**Northern Colletes**

*Colletes floralis*

Northern Colletes is a solitary mining bee. About half the global population lives in the UK and Ireland[[1]](#footnote-1) where it is restricted to flower-rich coastal habitats such as machair and dunes. Once a relatively common sight throughout the higher-altitude agricultural lands of the UK, under-grazing, agricultural intensification and development has resulted in reduction and fragmentation of its habitat. The bee is listed on the UK Biodiversity Action Plan (BAP) list and is classified as rare.

Description

Northern Colletes is a medium sized bee, about the size of a five- pence piece. It is predominantly black in colour with tawny red hairs covering the top of the thorax and paler hairs on the face. There are narrow white bands on each segment of the abdomen. The females are slightly larger, glossier and darker than the males.

Distribution

This bee has a large but highly fragmented range encompassing herb-rich grasslands along the coasts of the United Kingdom, Ireland and the Baltic countries as well as a very limited distribution in the mountain ranges of the Alps, Pyrenees and Balkan countries and eastwards into Asia[[2]](#footnote-2). In the United Kingdom, it is present on the coasts of western Scotland (notably the islands of the Outer Hebrides), Northern Ireland and the Cumbrian coast. In Scotland it is typically found on machair grassland, but also has a very limited distribution on the mainland where it is associated with the marram zone of coastal sand dunes.



**Distribution of *Colletes floralis* in the UK.** From NBN Gateway, accessed 3/11/13

Ecology

Northern Colletes is a solitary bee and so doesn’t form colonies with workers. Individual females nest in local aggregations on flower-rich grassland and dunes. The nest is a small burrow up to 26 cm deep. A secretion from glands in their mouths is used to coat the inside of the burrow before the eggs are laid in sealed cells. The burrow is then closed up with a soil plug. Each cell contains a food reserve comprised of regurgitated nectar and pollen that will support the larva and pupa through the winter while the bee develops. Adults normally emerge from mid-June onwards and remain active until late August. Mating occurs from mid-June through July after which the males die. Pollen is gathered from a wide variety of plants, but they show a preference for plants within the family Apiaceae (umbellifers)[[3]](#footnote-3).

Threats

This bee has a small and fragmented UK population, restricted by the amount of suitable herb-rich grasslands available. Because of its restricted distribution, any damage to its coastal habitat is likely to be detrimental.

* **Loss of habitat**

The main threats to the bees’ habitat come from agricultural expansion and intensification, in particular inappropriate grazing regimes, which can cause loss of the flower-rich habitats. The bee is likely to be able to fly only short distances (<500m) between nesting sites and foraging areas[[4]](#footnote-4) and so requires these flower-rich areas to be close to their nest sites. Developments such as golf courses, caravan parks and housing and coastal defences as well as sand and shingle extraction and recreational impacts also damage habitat. However controlled recreational use can help by creating bare areas for nesting.

* **Climate change**

Wetter, cooler weather during the brief flight period could affect the abundance and distribution of the species in UK. Global warming could also affect suitability of montane habitat in other parts of its range[[5]](#footnote-5).

Management

* Low intensity cattle-based farming, allowing appropriate autumn and winter grazing of dune grasslands appears to be the most effective method of maintaining the bees’ habitat, though evidence suggests that rabbit and human activities may also play a part4.
* Recreational impact and sand and shingle extraction need to be managed on coastal dune sites.
* More surveys are needed to find any new sites, and monitoring is needed to understand the status of the species at existing sites.

Current work

This species has a Species Action Plan (SAP) which encourages landowners and site managers with a population of Northern Colletes on their land to help protect the species. Some nesting sites of this bee are within Sites of Special Scientific Interest (SSSIs) and other reserves, giving them improved protection and the benefit of specific management plans.

**The RSPB** has Northern Colletes on some of its Hebridean reserves and has been involved in research and surveys of the bee in the UK[[6]](#footnote-6). Its Futurescapes project on machair habitats in the Western Isles is aiming to improve, restore and sustainably manage the extent of machair to benefit wildlife and crofting communities.

**The Scottish Wildlife Trust** manages its Ayrshire coast reserves at Gailes Marsh and Shewalton Sandpits, with appropriate grazing regimes to encourage flower-rich grasslands and associated invertebrates. It is hoped that planting areas with more umbellifers will help encourage Northern colletes.

Projects are also underway to enlarge, improve and join up areas of coastal green spaces and golf courses in the south Irvine area to create a series of green networks. This allows species to move across the landscape more easily, giving them a better chance of survival, and is the best way to expand the range of rare species such as the Northern Colletes.

Wider Context

Machair is one of the rarest habitats in Europe, and occurs over a total global area of just 19,000 hectares, with 70% of this in western Scotland and the remainder in western Ireland[[7]](#footnote-7). Other notable insects that rely on machair include the Belted beauty moth and Great yellow bumblebee. Two nationally scarce birds are also present in machair systems: the Corncrake (which is globally threatened) and Corn bunting.

Quick Facts

* This species was originally found for the first time in the British Isles in south-west Scotland in July 1899[[8]](#footnote-8). The record was published under the name Colletes montanus
* The first English record was from Sandscale Haws, Cumbria, in July 1994
* It is the only bee species which is more widespread in Ireland than in Britain5.
* Because Northern Colletes nest in aggregations in one place, it often gives the appearance of a large colony. However, every nest is separate, and the bees don't help one another.
* The male bees emerge a day or two before the females. The females are probably mated soon after emergence after which the male dies.
* Activity seems to be temperature dependent and the bees are usually only active in sunshine4.
* In the Inner Hebrides the Northern Colletes bee essential for the survival of a rare oil beetle, *Meloe brevicollis*. This beetle (until recently thought to be extinct in the UK) is dependent on solitary bees for survival. After hatching out of the soil, the beetle larvae sit around on flowers waiting for visiting bees to grasp onto. They get carried to the bee’s nest, where they kill their young and feast on their pollen stores.

Selected references

**Douglas, G. (2003).*****Colletes florali***[***s***](http://10.200.1.39/objective/?B436178) **Eversmann, a mining bee (Hymenoptera: Colletidae).****Invertebrate species dossier, Scottish Natural Heritage.**

**Bowler, J., Sears, J. and Hunter, J.(2009). Recent research on the northern colletes mining bee *Colletes floralis* Eversmann. *The Glasgow Naturalist:* 25, Supplement. Machair Conservation: Successes and Challenges: 43-49.**

RSPB and Hymettus Ltd surveyed sites in Western Scotland and Cumbria for Northern Colletes and found it at more sites than had been recorded previously. Possibly in part due to better management for machair grassland on many parts of Hebrides. However, the species appears now to be absent from several locations where it is believed to have occurred previously, such as Lewis, Harris, Skye, Rum and the mainland coasts of Sutherland and Wester. It is suggested that the apparent increase in sites was just a result of a better searching effort and in fact the population of this bee in Scotland is likely to be getting more fragmented due to sub optimal management of its habitat.

**Davis, E.S., Reid, N., and Paxton, R.J. (2012). Quantifying forage specialisation in polyphagic insects: the polylectic and rare solitary bee, Colletes floralis (Hymenoptera: Colletidae). *Insect Conservation and Diversity* 5(4): 289–297,**

The authors studied Northern Colletes from 6 sites around the Irish coast and one site on Islay in Scotland. Although C. floralis is polylectic (gathers pollen from many plants), it showed a clear dietary preference for plants within the family Apiaceae. Where Apiaceae was uncommon, the species exploited alternative resources. Plant families, such as the Apiaceae, could be included, or have their proportion increased in Agri-Environment Scheme seed mixes, to aid the management of C. floralis and potentially other wild solitary bees of conservation concern.

**Davis E.S., Murray T.E., Fitzpatrick Ú., Brown M.J.F. and Paxton R.J. (2010). Landscape effects on extremely fragmented populations of a rare solitary bee, Colletes floralis. *Molecular Ecology* 19(22): 4922-35.**

This paper describes genetic analysis using 9 gene loci on populations of *Colletes floralis* in Scotland and Ireland. Genetic variability was surprisingly high within populations and there was a high differentiation between populations. There was is evidence for substantial barriers to gene flow between populations and it is suggested that conservation measures for this and other solitary bees needs to consider site-specific management.

1. Edwards, M. 2001. Survey of three Biodiversity Action Plan bee species (*Colletes floralis, Osmia inermis, O. uncinata*) in Scotland, 2001. Unpublished report to SNH and RSPB. [↑](#footnote-ref-1)
2. www.arkive.org/northern-colletes/colletes-floralis/ accessed 3/11/13 [↑](#footnote-ref-2)
3. Davis, E.S., Reid, N., and Paxton, R.J. (2012). Quantifying forage specialisation in polyphagic insects: the polylectic and rare solitary bee, Colletes floralis (Hymenoptera: Colletidae). *Insect Conservation and Diversity* 5(4): 289–297. [↑](#footnote-ref-3)
4. www.doeni.gov.uk/niea/colletessapwebversionapril06-2.pdf Accessed 3/11/13 [↑](#footnote-ref-4)
5. JNCC UK Priority Species data collation: Colletes floralis version 2

http://jncc.defra.gov.uk/\_speciespages/235.pdf Accessed 3/11/13 [↑](#footnote-ref-5)
6. Bowler, J., Sears, J. and Hunter, J.(2009). Recent research on the Northern Colletes mining bee *Colletes floralis* Eversmann. *The Glasgow Naturalist:* 25, Supplement. Machair Conservation: Successes and Challenges: 43-49. [↑](#footnote-ref-6)
7. www.machairlife.org.uk/ Accessed 25/08/13 [↑](#footnote-ref-7)
8. Bees Wasps and Ants Recording Society http://www.bwars.com/index.php?q=bee/colletidae/colletes-floralis. Accessed 25/08/13 [↑](#footnote-ref-8)