Species Action Plans

National Species Action Plans

8.1 Biodiversity: The UK Steering Group Report (DETR, 1995) originally listed 416 priority species for which national Species Action Plans would be written. At that time 116 had already been written and 300 remained. In addition, a further 1,250 species were identified as being of 'conservation concern'. The priority list was reviewed in 1997and in 2007. After the 2007 revision the total number of BAP priority species was set at 1149. This list is available in Biodiversity Reporting and Information Group Report on the Species and Habitat Review 2007.

8.2 The four scientific criteria that were used to select the UK BAP species in the 2007 review were;

- International threat
- International responsibility & moderate decline in the UK
- Marked decline in the UK
- Other important factors – where quantitative data on decline are inadequate but there is convincing evidence of extreme threat

Local Species Action Plans for Buckinghamshire

8.3 On the publication of the Buckinghamshire & Milton Keynes BAP in 2000 it was planned that every species present in Bucks for which there is a national SAP or Conservation Statement, would eventually have a local SAP or Conservation Statement. SAPs would also be written for species which may not be considered a national priority, but which are threatened or declining within the County, such as green-winged orchid.

8.4 The following Plans were produced for species within Buckinghamshire.

- Chiltern Gentian
- Green-winged Orchid
- Striped Lychnis Moth

As Latin names were used in the original publication of the action plans for Chiltern gentian, green-winged orchid and striped lychnis moth, they have been retained in the following part of the document.

8.5 Under the 2007 review of the BAP it was decided not to continue with the production of SAPs and that species need would be met through the delivery of the relevant Habitat Action Plans.

8.6 The 3 SAPs produced in 2000 have not been revised and are reproduced in their original format, with the exception that new distribution maps for the three species have been produced and have been added.

Species Action Plan for Chiltern Gentian: *Gentianella germanica* in Buckinghamshire

Chiltern Gentian is a Nationally Scarce species of chalk downland in southern England. It is recorded from North Hampshire and Wiltshire through to Bedfordshire and Hertfordshire along the chalk downs. The stronghold is on the Chiltern Hills, particularly in Buckinghamshire. It appears to be declining from sites throughout its range. Habitat loss and unsuitable management, particularly the cessation of grazing, appear to be the main reasons for this decline. Hybridisation, with the more vigorous Autumn Gentian, is evident on several sites and may also be a contributory factor to the decline.

A survey of all currently and previously known sites within the County is required to update knowledge on the distribution of the plant. Management of chalk grassland sites is a priority for the conservation of this species, particularly the creation of bare ground for germination and reinstatement of grazing. Priority should be given to raising the awareness of this species with landowners and site managers to highlight the importance of Buckinghamshire's population. This would ensure the long-term conservation of this species.

1 Action plan objectives and targets

1.1 To ascertain the County status of the species through survey work and data collation.

1.2 To maintain populations at all extant sites.

1.3 To ensure protection of all extant sites.

1.4 To promote research into the ecological requirements of the species and its hybridisation with Autumn Gentian, *Gentianella amarella*.

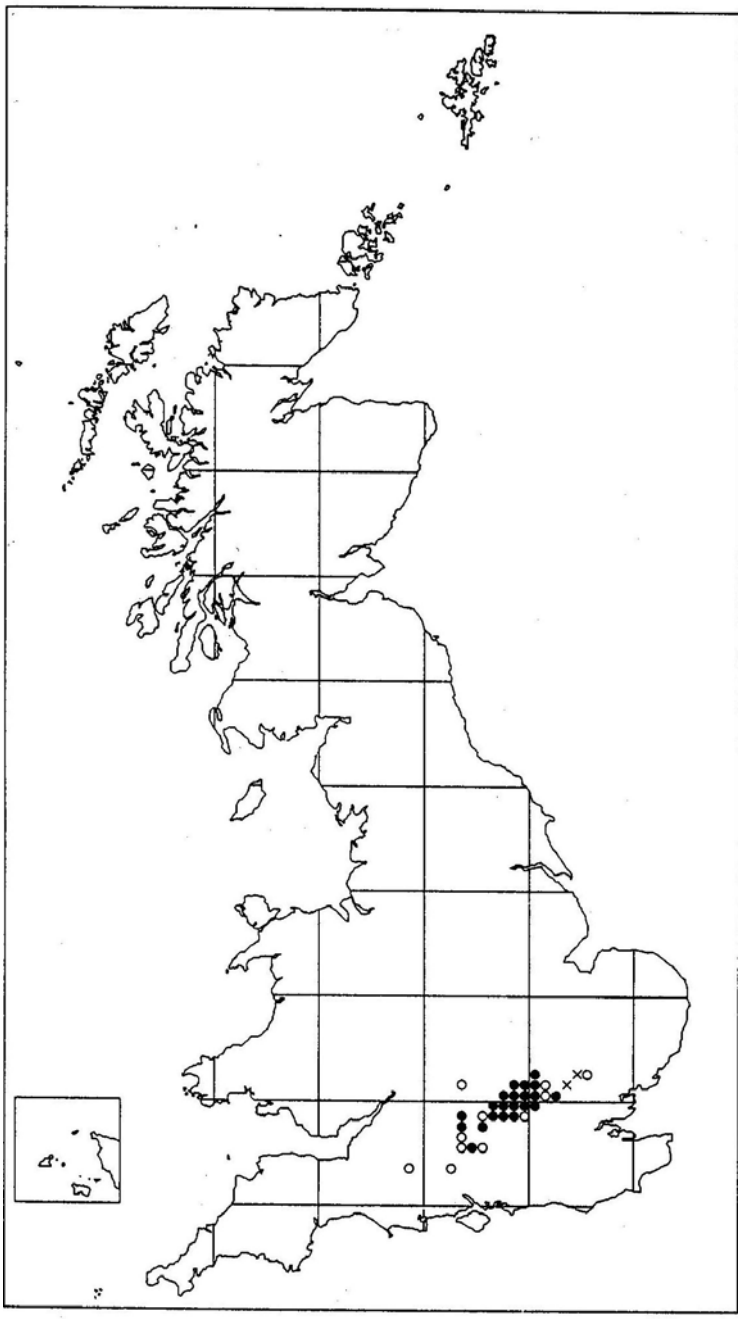
1.5 To initiate population monitoring of the species on specific sites in the county.

1.6 To promote appropriate site management for the long-term survival of this species.

2 Distribution and nature conservation status

2.1 Chiltern Gentian is given the category of Nationally Scarce (Stewart *et al* 1994). It has been recorded in 21 ten km squares since 1970. It is endemic to west and central Europe, occurring in southern central England from north Hampshire and north Wiltshire to Hertfordshire and Bedfordshire (Figure 1). The main strongholds for this species are now in Buckinghamshire, Oxfordshire, and Bedfordshire along the Chiltern scarp. Compilation of historical records and up-to-date survey work are required to ascertain its current distribution.

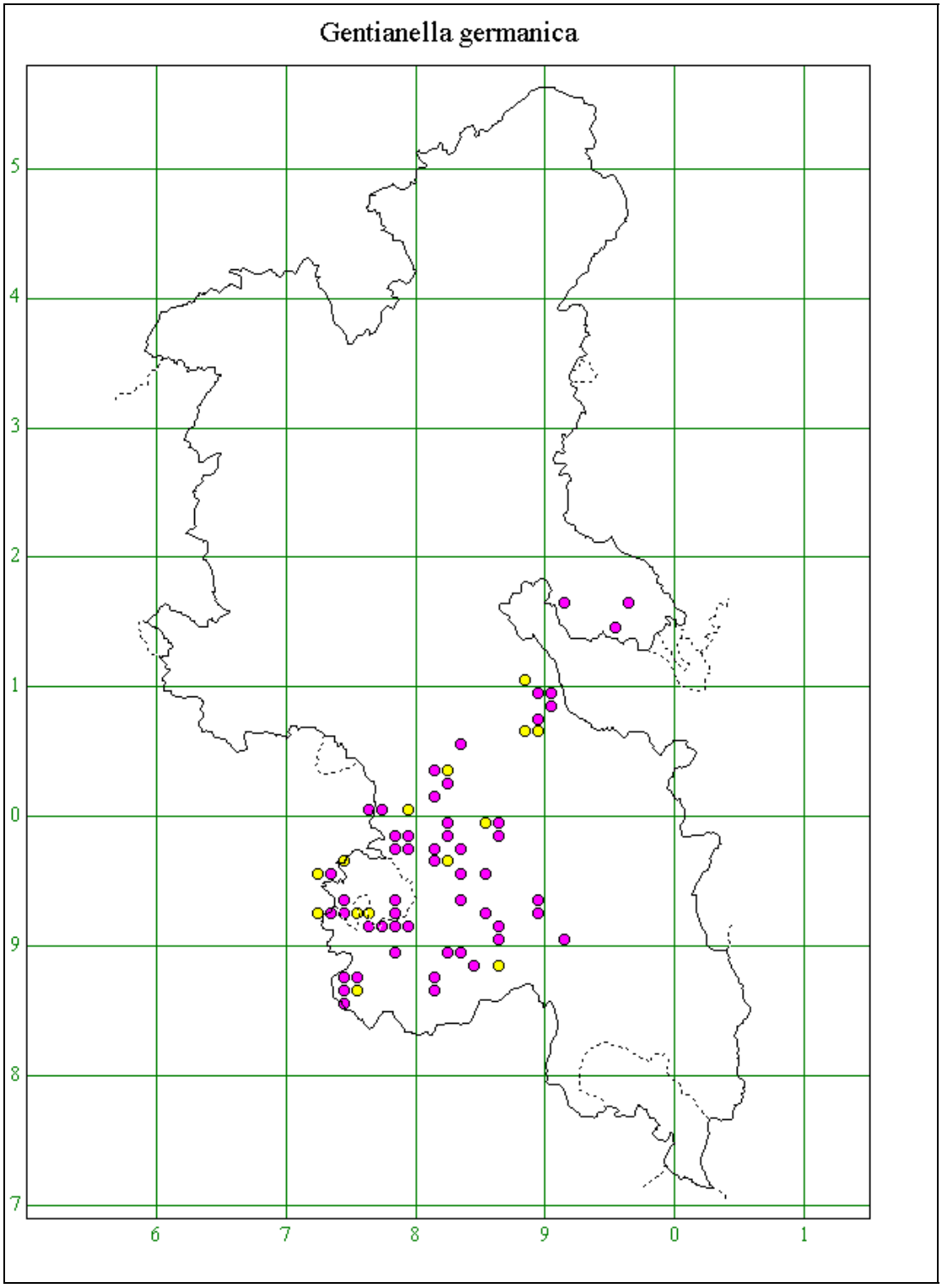
Figure 1. National distribution of Chiltern Gentian by 10 km squares



Current map	No	Atlas	No
1970 →	21	1930 →	14
Pre-1970	11	Pre-1930	11
Introductions	2	Introductions	0

Map taken from Stewart et al. (1994) with the kind permission of JNCC.

Figure 2. Distribution of Chiltern gentian records in Buckinghamshire, by 1km square



Open circles = records before 1980 Filled circles = records after 1980

Local distribution

2.2 Chiltern Gentian has been identified by the Wildlife Trust (WT) as a Buckinghamshire Biodiversity Challenge species with the conservation target to locate and maintain all existing sites through sympathetic management. While a Nationally Scarce plant, it is locally abundant in Buckinghamshire, although some sites have been lost to pasture improvement and neglect. Records of this species since 1980 reveal a total of 35 sites within the County (Figure 2). Some of these sites may no longer have or be suitable for this species, and there is concern that misidentification of the Autumn Gentian has confused records on some sites.

3 Ecological assessment

Description

3.1 Chiltern Gentian is a member of the Gentian family, *Gentianaceae*, and is superficially very similar to Autumn Gentian. Adult plants range between (2)7-35 (50) cm tall, producing bright bluish-purple flowers from August to October (Clapham *et al* 1987). In general the two species occur in similar localities, although Chiltern gentian requires more sheltered areas and is less able to withstand competition from other vegetation. Morphologically the two species are separated by the size of the corolla which in Chiltern gentian ranges between 25-35 mm, twice or more as long as the calyx, (and often transversely wrinkled) while Autumn gentian has a smaller corolla (13-20 mm), the tube of which is generally less than twice as long as the calyx. Typically, Chiltern gentian has more internodes (9-15) than Autumn gentian (0-9) and broader leaves at the base.

3.2 Chiltern Gentian hybridises freely with *G amarella*, although its occurrence is reduced because of the normally later flowering (Aug/Sept-Oct) of Chiltern Gentian (Autumn Gentian generally flowers from July to October). Wide variation in flowering times from year to year are however evident (*pers Comm* R Fitter). Hybrids are partially fertile and occur with the parent plants or with Autumn Gentian alone in places where the Chiltern Gentian formerly occurred. Additional identification notes are appended to this document (Appendix 1).

Ecology

3.3 Chiltern Gentian is usually a biennial, but annual plants occur sporadically among the biennials. The seed germinates in the spring and in the first year produces a rosette of leaves which die away to a small underground bud in early winter. This renews growth in the spring and flowers appear later that year. Annuals, which can occasionally be seen in flower between October to November, are of a much shorter stature often only 2 cm tall.

3.4 Seeds ripen during September/October. Each plant produces between 300-860 seeds (Grubb 1976). Dispersal appears to be mostly by wind, and there is evidence to suggest that dispersal is limited (Verklaar and Schenkeveld 1984). The persistence of the seed bank has not been thoroughly investigated, but it appears that some dormancy occurs (Grubb 1976). Populations of Chiltern Gentian tend to fluctuate from year to year and show large variations in numbers (Verkaar and Schenkeveld 1984). Germination experiments have revealed the importance of mycorrihzal association for successful germination and seedling establishment (Taylor 1982).

3.5 Chiltern Gentian is now confined to chalk downland and chalk pits in the south of England. It is associated with GC2 grassland of the National Vegetation Classification (Rodwell 1992) *Festuca ovina – Helictotrichon pratensis* grassland. It generally occurs in short, open turf, particularly in places where the soil has been disturbed, and it can grow successfully along the edges of well-worn footpaths, tracks and chalk pit faces. It is a successful coloniser of bare ground and is often found in association with common eyebright, bird's-foot trefoil, kidney vetch, Autumn Gentian and yellow-wort. It is also present in more sheltered areas along woodland margins and on scrubby ground on chalk soils. Regular associated species include agrimony, wild strawberry, hairy St John's-wort, dogwood and hawthorn. Suitable turf is maintained by sheep or cattle grazing and trampling or by rabbit activity. The creation of areas of bare ground is critical to allow germination of seed and seedling establishment.

4 Current factors leading to loss or decline

Habitat loss

4.1 The loss of a number of Chiltern Gentian sites has been attributed to quarrying or through the ploughing up and fertilising of chalk grassland for agriculture or invasion of scrub.

Habitat degradation

4.2 Populations of Chiltern Gentian have been lost, or are under threat, from inappropriate management of chalk grassland. In most cases this is through the cessation of grazing, which leads to a loss of a short open sward with bare ground where plants can establish. Where grazing has ceased, the seed bank may persist and in some cases, the plant has successfully germinated once scrub has been cleared. Over-stocking and inappropriate timing of grazing may also be damaging. Chiltern Gentian germinates in spring and flowers in late summer, hence late autumn/winter grazing may be the most suitable regime for this species. Cattle grazing of sites in late autumn or early spring at low densities may be suitable, providing this does not cause excessive poaching.

Hybridisation

4.3 Hybridisation with the more widespread Autumn Gentian may be contributing to a decline in the Chiltern Gentian. It has been suggested as a cause for the decline in populations in Surrey, Kent and Sussex (Pritchard 1961). Hybrid populations often show characteristics more weighted towards Autumn gentian than Chiltern gentian, suggesting that introgression has occurred and in some sites the hybrid appears to be the only remaining taxon present.

5 Current conservation activity

5.1 Management and monitoring of sites with Chiltern Gentian present are underway at the following sites:

- **Buttlers Hangings**: WT Nature Reserve. Management of site includes scrub control and grazing. Monitoring of population is undertaken by the reserve manager. Contact: Maurice Young, WT Reserve Manager.

- **Dancersend Nature Reserve and Waterworks**: WT Nature Reserve. Plots have been established within the Crong meadow reserve and regular monitoring of the Waterworks is undertaken by the Reserve Manager. Contact: Mick Jones, WT Reserve Manager.

- **Gomm Valley**: WT Nature Reserve. Site monitored by Maurice Young.

- **Ivinghoe Hills**: National Trust. Clearance of scrub underway. Contact: Graham Cannon, National Trust.

- **Parkwood**: National Trust. Clearance of scrub and reintroduction of grazing.

- **Swains Wood**: WT Nature Reserve. Population monitoring regularly undertaken by Rod d'Ayala.

6 Proposed action

Survey and monitoring

6.1 Survey all sites from which records are known either old or recent for this species to ascertain current distribution throughout the County (EN, WT, BCC, Records Centre, National Trust, Botanical surveyors).

6.2 Establish monitoring programmes for the species. Key populations in the county to be monitored with a view to understanding the fluctuations in the populations over a number of years (minimum five years). The following Buckinghamshire sites are proposed:

- **Buttlers Hangings**: Continue to monitor species and examine the possibility of establishing permanent quadrats or the use of a random quad-rats for long-term monitoring (WT).

Ellesborough & Kimble Warrens: Surveying site to establish whether Chiltern Gentian is present on the site (Botanical surveyors, WT, English Nature).

- **Dancersend Nature Reserve and Waterworks**: Monitoring is already underway and techniques are being reviewed as to the best long-term approach. Permanent and/or random quadrat sampling of meadow plots may be undertaken in future years (WT).

- **Ivinghoe Hills**: Survey new scrub-cleared areas to search for plants (NT).

- **Parkwood**: Survey site, particularly areas which have been recently cleared of scrub (NT).

- **Swains Wood**: Continue to monitor populations yearly (WT).

- **Turville Hill**: Survey site including horse-grazed paddocks to determine distribution of existing populations (English Nature, botanical surveyors, WT).

- **Yoesden Bank**: Monitor population of *germanica*, hybrids and *amarella* (BCC).

6.3 Pass records on to Bucks Environmental Records Centre for updating the recorder database (all botanical surveyors).

6.4 Produce a new distribution map for the county following the survey of sites (Records Centre, WT).

Site safeguard

6.5 Ensure that management statements for all SSSIs which support populations of Chiltern Gentian reflect the management needs of this species (EN).

Management

6.6 Promote positive management at existing sites by emphasising the importance to landowners and managers of this species (EN, BCC, FWAG, WT, NT).

6.7 Promote the reinstatement of positive management at all potential sites by emphasising the importance of this species to landowners and managers (EN, BCC, WS project, FWAG, WT, NT).

6.8 Specific management requirements at Buckinghamshire Sites:

- **Ivinghoe Hills**: Continue clearance of scrub where previous records for Gentians have been made. Keep areas of grassland open and encourage bare ground for germination of seed and seedling establishment (NT).

- **Turville Hill**: Liase with landowners over stocking density in horse-grazed paddocks and sheep-grazed plots (EN).

- **Butlers Hangings Nature Reserve**: Continue sheep grazing of compartment 1, possibly increasing grazing pressure in parts to create more open, bare ground for seed germination. Scrub clearance by winter and summer cutting should continue (WT).

- **Dancersend Nature Reserve and Waterworks**: Examine the possibility of scarification of areas in late autumn to encourage greater seed germination and the spread of the Chiltern Gentian. Continue present sheep grazing regime. Examine the resumption of flail mowing in some areas. Thames Water should be encouraged to resume mowing parts of the waterworks site (WT).

- Parkwood: National Trust. Continue clearance of scrub and scarification of ground to create bare areas for seed germination (NT).

- Gomm Valley: Investigate the possibility of reintroducing sheep grazing. If not feasible, reinstate grass strimming and scarification of areas to create bare ground for seed germination (WT).

Advisory

6.9 Ensure that land managers are aware of the presence and importance of this species and advise on appropriate management (EN, BCC, FWAG, WT, NT).

Future research

6.10 Investigate the seed viability of the species and determine its germination requirements (Universities, English Nature, WT).

6.11 Investigate the ecology and population genetics of the species and the hybrid form with Autumn Gentian in order to establish the management requirements of this species and the hybrid (Universities, EN).

6.12 Investigate the practicality of reintroductions of the species, if appropriate, in the future (EN, WT, BCC, FWAG, NT).

Communications and publicity

6.13 Produce a leaflet to increase the awareness, importance and threat to the Chiltern Gentian within the county and associated loss of chalk downland (WT).

6.14 Use the Wildlife Sites project as a means of approaching landowners to discuss chalk grassland management.

6.15 Raise awareness of this species through the Bucks Grassland Co-operative and use the Co-operative as a forum for discussing management work undertaken.

7 References

Clapham, A R; Tutin T G & Moore D M (1987): *Flora of the British Isles* 3rd edition. Cambridge University Press

Grubb, P J (1976): A Theoretical Background to the Conservation of Ecologically Distinct Groups of Annuals and Biennials in the Chalk Grassland Ecosystem. *Biological Conservation,* 10:53-76

Pritchard N M (1961): *Gentianella* in Britain iii *Gentianella germanica* (Willd) *Watsonia,* 4:290-303

Rodwell, J S (1992): *British Plant Communities. Volume 3. Grasslands and Montane Communities*. Cambridge University Press

Stewart, A; Pearman D A & Preston C D (1994): *Scarce Plants in Britain.* JNCC, Peterborough

Taylor (1982): *Mycorrhizae in Contrasted Groups of Chalkland Plants*. PhD D thesis, School of Botany. Cambridge University, Cambridge

Verkaar, H J & Schenkeveld A J (1984): On the Ecology of Short-lived Forbs in Chalk Grasslands. Life History Characteristics. *New Phytologist*, 98:659-672

Appendix 1

Additional identification notes to distinguish between *Gentianella germanica* and G*entianella amarella.*

Gentianella amarella (Autumn gentian): leaves lanceolate to ovate-lanceolate (narrower). Corolla tube more or less cylindrical. Corolla lobes narrowly ovate-oblong, 4-7 mm.

Gentianella germanica (Chiltern gentian): leaves ovate-lanceolate to ovate (broader). Corolla tube broadest at tip. Corolla lobes narrowly triangular ovate, 6-11 mm.

The hybrid G x pamplinii is intermediate between the two.

Information supplied by Richard Fitter, 1997.

Species Action Plan for Green-winged Orchid: *(Orchis morio)* in Buckinghamshire

Summary

The green-winged orchid's national status of 'not scarce' belies its decline since the 1950s. This orchid is a plant of lowland grassland in England, tolerant of a wide range of soil conditions and often regarded as typical of old, agriculturally unimproved, neutral grassland. Formerly widespread and locally common in pastures of southern England, it has declined dramatically. In many counties it is limited to nature reserves and other sites managed with conservation in mind. Habitat loss due to ploughing, reseeding and fertiliser use, as well as inappropriate management, eg over-grazing and abandonment of sites, seem to be the main reasons for the decline. Additional pressures from development, particularly housing, are also threats to the neutral grassland resource. Hybridisation with early purple orchids (Orchis mascula) have been reported, although this is not expected to be a significant threat in Buckinghamshire in view of their differing habitat preferences in the County.

A survey of all currently and previously known sites within the County is required to update knowledge on the distribution of the plant. Management and protection of unimproved neutral grassland sites is a priority for the conservation of this species. Raising the awareness of landowners and site managers to the needs of this species and the importance of the Buckinghamshire population would ensure its long-term conservation.

1 Action plan objectives and targets

1.1 To ascertain the County status of the species through survey work and data collation.

TARGET: to initiate a survey of existing and historic sites by 1999 and to complete by 2000. (Site visits in subsequent years may be necessary to confirm presence/absence.)

1.2 To maintain and increase where necessary viable[1] populations at all extant sites through sympathetic land management.

TARGET: To ensure viable populations occur on sites by 2005.

1.3 To ensure protection of all extant sites.

TARGET: To ensure all sites with viable populations are secured from development or damaging activities by 2000.

[1] A population is considered 'viable' where a minimum number of 50 individuals are visible and evidence of seed set/regeneration occurs every five years.

1.4 To promote research into the ecological and biological requirements of the species including fungal associations and its hybridisation with early purple orchid, *Orchis mascula*.

TARGET: To encourage Universities/Institutions to initiate research into its ecology and biology by 2000.

1.5 To initiate population monitoring of the species on specific sites in the county.

TARGET: To select sites and begin monitoring by 1999.

1.6 To identify suitable sites for restoration management and to reintroduce the species.

TARGET: To reintroduce the species to two sites by 2005.

2 Current status

2.1 Although formerly widespread and locally common, the Green-winged orchid has declined dramatically over the last 30-40 years (Stewart *et al* 1994). Since 1970, it has been recorded in 455 ten km squares, but has been lost from 380 ten km squares where it was recorded before 1970. The Green-winged orchid is found in Europe, western Asia and North Africa. In Britain it is widespread throughout England and Wales with occasional records in Scotland and Northern Ireland (Lang, 1980). In England its strongholds are in southern and central counties, from Dorset, Somerset, Gloucestershire and Worcestershire eastwards to East Anglia and Kent (Figure 1).

Local distribution

2.2 Records of Green-winged orchid in Buckinghamshire since 1987 reveal 15 current sites (see Figure 2). Many of these sites are on established SSSIs and/or Wildlife Trust reserves. Before 1987 it was recorded from a further 29 sites, a survey of all sites where populations are poorly surveyed to date is required to ascertain the current status and distribution. Surveying sites from where the species was recorded pre-1987 will check whether it has indeed disappeared from those sites, possible reasons for this and whether re-introduction is a possibility.

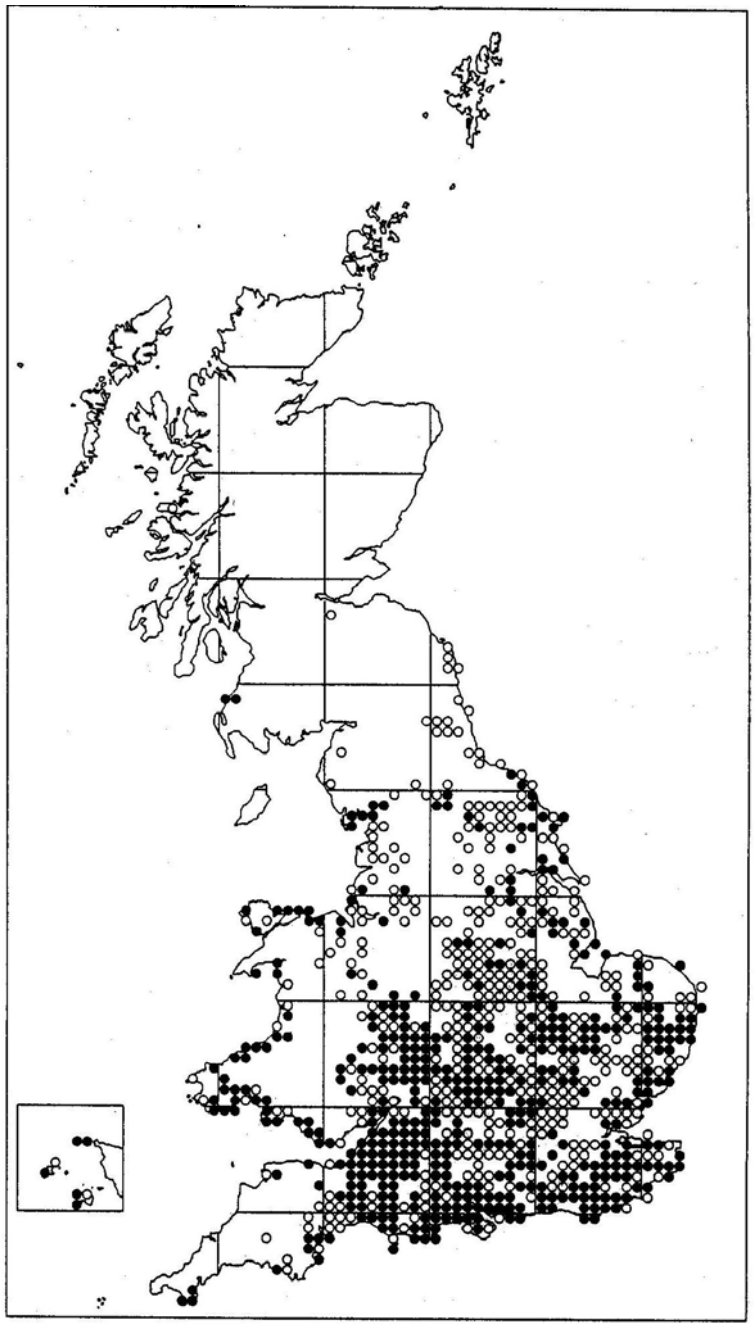
3 Ecological description

Description

3.1 The Green-winged Orchid is a member of the Orchid family, Orchidaceae. Adult plants are generally 8-20 cm tall, although plants up to 40 cm have been recorded (Lang, 1980). At the base of the stem are up to seven narrow, bluish-green leaves, with a further two or three smaller leaves sheathing the stem. The leaves are never spotted. The flower spikes are produced in May and June and are very variable in colour, from deep red-purple to pale purple, lilac, pink or occasionally white, with individual colonies of the plant containing a great variety of colour forms. (Summerhayes, 1951.)

3.2 The Green-winged orchid and early purple orchid may occur together in grassland and, although superficially similar, *O morio* is on the whole a smaller plant, with unspotted leaves and fewer, deeper coloured flowers. 'Technically it can be distinguished by the green-veined lateral sepals, which lie forward and help to form a hood together with the petals and back sepal, instead of being widely spread or bent backwards as in *O mascula*' (Summerhayes, 1951). Also, *O morio* never occurs in woodland, as *O mascula* so often does.

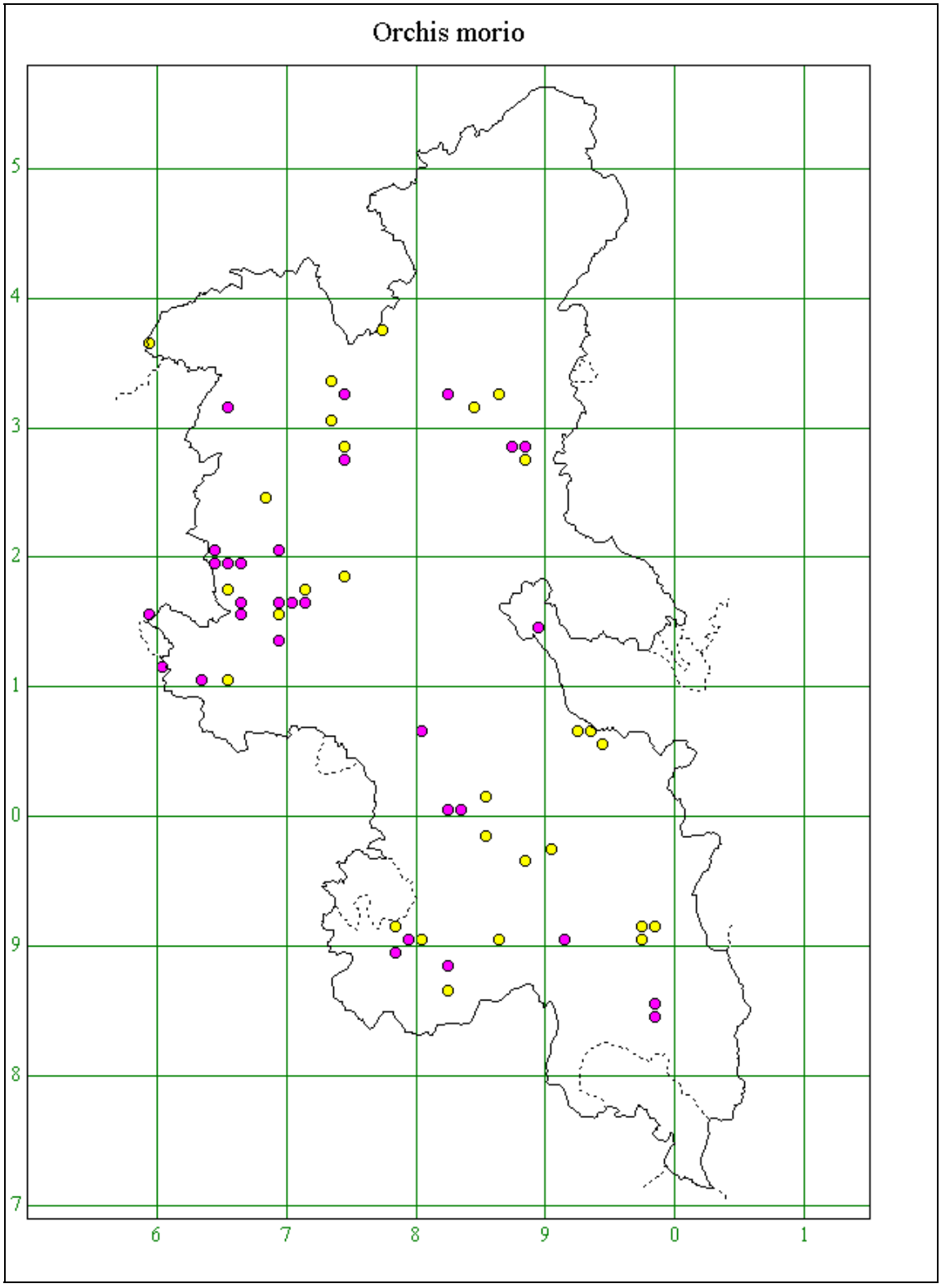
Figure 1.National distribution of Green-winged Orchid by 10 km square



Current map	No	Atlas	No
1970 →	455		
Pre-1970	380		
Introductions	0	All records	420

Map taken from Stewart et al. (1994) with the kind permission of JNCC.

Figure 2: **Distribution of Green-winged Orchid records in Buckinghamshire, by 1 km square.**



Open circles = records before 1980 Filled circles = records after 1980

3.3 *O morio* hybrids with *O mascula* and with *O laxiflora* (the Jersey orchid) have been reported (Brooke, 1950). Hybrids between *O morio* and *O mascula* are intermediate between the two parents, with spotted leaves (*O mascula*) and green-veined sepals (*O morio*) Summerhayes (1951) suggested that hybrids may be hard to detect and may frequently be overlooked. The plants flower at the same time and are visited by the same species of insect, so could be cross-pollinated. The frequency and impact of hybridisation is unknown.

Ecology

3.4 The green-winged orchid has been described as a monocarpic perennial which reproduces by seed by Stewart *et al* (1994). He states that plants can persist in a vegetative state for many years if the inflorescence is removed by mowing or grazing, eventually flowering and fruiting when this pressure is removed. However, Lang (1980) suggests that setting and spreading of seeds is important to the plant's persistence and that the gathering of the flowers of the green-winged orchid has contributed to its decline.

3.5 Another important feature that has recently been cast into doubt is whether *Orchis morio* is indeed monocarpic (ie a plant which sets seed once and then dies). Silvertown *et al* (1994), while studying the effects of fertiliser application on flowering populations of *Orchis morio*, found that plants in their study area in Lincolnshire were polycarpic and reported that this had also been observed in Cambridgeshire by T Wells. Individuals have been observed flowering for a minimum of four consecutive years at Pilch Fields, Buckinghamshire (pers com A McVeigh). If *Orchis morio* is actually longer-lived and polycarpic, this will influence (favourably) the likely recurrence of the plant on old sites where it has not been reported for some time.

Germination

3.6 Seeds develop rapidly, the first leaves appearing in the spring of the second year and the first tuber in the following year (Lang, 1980). The plants flower after four to five years (Wells, 1981), although cultivated plants have been reported to flower after only two to three years (pers comm R Manuel, Hardy Orchid Society).

3.7 In the wild, it is generally agreed that germination of orchid seeds, including *Orchis morio*, only occurs after the seed is penetrated by fungal hyphae, usually from a *Rhizoctonia* species, to form a mycorrhizal association. However, asymbiotic germination is possible in the laboratory for many species of terrestrial orchids, including *Orchis morio* (Wells, 1981). In fact, *O mori* is a relatively easy orchid to germinate and propagate in the laboratory (Arditti, 1982, pers comm N Heywood, Hardy Orchids Ltd; M Ramsey, Royal Botanical Gardens, Kew).

Habitat

3.8 Green-winged orchids are associated with MG5 grassland of the National Vegetation Classification (Rodwell, 1992), *Cynosaurus cristatus – Centaurea nigra* grassland. This is the typical grassland of grazed hay-meadows in lowland Britain. Loosely described as old meadow, this community describes species-rich lowland meadow vegetation, with a long history of lack of disturbance or improvement, such as is suggested by the presence of ridge-and-furrow. As well as old meadows, grassy railway cuttings and banks provide a suitable habitat.

3.9 The green-winged orchid has been described as favouring calcareous soils, but it is by no means restricted to them, occurring on heavy marl or even clay soils, as long as they are not too wet (Summerhayes 1951; Lang 1980). The species avoids waterlogged conditions, preferring damp ground (Lang 1980) and cannot thrive on really dry slopes or hills (Summerhayes 1951).

3.10 The orchid flourishes in short turf, avoiding shade. It sometimes occurs in the partial shade of bushes or scrub; but generally not in permanent woods. Both Summerhayes (1951) and Lang (1980) comment on its frequent occurrence in fields in which Cowslips (*Primula veris*) and Adder's-tongue Fern (*Ophioglossum vulgatum*) occur.

4 Current factors leading to loss or decline

Habitat loss

4.1 Habitat loss is the most significant reason for the decline in green-winged orchid populations. It is a plant of the traditional unimproved neutral meadows of lowland Britain which have been lost due to ploughing and reseeding or conversion to arable and which are still under threat. Changes in farming practices are also responsible including shift from hay cutting to silage production. Equally important are changes in land use with increasing development pressure, particularly housing, demands for sand and gravel and the construction of motorways and other roads. More subtle threats to grasslands of conservation interest are agricultural improvements due to fertiliser and herbicide applications and other inappropriate management.

4.2 Traditionally, stock animals were excluded from hay meadows from April to June or July, when the hay crop was taken. If grazing is continued during this period, early flowering species, such as *Orchis morio*, may be unable to set seed and an expansion of rosette hermicyptophytes will occur (Rodwell, 1992).

Habitat degradation

4.3 The impact of fertiliser applications on a population of green-winged orchids was the subject of an experiment by Silvertown *et al* (1994). They found that the application of inorganic fertilisers significantly decreased flower spike numbers during the six year treatment. Dramatic reductions in flower spike numbers seen with applications of phosphate suggested an additional toxic effect on the orchid or its fungal associates. For other nutrients, the decrease in flower spikes was closely correlated with the increase in hay yield, suggesting that competition between *Orchis morio* and the other vegetation may have been responsible for the decline in flower spike numbers.

4.4 Additional threats occur through inappropriate management. Although recent research indicates that seedlings are shade-tolerant, the restriction of this orchid to short grassland suggests that shade impairs its growth and/or flowering (McKendrick 1996). Where scrub is allowed to develop, the orchid population can be expected to decline. This has been reported to have occurred at a former site at Holtspur Bank.

Hybridisation

4.5 Hybrids between *O morio* and *O mascula* and *O laxiflora* have been reported fairly widely. However the impact of this on *O morio* populations is not known. In Italy, *Orchis x alata* has recently been shown to be a naturally-occurring hybrid between *morio* and *laxiflora* (Capito *et al* 1997).

5 Current action

5.1 Abbreviations used: EN: English Nature; BCC: Buckinghamshire County Council; DC: District Councils (Countryside Staff); WS: Wildlife Sites; WT: Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust;

Site protection

5.2 Through the WS Project many sites with green-winged orchid have been notified and contact made with landowners.

5.3 Seven sites are designated as Sites of Special Scientific Interest (SSSI), four of which are WT reserves (with a further site also a WT reserve) and therefore afford protection from adverse management and/or land use change.

Survey

5.4 Neutral grassland surveys have been undertaken by Hyder Consulting Ltd for Buckinghamshire County Council during 1996 and 1997. Some of these sites have the orchid present or are recently extinct sites.

5.5 A Phase 1 Habitat Survey of Great Brickhill and Bradenham was undertaken during 1997 as part of the Greensand project. Several Green-winged orchid sites have been surveyed as part of the WS project. Records are held at the County Museum.

Management and monitoring

5.6 Management and monitoring of green-winged orchids are currently underway at the following sites.

- **Bernwood Meadows**: WT Nature Reserve. The site is managed for hay, cut in July and aftermath grazed.

- **Munday Dean**: WT Nature Reserve. The site is cut for hay in summer and the aftermath grazed by cattle in the autumn. The orchids are monitored by the reserve manager. The site is opened once a year for the public to view the orchids.

- **Pilch Field**: WT Nature Reserve. The site is grazed by cattle from July to November and the orchid population is monitored by the reserve manager.

- **Stoke Common SSSI**: Owned by South Buckinghamshire District Council: Population monitored by Andy McVeigh, Bucks County Council.

6 Proposed action

Site survey and monitoring

6.1 Survey all sites from which records for this species are in doubt to ascertain the current distribution throughout Buckinghamshire. All sites should be surveyed except Bernwood Meadows, Munday Dean, Pilch Field, Stoke Common and Westcott ROF, where populations are already well known. Selected extinct sites should also be surveyed. These should include: Adstock, Beachampton, Dorton Railway Cutting, Drayton Beauchamp, Finemere Woods SSSI, Glebe Farm, Great Hampden, Hanover Hill, Hughenden, Latchmead Meadows, Ludgershall sites, Marlow Common, Newton Longville, Soulbury, Thornborough, Westcott Railway Cutting, Whaddon Chase. (WT, BCC, DC, EN, WS project.)

6.2 Establish monitoring programmes for the species. Key populations in the County to be monitored with a view to understanding the fluctuations in the populations over a number of years (minimum 10 years). Monitoring to take the form of mapping, permanent quadrats/transects, counting individuals as appropriate to the site. Formalise monitoring of five sites that

have been previously by WT reserve managers, BCC ecologists and the WS project:

- Bernwood Meadows, (WT)
- Munday Dean, (WT)
- Pilch Field, (WT)
- Westcott ROF: Royal Ordnance plc (WS project, Rare Plants Group, WT). Survey required of current abundance and a regular monitoring programme established
- Stoke Common, (BCC).

6.3 If the preliminary surveys confirm orchid populations establish monitoring programmes for:

- Armour Farm, liaison with landowner required (BCC)
- Frieth Meadows SSSI & SW Field: survey of current population needed (EN)
- Long Herdon (WT)
- Pokers Pond Meadow SSSI (EN)
- Rushbeds Woods and Railway Cutting (WT)
- Tingewick Meadows SSSI (EN).

6.4 Monitoring may include plant height, leaf numbers, number of flowers per spike, number of flowering and non-flowering plants.

6.5 Send all records to Bucks Environmental Records Centre/Milton Keynes Biological Records Centre for updating the RECORDER database (all botanical surveyors).

Site safeguard and management

6.6 Ensure that management statements for all SSSIs and WT reserves which support populations of green-winged orchids reflect the management needs of this species (EN, WT).

6.7 Liase with landowners and site managers to ensure that all existing sites are managed appropriately (EN, WS Project, BCC, DC).

6.8 Approach Railtrack about occurrences of the orchid on cuttings/embankments, to protect sites from undue disturbance. Dorton/Ashendon site on a railway line has just been destroyed by new line building (WS project, BCC).

6.9 Ensure that sites listed as potential WS containing 'viable' populations of the orchid are designated as WS (WS project).

6.10 Ensure that sites with records of this species which support viable populations are submitted to the County Museum and District Councils to compile an accurate database for planning enquiries (all surveyors, EN, WT, BCC).

6.11 Identify suitable sites for reintroduction with the view to introducing a population to two sites by 2000 (WT, BCC).

6.12 Visit and seek to persuade landowners and managers with suitable sites to participate in the reintroduction project (BCC, EN, WT, WS project).

Advisory

6.13 Ensure that landowners and managers are aware of the presence and importance of this species and advise on species management and any potentially damaging operations (EN, WT, WS project, BCC, DC).

Future research

6.14 Investigate the biology of mychorrizal association with this orchid and its response to changes in management.

6.15 Investigate the extent of hybridisation with *Orchis mascula* (Universities).

6.16 Investigate the possibility of reintroducing the species to two sites by 2000 (WT, BCC).

Communications and publicity

6.17 Encourage awareness of the species amongst the botanical community (EN, WT, Bucks Museum, BCC).

6.18 Inform landowners and managers about the importance of this species and its management requirements (EN, WT, BCC).

6.19 Produce a Species Action Card for distribution to landowners, managers and the wider public (WT).

6.20 Raise awareness of the threats to neutral grassland through the Nature Conservation Forum.

7 Acknowledgements

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Species Action Plan for Striped Lychnis *Shargacucullia lychnitis* Rambur in Buckinghamshire

Summary

Striped lychnis is a Nationally Scarce/Na[2] moth which is one of the 100 species included in BBONT's[3] Biodiversity Challenge for Buckinghamshire (BBONT 1996). It is also on the 'middle' list of Biodiversity: The UK Steering Group Report (HMSO 1995) ie one for which a National Action Plan will be produced in the next three years. The concern for the species at the national level is as a result of decline in range (> 50%) over the last 25 years. A review of the species' distribution 1980 - 1991 showed that the Buckinghamshire Chilterns represented the major British stronghold (Waring 1992).

As a precursor to the production of this Action Plan a striped lychnis survey was undertaken in Buckinghamshire during 1996. The results are summarised in Appendix 1 and detailed in Appendix 2.

1 Current status

International

1.1 Striped lychnis is found locally in Europe from Spain northwards to southern Sweden (Heath & Emmet 1993).

National

1.2 Nationally Notable (A Waring, 1992) undertook a review of the species' distribution and status in Britain which revealed post-1980 records from 32 tetrads: Buckinghamshire (11), Hampshire (10), Oxfordshire (4), West Sussex (4), and Berkshire (3).

Local

1.3 The post-1980 distribution of striped lychnis in Buckinghamshire, including records from the 1996 survey, is shown in Figure 1. The 1996 survey resulted in 18 new tetrad and three new 10 km square records (SU90, SP80 and SP90). This shows the moth to be reasonably widespread in the Chilterns though it is not always found where the foodplant is present.

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2 Invertebrates having been recorded in between 16 and 30 of the 10km squares covering Great Britain

3 Now known as the Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust

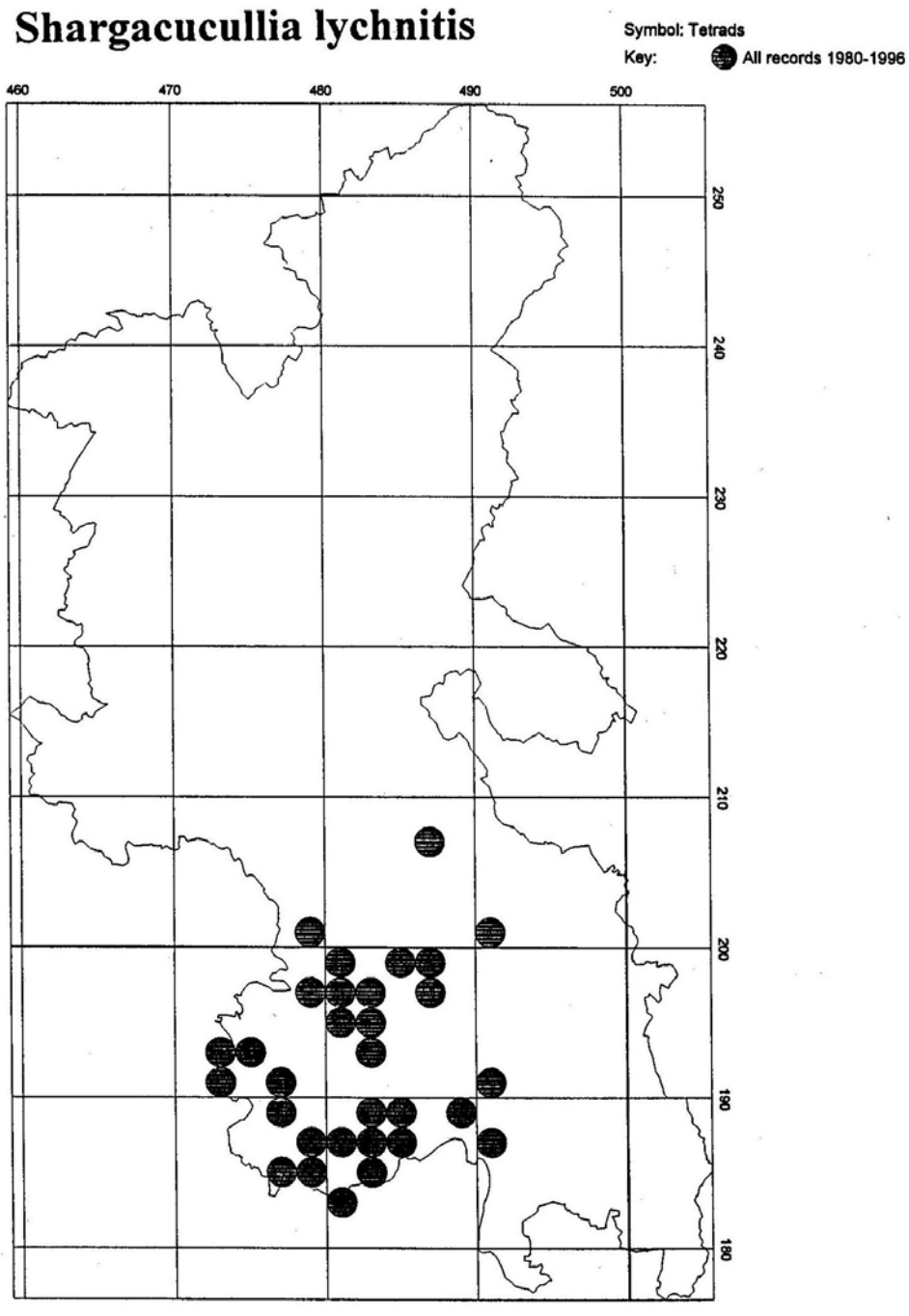

Figure 1. 2km distribution map of Shargacucullia lychnitis, 1980 - 1996

Historical

1.4 There are few historical records for the County, Ansorge (1969) listing High Wycombe, Missenden, near Stokenchurch, Medmenham and Hedsor while the Victoria County History (Barrett 1905) mentions Marlow and 'the borders of the County near Dancers End'.

2 Ecology

Larva

2.1 The larvae feed on dark mullein *Verbascum nigrum*, very rarely other species of *Verbascum* and *Scrophularia* (Skinner 1984). Several larvae were found apparently feeding on nettle *Urtica dioica* during the 1996 survey. Larvae usually occur on plants which are in relatively open situations with high numbers often found on isolated clumps of the foodplant. The larvae, which can be seen from mid-July until the end of August, mainly feed on the flowering spike of the plant including the seed heads.

Pupa

2.2 Pupation takes place at or just below ground level during August and September. Occasionally pupae will go two or more years before emerging (Waring in press).

Adult

2.3 Adults are on the wing June-July but are seldom seen, being rarely attracted to light (Skinner 1984).

3 Habitat

3.1 The favoured foodplant *V.nigrum* is a biennial, or where conditions remain suitable a perennial, which has a restricted distribution in Britain, being confined to disturbed calcareous soils, principally in the south-east, but occurring as far north as the Humber (Perring & Walters 1990). *V nigrum* is mainly found on areas of waste ground, field margins, fallow land (including set-aside) and road verges. Some of the sites will be temporary if the sward closes and no opportunities for seeding are available.

3.2 In Buckinghamshire most of the known sites for *V nigrum* are along road verges though increasingly set-aside fields and field margins are providing ideal conditions. Other sites include churchyards, quarries, woodland clearings and along footpaths and tracks. The relatively large number of sites along road verges may partly be a reflection of the fact that this is where most reports of the foodplant are from, being highly visible and generally accessible. The figures in Appendix 1 show that relatively high proportions of other sites examined actually held larvae including 100% of set-aside and field margins.

3.3 *S lychnitis* is frequently recorded on single isolated clumps of *V nigrum*, conversely there are some sites where large numbers of the foodplant is present yet no larvae have been found. Some of the sites are likely to be temporary either because there is only one isolated plant that a female moth has found by chance or because *V nigrum* becomes lost due to a change in the habitat.

4 Threats

4.1 The principal threat is loss of foodplant (through verge cutting) during the larval development stage, July to August inclusive. Conversely, the lack of occasional disturbance caused by cutting the full width of many verges may be leading to a reduction in the numbers of *V nigrum* as the sward becomes closed and new plants are unable to establish. However, the overall availability of the foodplant on verges and other sites does not currently appear to be a problem, indeed set-aside and woodland management are providing new sites each year.

4.2 Where *V nigrum* occurs in pasture it can be damaged by grazing animals as seen at Sprig's Alley in 1996.

4.3 By the nature of the habitat in which the foodplant occurs the majority of *S lychnitis* sites are found in 'ordinary' countryside rather than protected sites. However, this is probably not a great threat, indeed it offers an opportunity to use a rare species to help highlight the importance of the wider countryside for biodiversity and to extend the range of projects with farmers and landowners.

4.4 There is no information available to suggest whether or not climate is a limiting factor on the moth's distribution.

4.5 Like most lepidoptera *S lychnitis* is subject to attack by parasites including the tachinid fly *Withemia quadripustulata* (Waring in press).

5 Site protection and management

5.1 The BBONT challenge for *S lychnitis* states:-

Identify distribution of the species.

Sympathetic management on all key road verges by 2000.

Encourage sympathetic management on all other sites. *(BBONT 1996).*

When implemented this Action Plan will meet the challenge from 1997 onwards.

5.2 Three sites in Buckinghamshire are within SSSIs (Homefield Wood, Swain's Wood and Lodge Hill) but the remainder have no statutory protection. Sites may be permanently lost as a result of development or temporarily due to inappropriate management. Publicising the location of *S lychnitis* sites and providing advice and recommendations on management at key sites, notably road verges, should provide the basis for future protection.

5.3 Management of sites should focus on ensuring the continued availability of *V nigrum*. In the case of road verges this means that cutting should be avoided July-August inclusive where this does not conflict with road safety ie on sight lines and the edge of the carriageway. However, cutting of verges containing *V nigrum* must be undertaken at other times (April-May and/or September) to prevent the sward becoming too tall and rank, ensure ground disturbance and aid dispersal of seeds. Evidence from 1996 suggests that individual plants which produce the flower spike late in the season, either because it is their first year of flowering or because the original spike was cut down, do not support larvae. The timing of any early summer cutting could therefore be critical if the flower spike cannot regrow before the adult moths are on the wing and looking for plants to lay eggs on. Management guidelines for selected road verges will be produced and implemented from 1997 (*Divisional Surveyor).*

5.4 On other sites cutting of the sward and/or ground disturbance will also be necessary to maintain populations of *V nigrum*. On some sites it may be worth introducing plants grown from locally collected seed in order to bolster the population. This was successfully undertaken at Lodge Hill in 1996 and further plants will be introduced onto some of the field margins at the base of this site in 1997 (*Peter Hall).*

5.5 Set-aside currently offers both potential and existing sites for *V nigrum*. However, the routine maintenance of

set-aside, requiring cutting between 1 July and 15 August, will result in loss of foodplant. This can be avoided by promoting the use of a standard set-aside derogation on sites which support *V nigrum*.

5.6 Even with the likelihood of a reduction in the amount of set-aside, the trend to establish uncropped margins for game and wildlife interests is likely to continue. The field margins option in Countryside Stewardship provide an ideal opportunity to encourage further areas for the colonisation of *V nigrum*, particularly if they are close to existing populations. Margins could be either cut annually/biennially as with the road verges and/or strips could be harrowed to provide new opportunities for germination (*Countryside Services, FWAG & ADAS*).

5.7 The distribution of *S lychnitis* suggests that it is a mobile, albeit still relatively scarce, species which has the ability to colonise new sites where the foodplant is present. Opportunities for introducing *V nigrum* to selected sites where long-term management can be guaranteed should also be considered. Landscaping for the Wendover bypass will include wildflower seeding on some of the cuttings and *V nigrum* will be included in the mix. *S lychnitis* already occurs in the churchyard at St Mary's, Wendover which is adjacent to a section of the bypass.

5.8 Apart from St Mary's, other churchyards with *S lychnitis* are Fingest, Radnage and West Wycombe Hill. Contact with the church authorities should be made to ensure the survival of these colonies and to look for other churchyards where *V nigrum* occurs or could be introduced (*BCC Countryside Services and BBONT Community Wildlife Officer*).

5.9 Responsibility for ensuring appropriate management for *S lychnitis* at the principal sites:

SSSIs

- Homefield Wood (BBONT)
- Swain's Wood (BBONT)
- Lodge Hill (BCC Countryside Services).

Highway verges

- A4010 West Wycombe to Saunderton
- A40 West Wycombe to Piddington
- London Road, Great Missenden SP902001
- Hampden Road, Hughenden Valley SP863983-4
- (Countryside Services & Divisional Surveyors.)

Other sites

- Sprig's Alley (Countryside Services)
- Piddington verge and allotments SU 813941 (Countryside Services & Divisional Surveyor)
- Fingest - 2 field at SU 774910 (Countryside Services)
- St Mary's, Wendover (Countryside Services & Church).

5.10 Management for *S lychnitis* should only be undertaken where this will not cause damage to other significant species of flora and/or fauna.

6 Publicity and advice

6.1 The results of the survey will be submitted for publication in the Entomologists' Gazette [Martin Albertini, Chris Damant, Peter Hall & Jeremy Halls, 1997]. Additionally, short articles will be produced for the following: Butterfly Conservation (Upper Thames) Newsletter, BBONT News, British Wildlife, Chilterns NA Newsletter, Wycombe Urban Wildlife Group Newsletter, BIG Newsletter, FWAG Newsletter, Nature's Place, Southern Nature [Countryside Services/Albertini/Hall, 1996/7].

6.2 A press release will be issued outlining the work done to date, particularly in respect of the verge management [Countryside Services, July 1997].

6.3 An A5 sized 'cab card', with a photo of *V nigrum* and a brief description of the significance of the plant will be produced and distributed to verge cutting contractors [Divisional Surveyors, April 1997].

6.4 Advice will be given to farmers and landowners with existing or potential sites for *V nigrum* [Countryside Services, FWAG, ADAS].

7 Monitoring

7.1 Annual counts of larvae and foodplant should take place at the following sites:

SSSIs

- Homefield Wood [*BBONT*]
- Swain's Wood [*BBONT*]
- Lodge Hill [*Countryside Services*].

Highway Land [Countryside Services]

- A4010
- A40 West Wycombe
- London Road, Great Missenden SP 902001
- Hampden Road, Hughenden Valley SP863983-4.

1996 Sites with > 50 larvae [Countryside Services]

- Piddington verge and allotments SU 813941 (145 larvae)
- Fingest - two fields at SU 774910 (178).

Potential Sites

- Pasture, Sprig's Alley SU 765980 - c 2,000 *V nigrum* [Alan Showler]
- Shardeloes SU 946982 - 170 *V nigrum* [Countryside Services]
- Bacombe Hill SU 859069/861071 - 40 *V nigrum* [Countryside Services]
- Little Stocking Wood SU 852979 - 100 *V nigrum* [Alan Showler]
- Wendover bypass - *V nigrum* seed to be introduced to suitable locations in 1997/98 [Butterfly Conservation UTB who have already agreed to monitor butterfly colonisation of the bypass].

7.2 The annual counts will be co-ordinated by Countryside Services with reminders and a standard recording form sent out each July.

7.3 A repeat of the 1996 survey, which can be considered the baseline, should be undertaken in 2001 and every five years thereafter [Countryside Services to co-ordinate].

8 Further research and promotion

8.1 Quantify the importance of sites away from road verges through initiating further surveys on farmland and woodland habitats [Countryside Services].

8.2 Attempt to discover more about the phenology of *V nigrum* and its use by *S lychnitis* in order to fine-tune management prescriptions.

8.3 Establish if the distribution of *S lychnitis* extends further north or east in Buckinghamshire. St Mary's, Wendover is currently the most northerly site but *V nigrum* occurs on the Chilterns through to the Hertfordshire border and at least two sites in north Buckinghamshire [Countryside Services & moth recorders].

8.4 Provide copies of the Action Plan to relevant organisations in neighbouring counties (Berkshire, Oxfordshire and Hertfordshire), and other key counties (Hampshire and West Sussex) to encourage them to undertake similar surveys and plans [Countryside Services, 1997].

9 Review

9.1 A review of the Action Plan should be undertaken every five years or when relevant new information and targets come to light, including from the national level.

10 Organisations

ADAS - Agricultural Development Advisory Service.

BBONT - Berks, Bucks & Oxon Naturalists Trust; now the *Berks, Bucks & Oxon Wildlife Trust*.

Countryside Services - Strategic Initiatives Team within the Environmental Services Department of Bucks County Council.

Divisional Surveyor - Bucks County Council Environmental Services Department.

FWAG - Farming & Wildlife Advisory Group.

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Appendix 1

Habitat	No of Sites Surveyed	No of Sites with Larvae	Total No of Larvae	No of Plants Examined[4]
Road verges	57	33	443	839
Set-aside fields and field margins	7	7	394	1,384
Permanent pasture including Chalk grassland	13	9	99	170
Woodland rides, clearings and new plantings	6	4	120	768
Churchyards	5	4	16	80
Total	**88**	**57**	**1,072**	**3,241**

Table 1. 1996 Striped Lychnis survey in Buckinghamshire.

[4] On sites where larvae found.

Appendix 2

Striped Lychnis *Shargacucullia lychnitis* Survey in Buckinghamshire 1996

Date	Location	Grid Ref	No *V nigrum*	No Larvae	Comments	Recorder
		SU 89				
12/8	Piddington	813941	150	145	Area of rank grassland, allotments, planted broadleaved trees. Most larvae (94) in grassland west of allotments and close to A40. Area of tree planting at eastern end recently strimmed.	CD/JH
"	A40 W Wycombe, north verge	819942-826946	40	6	Four larvae transferred onto southern verge to avoid trenching work.	"
"	Old Dashwood Hill (Old Oxford Road), south verge	803946	30	1		"
"	Old Dashwood Hill, recent plantation	803945	100+	22	Whole field planted with broadleaved trees within the last two years. *V nigrum* around the margins but also inbetween the trees.	"
"	A4010 West Wycombe	833953-7	30+	10	Verge and ditch tightly mown, few remaining flowers.	MA/PH
"	Railway embankment adj A4010	830958	50+	3	In rank grassland.	"
"	A4010, west verge	829962-826965	50+	64	Larvae on 19 plants.	"
"	A4010, east verge	824970-815979	50+	45	Larvae on 21 plants, some recently mown.	"
/9	A4010 Saunderton (Haw Lane)	810987	?	?		EB
8/8	Cryers Hill, Hughenden Valley	870968	500	200+	Arable field, not currently cropped, with earthworks present for a water pipeline to be laid.	AS
"	Bryant's Bottom Road, Hughenden Valley	863982	30	12		AS/PH
10/8	Slough Hill	809980	1	2		AS/CD
12/8	Slough Lane, east verge	818958	8	4		CD/JH
"	Slough Lane verge	812979	7	3	Top of bank on the inside bend of the road.	"
"	Slough Lane verge (west)	814963	1	1		"
"	Set aside field margin, Butler's Hangings	817963	60+	2	Flower-rich margin, most *V nigrum* in the SE corner of the field.	CD/JH/ AS
12/8	Set aside (whole field), Smalldean Lane	818987	15	7		CD/JH
"	Churchyard, W Wycombe Hill	827949	25	2		MA

"	W Wycombe Hill	827950	30	6	Track to mausoleum.	"
14/8	Prestwood LNR	867992	3	2	Just above car park.	PH/JH
"	Hampden Road, Hughenden Valley	863983-4	30	53	West verge north of Upper Warren Farm. Verge and ditch c 15 m wide. Some plants and larvae on edge of carriageway - larvae moved.	"
"	Bryant's Bottom Road, Hughenden Valley	862982	3	12		"
"	Warrendene Road, Hughenden Valley	862977	83	8	10-15 m wide verge plus ditch. Most plants in ditch or top of it. Larvae on just six plants.	"
"	Longrove Plantations, Hughenden Valley	863976	200	5	Area of replanted woodland.	"
"	Clappins Lane, Walter's Ash	846982	1	1	Opposite entrance to Cournswood House.	"
"	Woodland south of Clappins Lane	849983	18	1	Along forest ride. Chiltern Woodland Project involved in management.	"
"	Clappins Lane-Speen Road junction	850986	1	1		"
"	*Little Stocking Wood*	*852979*	*100*	*0*		"
"	*Hampden Road-Perks Lane*	*866990*	*3*	*0*		"
12/8	*Smalldean Lane*	*820988*	*10*	*0*		*CD/JH*
"	*Smalldean Lane*	*815981-823990*	*50+*	*0*	*Plants scattered along most of the verge mainly in the base of the hedge so not suitable?*	*"*
"	*Bradenham, off Smalldean Lane*	*824990*	*30+*	*0*	*Grassland above NT car park.*	*"*
/9	*Hughenden Valley road - Millfield Bank*	*867955*	*20*	*0*		*MA*
		SU79				
12/8	Bottom Road, Radnage	796971	8	2	Along field margin just beyond the verge.	CD/JH
"	Bennett End, Radnage	782972	3	5	Plants in a driveway.	PH
"	Fingest Church	777911	10	4		"
"	Fingest	774910	500+	178	In two fields north of the Fingest-Turville Road.	"
"	Radnage Church	787979	30+	9	Mainly around boundary wall.	MA
12/8	Pasture opposite Radnage Church	785979	3	30	Larvae all on one clump. Fifteen re-located to churchyard.	MA
13/8	Swain's Wood SSSI	7391	50	7	Larvae on five plants. Most of rest grazed by deer?	PH
13/8	South of Ibstone	758920	18	2	Recently cut. Good site in 1991.	"
12/8	*Fingest road verge*	*778911*	*2*	*0*		"
"	*Freith*	*794902*	*2*	*0*	*Base of road sign, rest of area cut.*	"

"	*Turville Hill and footpath*	*774911*	*10+*	*0*		"
"	*Sprig's Alley*	*765980*	*2000+*	*0*	*All plants have been completely stripped by sheep, only basal rosettes remaining.*	*MA/CD/ PH/JH*
"	*Wiggan's Lane*	*784997*	*2*	*0*	*West verge, foot of bank.*	"
"	*Bottom Road, Radnage*	*796971*	*1*	*0*		*CD/JH*
		SP70				
13/8	Lodge Hill SSSI	791001	50+	7	South-facing slope. Most plant tops removed (grazing?).	PH
"	Lodge Hill SSSI	793003	30	8	North-facing slope. Larvae on seven plants.	"
12/8	*Wiggan's Lane*	*783003 and 784005*	*6*	*0?*	*Plants missed during survey - in adjacent field, not on road verge.*	*CD/JH*
"	*Shimwell's Farm*	*783001*	*6*	*0*		"
		SU88				
4/8	Homefield Wood	813867	400	86	Along surfaced track, except one larvae in the orchid meadow.	MH
12/8	Bockmer End	813862	2	2	Road verge.	MA
12/8	Mundaydean Lane	842874	5	2	Road verge.	MA
"	"	829879	8	5	Road verge.	"
"	"	827880	7	6	Edge of track.	"
16/8	South of Sentry Hill, Marlow	834852	50+	5	Many plants mown previously, only just flowering. Larvae found on three seeding plants. Field is on edge of golf fairway.	"
?/9	Sheepridge NR, Well End (and Sheepridge Lane)	883885	40	20	Site owned by the Parish Council, managed by WUWG.	BH/EB
12/8	*Hook's Farm, Marlow*	*828859*	*Few*	*0*	*Road verge.*	*MA*
12/8	*Hook's Farm, Marlow*	*830858*	*Few*	*0*	*Road verge.*	*"*
12/8	*Sentry Hill, Marlow*	*835855*	*12*	*0*	*Horse-grazed pasture which previously had S lychnitis. BCC owned site - tenant sympathetic to nature conservation*.	*"*
"	*Road verge, Chisborough Cross*	*816890*	*5*	*0*	*Growing on bank on the inside of the bend*	*CD/JH*
		SU78				
15/8	Hambleden Valley, C87 verge	781871	2	6	Plants on both sides.	CD/PH
"	"	785856-8	3	1	"	"
"	"	777887	4	1	East side.	"
"	"	775894	15	2	Most plants mown.	"
"	"	776897	18	8	Plants on verge, garden fringe and field edge.	"

"	Skirmett	776898	20	11	In orchard/nettle bank close to the road.	"
"	Hambleden Valley	774888	300	3	Set-aside field.	"
"	Hambleden Valley, Dudley Lane	775888	150	6	Evidence of other larvae.	"
"	Hambleden Valley	778885	40	20	Including four on *V x semiabum* (hybrid *V nigrum* and *V thapsus*). Rough, fenced-off field corner.	"
"	"	775895	1	2	On footpath.	"
"	A4155	768854	2	7		"
12/7	A4155 Medmenham	799846	?	4	South verge by Westfield cottages.	MA
"	*Hambleden Valley C87*	*777887*	*2*	*0*	*By the junction.*	CD/PH
"	"	*780880*	*3*	*0*		"
15/8	"	*783866*	*1*	*0*		"
"	*Hambleden*	*784866*	*3*	*0*		"
"	*Dudley Lane, Hambleden Valley*	*781888*	*14*	*0*		"
		SP80				
1/9	St Mary the Virgin, Wendover	871073	15	1	Small area of uncut grassland within the graveyard.	JH
15/8	*Bacombe Hill*	*859069 861071*	*40*	*0*	*Mostly young rosettes. 10-15 flowering this year.*	*AM*
12/8	*Pink Road, Loosley Row*	*820012*	*2*	*0*		*PH*
"	*Rignall Road, Gt.Missenden*	*878021*	*1*	*0*		*"*
		SP90				
14/8	London Road, Great Missenden	902001	15	3	East verge, 100 m south of Nags Head PHD.	PH/JH
"	*A413 Missenden bypass*	*900008-902005*	*30*	*0*	*Mainly on east verge.*	"
"	*Nags Head Lane-London Road, Gt Missenden*	*902002*	*10*	*0*	*Plants in ditch, some strimmed.*	"
		SU99				
12/8	Holtspur Bank LNR	918904	4	1		PH
1/8	*A413 Great Missenden*	*905998*	*10*	*0*	*Junction to Missenden. Just inside recently cut sight line.*	*PH/JH*
"	*Shardeloes*	*946982*	*170*	*0*	*Minor road off A413. Plants along verge, by the R Misbourne and amongst tree/shrub planting.*	"
"	*A413 Amersham bypass*	*951974-953967*	*60*	*0*	*Frass and characteristic feeding damage on one plant.*	"
"	*A404 Amersham*	*953966*	*24*	*0*		"

		SP93				
16/8	*Great Brickhill*	*910302*	*3*	*0*	*Plants in horse-grazed pasture. Only just flowering.*	*JH*

Recorders

MA - Martin Albertini	JH - Jeremy Halls	AS - Alan Showler
CD - Chris Damant	MH - Martin Harvey	EB - Eric Britnell
PH - Peter Hall	AM - Andy McVeigh	BH - Bill Havers

Plant records also provided by Mike Jennings, Emma Lansdell, Roy Maycock, Jeremy Page and Corinna Woodall.