Bolton pers. comm.) (X); Brompton, ploughed out in the 1940s (J. H. Bolton pers. comm.) (X); near Ruston, pasture, 100+ plants in the past but now declined, with *O. morio* (B); Forge Valley (old B.S.B.I. records) (PX); Yedmandale (B.S.B.I. records) (PX); 44/9.9, Highdale north of Hackness in 1932 (B.S.B.I. records) (PX); 45/9.0, Robin Hood’s Bay (B.S.B.I. records) (X); 54/0.8, near Scarborough race course and Seamer in 1938 (B.S.B.I. records) (X).
- S.W. Yorks., v.c. 63: 43/4.9, Rotherham, L. Langley 1828 (Lees 1888) (X); 43/5.9, Conisborough, “near Toll-Gate” in 1800, **herb. Salt** (Lees 1888) (X); 44/5.0, Scawsby Leys (Lees 1888) (X); 44/5.1, Hampole, Smeaton, and Brockendale, three old records all Lees (1888) (X).
- Mid W. Yorks., v.c. 64: 34/8.6, Settle, waste ground (Lees 1888; Riley 1923) (X); 44/2.7, Mickley, (Lees 1888) (X); Clothholme, (Slater 1883) (X); 44/3.4, Woodhall, field near the river, seen in 1958 but now possibly lost (PX); Collingham, meadows by the river, recorded in 1955 by B. A. Kirkby (Biological Records Centre record), also pre-1954 by Butcher (1954) (PX); Linton Common, meadow now mostly built upon and overgrown, not refound in 1985 but recorded in recent past (Nelson 1963) (PX); Wattle Syke and Wetherby, riverside meadows not seen recently (PX); 44/3.5, Knaresborough, east of Birkham Wood, lost to ploughing in 1971 (A. Mettam pers. comm., Jowsey 1978) (X); 44/3.6, Burton Leonard, formerly at quarries but not seen since the 1960s (M. Sanderson and others pers. comms.) (X); (Wormald Green Quarries (D. R. Grant pers. comm.) is almost certainly the same site as the one described above for Burton Leonard); 44/3.7, Ripon, riverside pasture upstream from the road bridge, known for many years and status (B) in 1974, single plant seen in 1978 is last sighting (M. Sanderson pers. comm.) and this when land was in the process of being upgraded agriculturally, not refound in 1983 and 1985 (PX); Queen Mary’s Dubbs, seen in 1957 (Biological Records Centre records) but not recently, heavily grazed, overgrown in places and probably improved, not refound in 1985 search (X); near Bridge Hewick (Slater 1883) (X); 44/4.3, Sherburn, old record (Lees 1888) (X); 44/4.4, Stutton, Thorp Arch (Lees 1888) (X); Tadcaster (Auden 1906) (X); 44/5.4, Bishopthorpe area (Lees 1888; Robinson 1902) (X); 44/6.2, Barlow, near Drax (Lees 1888) (X).
- N.W. Yorks., v.c. 65: 34/6.9, Sedbergh/Lower Dentedale, stated to grow with *O. morio* but neither species had been seen of late (Handley 1898) and also recorded for this area by Lees (1888) (X); 34/9.8, Bishopdale, small newly found colony in pasture (B); 34/9.9, near Muker, an unconfirmed record in the early 1980s, not refound, present status doubtful; near Crackpot, steep sloping pasture near stream, growing with *Platanthera chlorantha*, occurs intermittently and not refound in searches in 1984–1986, status probably (A/B); 44/0.8, east of Aysgarth, pasture, often overgrazed, (A); Redmire Force, pasture to south of river. Seen in small quantity in 1975 (W. Sledge pers. comm.), not refound in recent searches (PX); Swinithwaite, very small colony discovered by author in 1982 on closely grazed pasture, dwarf plants (A); Wanlas, recorded by F. M. Tayler in 1973, not refound (PX); West Witton, found on Y.N.U. Excursion in 1957 when status (B), but not refound in recent searches although site still intact (PX); 44/1.8, Leyburn, controlled grazed pasture protected as a nature reserve, with *O. morio*, (C), and unconfirmed report nearby on disused railway line; East Witton, classic site near river, tall plants in ungrazed situation, known here for many years but site now reduced in area with 100+

- plants as recently as the 1970s, but now much less (C), plants may also occur on the nearby river banks but not refound; 44/2.7, above Tanfield, on the north bank of the Ure (Foggitt c.1880; Slater 1883) (X); 44/2.8, near Masham, small colony in pasture (A); 45/1.0, Round Howe and Lower Swaledale (Baker 1863) but not recorded for many years (X).
- Durham, v.c. 66: 45/2.1, Baydales (Winch 1832) (X); 45/2.5, Lambton Gate (Winch 1832) (X); 45/3.1, Dinsdale, near the river (Baker & Tate 1868) (X), Middleton-One-Row (Baker & Tate 1868) (X); 45/3.3, Bishop Middleham, quarry, destroyed by working in the mid-1970s (A. F. Porter pers. comm.) (X); 45/3.6, Fulwell and Boldon Hills (Winch 1832) (X); Cleadon Hills, on the east side (Winch 1832) (X); 45/4.3, near Hart, coastal grassland, most northerly extant site in Britain (A); 45/4.5, Ryhope, sea coast (Winch 1832) (X); 45/4.6, Marsden, sea coast (Winch 1832) (X).
- S. Northumb., v.c. 67: 45/3.7, Cullercoats, coastal links (Baker & Tate 1868) (X), long since extinct and formerly most northerly British record.
- Westmorland, v.c. 69: 34/4.7, Arnside Knott, heathy ground (Wilson 1938) (X); New Barns, Arnside, formerly at site of present caravan complex, known here in the 1930s. (L. Livermore pers. comm.) (X); Black Dyke, not seen here since 1930s (M. Baecker pers. comm.) (X); 35/6.1, Drybeck (Wilson 1938) (X); Burrells and Whirby (Wilson 1938) (X); 35/7.1, Warcop, thought to survive here until the 1960s (X); Great Ormside, known on the banks of the Eden but ploughed out in the 1970s and not seen since (C. Willinck pers. comm.) (X).
- Cumberland, v.c. 70: 35/1.3, Woodhall (Hodgson 1898) (X); Baker (1885) gives Woodhall, Keswick, presumably an error?; Tallentire, pasture (Hodgson 1898) (X); Blindcrake (Hodgson 1898) (X); 35/3.4, meadow below Raughton Head (Hodgson 1898) (X); 35/3.5, Stainton Banks (Hodgson 1898), single plant seen here in 1927 (D. Blezard in records of E. Blezard) (X); 35/4.3, Lamonby, rough pasture, site reclaimed and reseeded, not seen since early 1970s (E. H. Rhone pers. comm.) (X); 35/4.5, Crosby-on-Eden, single plant in 1889 (Hodgson 1898) (X); 35/5.3, Great Salkeld, known here until the 1960s but the site now a plantation (E. H. Rhone pers. comm.) (X); Edenhall, meadows (Hodgson 1898), several plants in meadow by R. Eden in this area in c.1930 (J. R. Parker in records of E. Blezard) (X).
- A 1953 record for Caerns., v.c. 49, near Pabo (de Vesian 1982) is based upon a herbarium specimen in NMW and is considered to be a geographical error (R. G. Ellis, W. S. Lacey, M. Morris pers. comm.).
- I would be interested to hear of any other records or of any newly discovered or refound colonies especially within the survey area.

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## REFERENCES

- AUDEN, G. A., ed. (1906). *Historical & scientific survey of York and district*. York & London.
- BAINES, H. (c.1840). *The flora of Yorkshire*. London.
- BAKER, J. G. (1863). *North Yorkshire – studies of its botany, geology, climate and physical geography*. London.
- BAKER, J. G. (1885). *A Flora of the English Lake District*. London.
- BAKER, J. G. & TATE, G. (1868). *A new Flora of Northumberland and Durham*. Newcastle.
- BUTCHER, R. W. (1954). *Colchicum autumnale* L., in Biological Flora of the British Isles. *J. Ecol.*, **42**: 251.
- CLAPHAM, A. R. ed. (1969). *Flora of Derbyshire*. Derby.
- DE VESIAN, D. E. (1982). Plant record. *Watsonia*, **14**: 197.
- FOGGITT, W. (c.1880). Notebooks. Records held by Yorkshire Naturalists' Union Recorder.
- HANDLEY, J. (1898). *Catalogue of plants growing in the Sedbergh District including the Lune Basin from Middleton to Tebay*. Leeds.
- HODGSON, W. (1898). *Flora of Cumberland*. Carlisle.
- HOWITT, R. C. L. & HOWITT, B. M. (1963). *A Flora of Nottingham*. Private.
- JOWSEY, W. H. (1978). *Botanical atlas of the Harrogate District*. Harrogate.

- LEES, F. A. (1888). *The flora of West Yorkshire*. London.
- NELSON, G. A. (1963). A Flora of Leeds & District. *Proc. Leeds Phil. Lit. Soc.*, 9: 153.
- PERRING, F. H. & WALTERS, S. M., eds (1962). *Atlas of the British flora*. London.
- RILEY, F. (1923). *The Settle District & north west Yorkshire Dales*. Settle.
- ROBINSON, J. F. (1902). *The flora of East Riding of Yorkshire*. London & Hull.
- SLATER, H. H. (1883). The flora of Ripon & neighbourhood. *Trans. Yorks. Nat. Union*, Part 8. London.
- SUMMERHAYES, V. S. (1968). *Wild orchids of Britain*, 2nd ed. London.
- WHELDON, J. A. & WILSON, A. (1907). *The flora of West Lancashire*. Private.
- WILSON, A. (1938). *The flora of Westmorland*. Arbroath.
- WINCH, N. J. (1832). Flora of Northumberland & Durham. *Trans. Nat. Hist. Soc. Northumberland*, 2, Part 1. Newcastle.

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