

HAREHOPE QUARRY BEE SURVEY REPORT

APRIL 2018 TO JULY 2019



Female Leafcutter Bee, *Megachille*. bringing leaves back to the nest, completed cell below.

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INTRODUCTION

Harehope Quarry is a former limestone quarry in Weardale, Co. Durham. The site is located about 1 Km south east of Frosterley centred on grid reference NZ0355 3632. The quarry is a Local Wildlife Site with areas of wet woodland, species-rich limestone grassland, ponds and river habitats. The site is renowned for its exposures of Frosterley Marble as well as characteristic features of limestone geology. The site is managed to promote biodiversity, provide some permissive access and encourage outdoor learning through educational visits, courses and events.

This survey has been carried out by an amateur entomologist who was introduced to solitary bees by the North Pennines AONB partnership project, Cold blooded and Spineless. This survey was carried out on behalf of this project which is a five-year Heritage Lottery funded initiative running until late 2019 with the aim to record and celebrate invertebrates in the North Pennines AONB.

METHODS

The focus of this study is bees, both bumble bees, *Bombus* and solitary bee species, though other invertebrate species, wasps, hoverflies and butterflies etc have also been recorded and identified as time and expertise allowed.

On three occasions in June 2018, July 2019 and August 2018 pan traps were used at 5 locations across the site. The same locations were used at each visit. These locations focused on open flower rich habitat near the quarry. Each of the 5 pan trap stations had 3 traps, one yellow, one blue and one white. Pan traps are painted with special UV paint, half filled with water and a drop of detergent and placed on the ground in short open vegetation. Trapping was only carried out when weather conditions (see table 1) were suitable for foraging bees. The traps were left for at least 8 hours from around 10 am to 6 pm, then collected in.

Records from pan trapping were supplemented by visual observations and catches from hand netting during the three trapping days along with three additional visits to catch and record. Visits to site covered the period from the 20th April to the 11th August with one or two visits per month. The timings of survey was aimed at recording as full a sweep of species as possible covering early spring species, summer and late summer species which are present as their different pollen plants are in flower.

RESULTS

Appendix 1 provides all species data collected for the site across the recording period, May to August 2018 and April to July 2019. A number of groups including flies *diptera* may be identified at a later date and added to this report.

In total 27 bee species were recorded plus a possible 28th species.

Nine species of bumble bee were observed, the widespread 'Big 7' Red tailed, *Bombus lapidarius*, Early, *Bombus pratorum*, Common carder, *Bombus pascorum*, White-tailed, *Bombus lucorum*, Buff-tailed, *Bombus terrestris*, Garden, *Bombus hortorum* and Tree bee, *Bombus hypnorum*. In addition to these the locally scarce species Bilberry bee, *Bombus monticola* was also recorded on site along with a species of cuckoo bumblebee, the Gypsy cuckoo, *Bombus bohemicus*.

Eighteen species of solitary bee were seen with this comprised of the following number of species per genera:

4 *Andrena*

2 *Halictus*

1 *hylaeus*

5 *lasioglossum*

3 *Nomada* (possibly four see Appendix 1)

1 *Sphcodes*

2 *Megachile*

In addition to this 16 butterfly species were recorded, 8 hoverflies were identified to species as were small numbers from other groups, though none of these groups were systematically recorded.

DISCUSSION

This survey has produced data on invertebrate species found at Harehope quarry, where previously next to no data existed. The survey effort has been restricted due to the time available to collect and identify specimens. It is hoped that collection will continue, and the species list will continue to grow.

A number of *Andrena* species found relatively frequently in the north have not yet been recorded on site, species such as *Andrena cineraria*, *A. clarkella*, *A. fulva*, *A.*

nigroanea, and *A. ruficrus*. These may simply have been missed on site as large numbers of bees were not observed on site and hand netting can miss many of them especially when densities are low. The timing and number of surveys may have missed these species especially early species such as *A. ruficrus* which can be out from late February.

A number of species in other groups are likely to be present on site and with time and further survey the species list is likely to increase. Additional *Nomada* species (e.g. *N. goodeniana* & *N. leucophthalma*), *lasioglossum* species such as *L. calceatum*, additional *Sphecodes* species and more cuckoo bee species (e.g. *Bombus vestalis* often seen in the north). Earlier visits through late Feb to mid-April (not yet covered by survey) and more time on site will no doubt produce a fuller species list.

Though a number of species expected to be here are as yet unrecorded there are also a number of interesting records for the site. *Bombus monticolor* and *Andrena lapponica* are both upland species of limited distribution in the UK which have been recorded here. These bees are often associated with bilberry, *Vaccinium Mytilus*, which is not present on site, but is likely to be in the local area.

A number of species found on site are either at the northern edge of their range or have been infrequently recorded in this area. *Lasioglossum villosum*, though common in the south becomes rarer in the north. *L. smeathmanellum* is also commoner in the south being replaced as you move north and into upland areas by *L. cupromicans*. Here we have both species. Similarly, *Megachile versicolor* is at the north eastern end of its range here with no previous records for this area. *M. willughbiella* which extend up to northern Scotland has few records for this part of the country with it being commoner in the south.

The table below shows the known parasite /host associations (based on S. Falks 2015) between species recorded on site and parasites and host species which are known to occur in the north of England. If a parasitic bee was found to be present but none of the known host species recorded this would indicate either an unknown host was being used or that the known host not yet recorded is likely to be present. No parasitic bees recorded on site are without possible host species so far recorded on site.

Harehope Quarry is considered to hold a wide diversity of flowering plants which provide forage for bees from spring with willows and gorse through the summer with flower rich meadows and into early autumn. What it does lack however is loose soils in the form of sandy substrates or similar which could support large aggregations of nesting bees. Only very small number of nesting holes were observed at the base of the quarry, most of the quarry sides are solid rock, with low suitability for nesting bees.

Bee Species recorded on site	Known Parasites In bold if recorded on site	Host species
Andrena chrysoseles	N.fabricianus	NA
Andrena haemorrhoa	N. ruficornis	NA
Andrena lapponica	N. panzer (prob here)	NA
Andrena scotica	N. flava, N. marshamella	NA
Halictus rubicundus	Sphecodies gibbus, S. monilicornis	NA
Halictus tumulorum	S. geoffrellus	NA
Hylaeus hyalinatus	unknown	NA
Lasioglossum albipes	S.monilicornis	NA
Lasioglossum cupromicans	S. geoffrellus	NA
Lasioglossum leucopus	Poss. S. geoffrellus	NA
Lasioglossum smeathmanellum	unknown	NA
Lasioglossum villosum	S.geoffrellus	NA
Megachile Willughby's	unknown	NA
Megachile versicolor	unknown	NA
Nomada flava	NA	Andrena scotica, A.nigroaenea
Nomada panzer	NA	Andrena fucata, A.fulva, A. lapponica
Nomada ruficornis	NA	Andrena haemorhoa
Nomada marshamella	NA	Andrena scotica
Sphecodes monilicornis	NA	Halictus rubicundus, Lasioglossum calceatum, L.albipes

CONCLUSIONS

As discussed the number of species so far recoded at site 27-28 bees is expected to be augmented with more survey work, particularly if the early spring period is covered.

This study has added to our understanding of bees in the local area as a number of species recorded here are either of restricted distribution, at the northern edge of their range or been recorded in what was a gap in their known distribution. Further survey will continue to increase our knowledge of invertebrates on this site. Work will continue to focus on bees with increasing attention given to wasps.

Appendix 1 Invertebrate data

	Net 20/4/19	Net/obs 19/5/18	Net/obs 23/5/19	Pan traps 5/6/18	Net/obs 5/6/18	pan trap 5/7/19	Net/obs 5/7/19	11/8/18 Pan traps	Net/obs 11/8/18
Temp			15-17	13	13			19	
Wind			3-4	2-3	2-3			2-3	
Cloud			50%	40%	40%			10-50%	
HYMENOPTERA									
Apis mellifera			P	2	2		Abundant		P
Bumble bees									
Bombus bohemicus							1 M		
Bombus hortorum								W2, Q1	
Bombus hypnorum			W many				W few		
Bombus leucorum	Q			Q3+	W		Q		
Bombus leucorum/terrestris							P	W5	
W indistinguishable white tailed agg			P					W4	
Bombus lapidarius			PW		Q		W many	W1	
Bombus monticolor					Q				
Bombus pascorum							W few	W1	
Bombus pratorum		P	PW				W many		
Bombus terrestris				Q			W&Q many	W5	P
Solitary bees									
Andrena chrysoceles				2F	F				
Andrena haemorrhoa		F	F1	F10, M2					P
Andrena lapponica			F1						

Andrena scotica			F3					
Halictus rubicundus							M1	
Halictus tumulorum					M1		F1	
Hylaeus hyalinatus				F1 & M4				
Lasioglossum albipes					M1			
Lasioglossum cupromicans							F1	
Lasioglossum leucopus			F1				F	
Lasioglossum smeathmanellum							F1	
Lasioglossum villosum							F1	
Megachile Willughby's							M	
Megachile versicolor							F	
Nomada flava F		P	1					P
Nomada flava/panzer M*		M2 +		M1				
Nomada ruficornis				F6				
Nomada marshamella		F2+	F1	F1 & M2	F2 +			P
Sphecodes monilicornis			F1					
Wasps								
Ectemnius continuus								F1
Mellinus arvensis								1
Pompilidae								1
Hymenoptera-wasps unidentified				11				
Saw flies								
Symphyta sp. No of individuals				4				
Rhogogaster sp. No of individuals							26	
Ant sp.				3			1	

Painted lady							Few		
Peacock	P		P						
Red admiral							2		
Ringlet							lots		
Small copper									3
Small heath							lots		1
Small skipper							Lots		
Wall									2
Coleoptera									
Cantheris rustica (soldier beetle)			1						
Pollen beetles				5				2+	
Hemiptera sp				4				4	

*It is often not possible to distinguish between *Nomada Flava* and *N. panzari* males

M=Males, F=Females, Q=Queens, P=Present not counted

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