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First record of wild larvae of the short-necked oil beetle *Meloe brevicollis* Panzer (Meloidae) in Scotland

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Oil beetles (Meloidae) are medium to large, 15-30 mm black beetles often found in open habitats, particularly those populated by solitary bees (Hymenoptera). Oil beetles in Scotland belonging to the genus *Meloe* are kleptoparasites of solitary bees. Scotland has just three species of oil beetle: the most frequently encountered violet oil beetle *Meloe violaces* Marsham, the possibly extinct (Ramsay, 2011) black oil beetle *M. proscarbeaus* Linnaeus, and the rare short-necked oil beetle *M. brevicollis* Panzer (Fig. 1).

Fig. 1. An adult short-necked oil beetle (*Meloe brevicollis*), Crossapoll dunes, Isle of Coll, Scotland, 12th May 2014. The beetle is *ca.* 20 mm long. (Photo: Scott Shanks).

The short-necked oil beetle was presumed extinct in the U.K. until a population was discovered in Devon, England in 2006, followed by the first Scottish record on the Isle of Coll in 2009 (Redpath, 2010). Since then, other populations have been discovered including recently in Pembrokeshire, Wales in 2020 (Moran, 2020).

The discovery on Coll remained the only known Scottish population until 2021 when individuals were also recorded on Barra and Islay in similar habitats to those found on Coll. Despite several surveys, no oil beetles have been recorded on the neighbouring island of Tiree or Gunna (J. Bowler, pers. comm.). The first specimen on Coll was found in the Crossapoll dunes (Tràigh Chrossapol) and surveys throughout the island in 2014 confirmed that the species could be found wherever dune habitats were in suitable condition. From the beetle's first discovery on the island it was predicted that the host for the species would be the nationally rare northern colletes solitary bee (*Colletes floralis*), as the two species were associated with the same habitat. This was confirmed in 2017 when excavations of previously marked bee nests found two short-necked oil beetle larvae feeding on the nest provisions of northern colletes (Silvey, 2017).

Previous *ex situ* work on the species had shown that females begin to lay their eggs around ten days after emergence, and that eggs hatched after 37 days when incubated at 20°C (J.R. Silvey, pers. obs.). This time period further confirmed northern colletes as the preferred host, as larvae timed their emergence to coincide with the main flight period of the host species, rather than the later emerging heather colletes (*Colletes succinctus*), which is also present on the island.

With the host confirmed, efforts were made in 2019 to record the free living triungulins (the larval stage that attaches to a bee and so gains access to the nest), which had not been recorded in Scotland before. Using the emergence time of captive larvae in 2016 and the known emergence time of northern colletes, fieldwork began on the dunes of Coll on the 27th June 2019.

The survey method for larvae initially involved ten-minute searches in areas where adult beetles had been previously found. The behaviour of triungulins was expected to be similar to that of other oil beetle species and searches were therefore focussed on flowers with a careful search for the small (*ca.* 1 mm long) larvae (Fig. 2). It soon became apparent that larvae were adept at hiding deep within the sepals of the flowers but any slight movement of the flower with a pencil or finger would cause them to scurry into the open presumably because they associate the vibrations with the possible presence of a host species. Using this technique, the first triungulin was found on hawkbit (*Leontodon* sp.) with 23 larvae found in total across the dune site. Larvae were confirmed as *M. brevicollis* using Walters (2011).

Larvae were found on a wide range of plant species (Table 1) but not recorded on any flowering grass heads such as marram (*Ammophila arenaria*), potentially indicating a preference for the species of plants that bees were likely to visit.

Given the time of year and habitat type, the majority of flowers present in the area were yellow and as such the dark brown triungulins were extremely conspicuous on the petals of these flowers when disturbed (Fig. 2).

Fig. 2. Three triungulins (one indicated by arrow) on birdsfoot-trefoil (*Lotus corniculatus*), Isle of Coll, Scotland, 2019. (Photo: J.R. Silvey)

Species	Number of larvae
Hawkbit *(Leontodon* sp.*)*	5
Birdsfoot-trefoil (*Lotus corniculatus)*	6
Buttercup (*Ranunculus* sp.*)*	2
Kidney vetch (*Anthyllis vulneraria)*	5

Table 1. Number of triungulin larvae found on different species of flower, Isle of Coll, Scotland, 2019.

This greatly aided survey efforts and further triungulins were found adjacent to active bee colonies in another area of the island. It is theorised that the hiding behaviour exhibited by triungulins is in response to a potential avoidance behaviour displayed by the target bees whereby they actively avoid flowers on which triungulins are visible. It would have been interesting to document the interactions between bees and triungulins. However, no visits by bees to occupied flowers were witnessed in 2019, and all bees caught and examined lacked visible triungulins.

This discovery represents the first recording of the triungulin larvae of short-necked oil beetles in the wild in Scotland.

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REFERENCES

Moran, A. (2020). One of the UK's rarest oil beetles found in Wales. *Discover Wildlife*. 3rd April, 2020. https://www.discoverwildlife.com/news/oil-beetle-pembrokeshire-wales/ Accessed 19th February 2021.

Ramsay, A.J. (2011). A review of the status of *Meloe proscrabaeus* (L.) in Scotland. *Entomologist's Monthly Magazine* 147, 189-193.

Redpath, N. (2010). Short-necked oil beetle found on Coll! *Scottish Invertebrate News* 1(2), 1.

Silvey, J.R. (2017). The solitary bee *Colletes floralis* Eversmann as a host of *Meloe brevicollis* Panzer (Meloidae) in Scotland. *The Coleopterist* 26(3), 143-146.

Walters, J.W. (2011). Oil beetle triungulin larvae. http://johnwalters.co.uk/research/oil-beetle-triungulin-larvae.php Accessed 7th April 2021.