

Hymettus

**A survey for the northern bees – Year 2
A further investigation for *B. muscorum* in
The Peak District**



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Cover photograph:
Bombus muscorum male by Mike Edwards

Summary

- 2008 saw a continuation of survey work initiated in 2007 of the Peak District National Park for a suite of 6 northern-biased aculeate hymenoptera.
- Nine areas were thoroughly surveyed in 2008 for the presence of principally *Bombus muscorum* though evidence of the five other species was also searched for.
- Of the six focal species, only one was recorded, *Andrena tarsata* from a site first visited in 2007.
- There was no positive evidence of any populations of *Bombus muscorum* in the Peak District. Reasons for this are not known, as there are large areas of uninterrupted moorland and associated foraging habitats perceived to be of suitable quality for *Bombus muscorum*.

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4. Survey sites and results

4.1 Swallow Moss (South-west Peak) SK068595

Survey dates: 20/06/08, 12/07/08, 16/08/08

This area of the Leek Moors SSSI is noted for its botanical diversity. There is ample vegetation structure and foraging through the spring and summer. However, after numerous visits over the two years (8 in total), no evidence of *B. muscorum* or the other northern bees could be found. It is a prosperous area for *B. monticola*.

4.2 Goyt's Moss (South-west Peak) SK015726

Survey date: 16/08/08

Another site previously visited in 2007 but thought worthy of a re-visit due to its vegetation diversity, structure and potential for *Andrena tarsata* (abundance of *Potentilla erecta*). On this occasion 2 female *A. tarsata* were recorded foraging from *P. erecta* along a roadside verge. There was no evidence of any of the other bee species.

4.3 Hope Forest – Birchin Clough (High Peak) SK113920

Survey date: 25/08/08

This is an area of open moorland with sheltered, deep cloughs with flower-rich slopes. This area was searched on a cool and windy day. Only a few bees of the *B. lucorum* complex species were observed.



Figure 1: Birchin Clough



Figure 2: Footpath leading up to open moorland and inset: solitary bee holes in footpath

On the footpath leading off the moor are areas of erosion and these areas contain an aggregation of nest holes. However, due to the poor weather, no solitary bee activity was observed and therefore species identification was not attained.

4.4 Leygatehead Moor – William Clough (High Peak) SK060893

Survey date: 25/08/08

A narrow clough on the western edge of the Peak District National Park, William Clough is an area surrounded by high moorland dominated by heather (*Calluna vulgaris*). The clough has increased diversity with tormentil, bell heather (*Erica cinerea*) and cat's-ear (*Hypochaeris radicata*). Numerous bumblebees (*B. lucorum* complex) were observed but no *B. muscorum* were found. There were no *B. monticola* but *Nomada fuscipes* was recorded from an area of bank slippage.

4.5 Motcar Fields and road verge (High Peak) SK225877

Survey Date: 22/08/08

An area of rush pasture and drainage ditch adjacent to a road. This species-rich ditch and surrounding marsh below drier, flower-rich slopes contained an abundance of nectar sources including bird's-foot trefoil (*Lotus corniculatus*). No evidence of the target species was recorded.



Figure 3: Motcar fields and road verge

4.6 Stanage Edge (High Peak) SK227865

Survey Date: 22/08/08

Stanage Edge is a ridge of granite running south to Burbage Moor (surveyed in 2007). The northern part of this ridge and surrounding moorland was searched with no positive results.



Figure 4: View from Stanage Edge

4.7 Broomhead Moor and Flint Hill (High Peak) SK217947

Survey Dates: 22/07/08, 22/08/08

This area is a large, open expanse of heather moorland on the eastern side of the Peak District. There were numerous solitary bee holes in the footpaths and eroded faces of peat though no bees were seen. *B. lucorum*, *B. monticola* and *B. pascorum* were observed foraging on the moor but no *B. muscorum* were seen.



Figure 5: Flint Hill

4.8 Flask Edge (SK285785)

Survey date: 25/08/08

An area of open moorland with birch scrub on the eastern edge of the Peak District. This area offers good foraging habitat (species-rich road verges and open moor) but no evidence could be found. *B. terrestris* was the only bumblebee observed on the moorland.

4.9 Swinehole's Wood, Staffordshire Wildlife Trust reserve (SK047505)

Survey Date: 25/08/08

This moorland and woodland site is located just outside the Peak District boundary but offers high quality moorland with good *Sphagnum* cover and flower-rich foraging. *B. monticola*, *B. terrestris* and *B. pascuorum* were recorded but there was no evidence of *B. muscorum*.



Figure 6: Swineholes Wood

5. Conclusions

After an intensive and extensive survey of most of the suitable locations (open moorland including upland rush pasture) in the Peak District there appear to be no populations of *B. muscorum*. If the bee is in this area it must be at such low densities that it is hard to find and therefore likely to be on the point of local extinction.

There are no obvious reasons for the lack of this species in the Peak District however numerous works have been undertaken on the genetics of *B. muscorum*, including work undertaken at the University of Southampton (Darvill *et al.*, 2006) on the inbreeding of *B. muscorum*. This work discusses the possible inbreeding of males and gynes from the same nest, thus reducing genetic variability. This could explain the decline in this species in many areas due to population isolation and the associated inbreeding that then occurs.

The Peak District however, is a very large, uninterrupted expanse of moorland with associated habitats including scrub, ruderals, species-rich road verges giving rise to ample foraging such as thistles, composites and, in certain areas, trefoils. The Leek Moors SSSI (SK05) in particular stands out as the most intact and diverse moorland with species-rich hay meadows off the moorland tops and very diverse roadside verges. Populations of *B. muscorum* in the Peak District would have access to suitable foraging over a very wide area and there is seemingly room for many nesting queens over this range and therefore enough mixing of genetics to retain viable populations. It is then possible that there are other factors affecting this species, at least in this area.

6. Acknowledgements

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7. References

Betts, C., Laffoley, D.D'A. and Cribb, P.W. (eds.) (1986) *The Hymenopterist's Handbook*. Hanworth: The Amateur Entomologists' Society.

Darvill, B., Ellis, J.S., Lye, G.C., and Goulson, D. 2006. Population structure and inbreeding in a rare and declining bumblebee, *Bombus muscorum* (Hymenoptera: Apidae). *Molecular Ecology*, 15: 601-11.

Jukes, A. (2007) *A survey for the northern bees focussing on: The Lancashire saltmarshes And The Peak District*. Unpublished report for Hymettus Ltd.