

Creation of patches of bare ground to enhance the habitat of ground-nesting bees and wasps at Shotover Hill, Oxfordshire, England

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SUMMARY

Four shallow bays, each about 3 x 5 m, with a rear vertical face of 30 cm, were dug to attract ground-nesting bees and wasps. All four bays were colonised in the first year and 80 solitary bee and wasp species have been recorded to date (2004). Two scarce heathland mosses also colonised the site and the bays were frequently used by common lizards *Lacerta vivipara* for basking

BACKGROUND

Shotover Hill, 5 km to the east of the city of Oxford, rises steeply to a height of 171 m above sea level. About 20% of Shotover Hill is protected as a Site of Special Scientific Interest (SSSI) and the remaining 80% is in private ownership. Up until the 1940s Shotover Hill was an area of extensively grazed heath with sparse heather *Calluna vulgaris* cover. At this time the sunny, south-facing slopes were known to be very rich in solitary bees and wasps (aculeate Hymenoptera). Subsequently, a dramatic decline in stock grazing resulted in scrub and woodland colonising much of the former open heathland.

Recent surveys indicated that Shotover still supported a diverse solitary bee and wasp fauna (161 species). However, there has been a shift from predominantly soil-nesting to aerial (above ground) nesting species since the 1940s (Wright and Gregory, *in press*). This is attributed to the loss of the open heathland. The botanical interest of the remaining areas of

open acid grassland is maintained by mowing. It was apparent that sandy ground at the edges of eroded tracks was a favoured, yet vulnerable, nest location for many of the soil-nesting bees and wasps at this site. It was therefore decided to artificially create some structured patches of open ground in an attempt to enhance and extend the nesting habitat for these species.

ACTION

Creation of open ground: Four shallow 'bays' were excavated to increase the area of bare ground within the SSSI. The bays were located in two contrasting habitats; a remnant area of about half a hectare of heathland and a recently cleared area of hawthorn *Crataegus monogyna* scrub. They were dug in January 2001 (remnant heath) and January 2002 (cleared scrub), each in just a few hours, by the Oxford Conservation Volunteers. Prior to this work the extent and structural diversity of bare ground suitable for soil-nesting bees and wasps

Table 1. Number of solitary bee & solitary wasp species using cleared areas, Shotover Hill, Oxfordshire (2002-2004) (from Gregory & Wright 2005).

Nesting type	Number of solitary bee and solitary wasp species		
	Remnant heath	Cleared scrub	Both habitats combined
Soil nester	25	42	46
Parasite of soil nesters	13	15	21
Aerial nester	0	12	12
Parasite of aerial nesters	0	1	1

Table 2. Species of solitary bee and solitary wasp recorded nesting in the cleared areas, Shotover Hill, Oxfordshire (2002-2004).

SPECIES	Remnant heath	Cleared scrub
Soil nesting species		
<i>Priocnemis parvula</i>		4
<i>Priocnemis fennica</i>		4
<i>Priocnemis hyalinata</i>		4
<i>Priocnemis gracilis</i>		4
<i>Priocnemis schioedtei</i>		4
<i>Caliadurgus fasciatellus</i>		4
<i>Arachnospila anceps</i>		4
<i>Tachysphex pompiliformis</i>	4	
<i>Crossocerus ovalis</i>		4
<i>Crossocerus pusillus</i>		4
<i>Crossocerus quadrimaculatus</i>	4	4
<i>Lindeni panzeri</i>		4
<i>Lindeni albilabris</i>	4	4
<i>Entomognathus brevis</i>		4
<i>Oxybelus uniglumis</i>	4	
<i>Mellinus arvensis</i>	4	4
<i>Cerceris rybyensis</i>	4	4
<i>Colletes succinctus</i>	4	
<i>Andrena haemorrhoa</i>		4
<i>Andrena flavipes</i>		4
<i>Andrena nitida</i>	4	4
<i>Andrena nigroaenea</i>	4	4
<i>Andrena bicolor</i>	4	4
<i>Andrena helvola</i>		4
<i>Andrena clarkella</i>		4
<i>Andrena barbilabris</i>		4
<i>Andrena humilis</i>	4	4
<i>Andrena chrysoseles</i>	4	
<i>Andrena minutula</i>	4	4
<i>Andrena subopaca</i>	4	4
<i>Andrena ovatula</i>	4	4
<i>Andrena wilkella</i>		4
<i>Andrena dorsata</i>	4	4
<i>Halictus rubicundus</i>		4
<i>Halictus tumulorum</i>	4	4
<i>Lasioglossum leucozonium</i>	4	4
<i>Lasioglossum calceatum</i>	4	4
<i>Lasioglossum malachurus</i>		4
<i>Lasioglossum fulvicorne</i>		4
<i>Lasioglossum villosulum</i>	4	4
<i>Lasioglossum punctatissimum</i>	4	4
<i>Lasioglossum minutissimum</i>	4	4
<i>Lasioglossum parvulum</i>	4	4
<i>Lasioglossum rufitarse</i>	4	4
<i>Lasioglossum morio</i>	4	4
<i>Lasioglossum leucopum</i>		4
Parasites of soil nesting species		
<i>Hedychridium roseum</i>	4	
<i>Hedychridium ardens</i>	4	
<i>Trichrysis cyanea</i>		4
<i>Myrmosa atra</i>		4
<i>Evagetes crassicornis</i>		4
<i>Nysson spinosus</i>		4

Table 2. contd.

SPECIES	Remnant heath	Cleared scrub
<i>Nysson dimidiatus</i>		4
<i>Sphecodes reticulatus</i>	4	
<i>Sphecodes monilicomis</i>	4	4
<i>Sphecodes pellucidus</i>	4	4
<i>Sphecodes ephippius</i>	4	4
<i>Sphecodes niger</i>	4	4
<i>Sphecodes puncticeps</i>	4	4
<i>Sphecodes crassus</i>	4	
<i>Sphecodes geoffrellus</i>		4
<i>Nomada integra</i>	4	4
<i>Nomada goodeniana</i>	4	
<i>Nomada fabriciana</i>		4
<i>Nomada flavoguttata</i>	4	4
<i>Epeolus cruciger</i>	4	
Aerial nesting species		
<i>Trypoxylon attenuatum</i>		4
<i>Crossocerus megacephalus</i>		4
<i>Rhopalum clavipes</i>		4
<i>Psenulus pallipes</i>		4
<i>Pemphredon lugubris</i>		4
<i>Passaloecus insignis</i>		4
<i>Passaloecus singularis</i>		4
<i>Spilomena curruca</i>		4
<i>Hylaeus annularis</i>		4
<i>Osmia rufa</i>		4
<i>Hoplitis spinulosa</i>		4
<i>Megachile ligniseca</i>		4
Parasites of aerial nesting species		
<i>Chrysis impressa</i>		4

was mostly limited to path edges. The bays were dug into gently sloping ground using spades, to leave a bare area of up to 3 x 5 m, with a vertical face reaching about 30 cm along the back edge.

CONSEQUENCES

Colonisation of bays by bees & wasps:

Within the first year all four bays were rapidly colonised and to date (2004) 80 solitary bee and wasp species have been recorded (Table 1). Of these, 28% are parasites of other bees and wasps which is deemed to indicate a healthy community. A complete list of solitary bee and wasp species recorded using the bays to date is given in Table 2. Prior to the creation of the bays the area of remnant heath would already have had a reasonable diversity of bees and wasps characteristic of this habitat. In contrast to this, the hawthorn scrub had a closed canopy with minimal ground flora, and the diversity of aculeate hymenoptera would have been very low indeed.

Future management: After excavation the bays are left unmanaged and are allowed to colonise naturally with plants and animals. As each bay becomes vegetated the intention is to excavate another nearby to create a long term continuity of this early successional habitat.

Other than the targeted bees and wasps, two locally scarce heathland mosses (*Polytricum piliferum* and *Pleuridium acuminatum*) have benefited directly from creation of the bays. The latter ephemeral species is currently only known on Shotover Hill at the 'cleared scrub' (former hawthorn-dominated area) bay. The bays were also popular basking spots for viviparous lizard *Lacerta (Zootoca) vivipara* and invertebrates, such as robber flies (Asilidae).

Conclusions: The bays are quick and easy to construct and are therefore considered to offer a very practical management option offering major benefits to both targeted and non-targeted fauna and flora which benefit from early successional habitats.

REFERENCES

Wright I.R. & Gregory S.J. (In press) The aculeate Hymenoptera of Shotover Hill, Oxfordshire. *The British Journal of Entomology and Natural History*, (in press)

Gregory S. J. & Wright I.R. (2005) Habitat Management News: Creation of patches of open bare ground to enhance the habitat of ground-nesting bees & wasps. *British Wildlife*, 16, 408-409.

For published article subsequent to this case study see: Wright I.R. & Gregory S.J. (2006) *The aculeate Hymenoptera of Shotover Hill, Oxfordshire*. *The British Journal of Entomology and Natural History*, 19, 65-76.

For further information about Shotover and its wildlife see: <http://www.shotover-wildlife.org.uk/>