

# Scrub clearance and soil disturbance increases bee orchid *Ophrys apifera* frequency in calcareous grassland at Norton Heath roadside verge, Essex, England

Tim Gardiner<sup>1</sup> & Andrew Vaughan<sup>2</sup>

<sup>1</sup> 2 Beech Road, Rivenhall, Witham, Essex CM8 3PF, UK; [tg@writtle.ac.uk](mailto:tg@writtle.ac.uk)

<sup>2</sup> Epping Forest Countrycare, Epping Forest District Council, Civic Offices, High Street, Epping, Essex CM16 4BZ, UK; [avaughan@eppingforestdc.gov.uk](mailto:avaughan@eppingforestdc.gov.uk)

## SUMMARY

Scrub clearance was undertaken on calcareous grassland along a roadside verge at Norton Heath in Essex. The site was fenced to prevent grazing by rabbits *Oryctolagus cuniculus*. After scrub clearance, the number of bee orchid *Ophrys apifera* basal leaf rosettes was counted in a 3 x 3 m area where the soil was disturbed by turning over manually with a fork, and in an adjacent control which had no soil disturbance. A total of 29 basal rosettes of *O.apifera* were noted in the disturbed area in the first spring after clearance, contrasting with only seven rosettes in the undisturbed control plot. These results suggest that it may therefore be beneficial to create scrapes to encourage the establishment of *O.apifera* and also a range of other calcareous grassland plants.

## BACKGROUND

The bee orchid *Ophrys apifera* has a widespread distribution in the county of Essex (south-east England) but as elsewhere, is uncertain and sporadic in its occurrence (Jermyn 1974). Disturbed calcareous grassland is one of its main habitats and particularly good colonies can exist on new roadside cuttings. This orchid is more commonly recorded on soils with a high pH ( $\geq 7$ ), historically, north-west Essex has been its stronghold due to the prevalence of chalky boulder clay (Jermyn 1974). A large colony of *O.apifera* has been recorded on a roadside verge at Norton Heath in central Essex. The verge is a linear strip running east to west, approximately 20 m wide x 170 m long, with an earth mound at either end. This site is protected from rabbit *Oryctolagus cuniculus* grazing by a wire mesh fence, and was primarily established for the reintroduction of sickle-leaved hare's-ear *Bupleurum falcatum* subsp. *falcatum* (an endangered species in the

UK) on exposed calcareous substrate within the fenced area (Adams 2001). However, in recent years, in part due to the prevention of rabbit grazing, the western bank of the verge has become scrubbed over leading to a reduction in floristic diversity and the loss of *O.apifera* from the west mound.

This paper documents the appearance of *O.apifera* and other vascular plants in relation to scrub clearance and a small-scale soil disturbance experiment.

## ACTION

**Norton Heath roadside verge:** This roadside verge reserve (Ordnance Survey grid ref: TL 610045) was established in 1985/6 on the north side of the A414 main road (Ongar to Writtle section), primarily to provide bare calcareous substrate for the reintroduction of *B.falcatum* in 1988 (Adams 2001). Two earth mounds (c. 1.5 m in height) were established

at each end of the verge using locally sourced chalky soil, and the whole area was enclosed by a rabbit proof fence to prevent grazing having a detrimental impact on *B.falcatum*. However, due to the absence of active management (e.g. cutting) and rabbit grazing on the western mound, scrub had encroached. The soil type of the site is boulder clay with a high pH (8). Plenty of exposed calcareous substrate was present on the mound before scrub encroached.

**Scrub clearance and soil disturbance:** Scrub (mainly saplings of dogwood *Cornus sanguinea* and hawthorn *Crataegus monogyna*) was cleared using brushcutters over a 250 m<sup>2</sup> area of the western bank in October 2007 by Epping Forest Countrycare (EFCC) and volunteers. All cut material was collected and removed from the bank. After this clearance, soil in a 3 x 3 m area on top of the bank (south-facing) was turned over manually with a fork (Fig. 1) in September 2008 to see if this would enhance re-establishment of calcareous grassland flora. An adjacent 3 x 3 m plot with no soil disturbance was established as a control.



**Figure 1.** The disturbed soil plot (3 x 3 m) at Norton Heath eight months after turning of the soil, May 2009 (photo: Tim Gardiner).

**Orchid counts:** Counts of the number of *O.apifera* basal leaf rosettes were made in both 3 x 3 m plots on 12 May 2009. No *O.apifera* plants were recorded on the bank before scrub clearance occurred. Other plant species present in the plots were recorded but no estimation was made of their abundance.

## CONSEQUENCES

A total of 29 *O.apifera* basal leaf rosettes (density of 3.2 plants/m<sup>2</sup>) were counted in the

area where scrub clearance and soil disturbance was conducted in comparison with only seven rosettes (0.8 plants/m<sup>2</sup>) in the plot where the soil was left undisturbed after scrub clearance. The species richness of other vascular plants was also higher in the plot with disturbed soil (15 species) compared to the undisturbed plot (10 species) (Table 1). There were several indicators of calcareous soil, including traveller's joy *Clematis vitalba* and hairy St. John's-wort *Hypericum hirsutum*.

The locally common, slender groundhopper *Tetrix subulata* was recorded in the disturbed plot in spring 2009 but was not observed in the undisturbed plot; this orthopteran is characteristic of habitat with plentiful bare earth and may benefit from soil disturbance management that seeks to enhance floristic diversity.

**Discussion:** Norton Heath roadside verge is protected from rabbit grazing (and associated disturbance) by a rabbit proof fence, thus the most practical option for encouraging the establishment of a varied calcareous flora including *O.apifera* was considered to be to disturb and expose bare soil.

It would seem that *O.apifera* responded very quickly to the soil disturbance treatment with 29 plants being recorded in the first spring after turning of the soil, in comparison with the undisturbed plot which held seven plants. Due to the small-scale nature of the experiment (only one treatment plot and one control plot) it could be argued that this may simply be a result of chance; however it is often noted that *O.apifera* responds well to disturbance of the soil (Jermyn 1974), and our study suggests that the combination of scrub clearance followed up by small-scale soil disturbance enhanced the establishment of this orchid on the calcareous grassland. Soil disturbance also appeared beneficial to a range of other calcareous grassland plants, as well as several declining arable weeds such as field madder *Sherardia arvensis* (found outside of the study plots in a scrub cleared area).

## ACKNOWLEDGEMENTS

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**Table 1.** Vascular plant species recorded in the two 3 x 3 m plots at Norton Heath roadside verge in May 2009 (X indicates presence).

Plant species	Treatment	
	Disturbed plot	Undisturbed plot
Bramble	X	X
<i>Rubus fruticosus</i> agg.		
Bristly ox-tongue	X	
<i>Picris echioides</i>		
Common horsetail	X	X
<i>Equisetum arvense</i>		
Common vetch	X	
<i>Vicia sativa</i>		
Creeping cinquefoil	X	X
<i>Potentilla reptans</i>		
Creeping thistle	X	
<i>Cirsium arvense</i>		
Dandelion	X	X
<i>Taraxacum officinale</i> agg.		
Dogwood	X	X
<i>Cornus sanguinea</i>		
Hairy St. John's-wort	X	
<i>Hypericum hirsutum</i>		
Hawthorn	X	
<i>Crataegus monogyna</i>		
Pendulous sedge	X	X
<i>Carex pendula</i>		
Common ragwort		X
<i>Senecio jacobaea</i>		
Red fescue	X	X
<i>Festuca rubra</i>		
Ribwort plantain	X	
<i>Plantago lanceolata</i>		
Spear thistle	X	X
<i>Cirsium vulgare</i>		
Traveller's joy	X	X
<i>Clematis vitalba</i>		
<b>Total</b>	<b>15</b>	<b>10</b>

## REFERENCES

- Adams K. (2001) Notes on Essex specialities. 5: Sickle-leaved hare's-ear *Bupleurum falcatum* L. subsp. *falcatum*. *Essex Naturalist (New Series)* **18**, 157-160.
- Jermyn S.T. (1974) *Flora of Essex*. Essex Naturalists' Trust, Colchester, UK.

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