

The violet oil beetle *Meloe violaceus* Marsham (Meloidea) in northern Scotland

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Introduction

Meloe violaceus Marsham (Fig.1) is one of three oil beetles recorded in Scotland. *M. brevicollis* Panzer is extremely restricted in range in Britain. In Scotland a population was found on the Argyll island of Coll (VC 103) in 2009 (Alexander, Dodd & Denton, 2014), and a strong population was found at one site on Barra (VC 110) in June 2021 (Bruce Taylor, pers. comm.). Both *M. violaceus* and *M. proscarabaeus* Linnaeus have been recorded more widely in Scotland but, at least in the north of Scotland, records have been subject to misidentification and confusion. This paper is intended to clarify the current situation in the north of Scotland by analysis of data held by the Highland Biological Recording Group (HBRG), and to describe what is known of the biology of *M. violaceus* in the Highland Local Authority Area covering vice-counties 96, 97, 104-109 and parts of 95 and 98.



Fig. 1 Left, *Meloe violaceus*, Spean Bridge, 3 June 2020. © Ian Strachan. Right, *Meloe triangulin* larvae on *Andrena* sp., Glen Moriston, 10 April 2011. © Jane Bowman.

Methods

This paper is based primarily on 130 records from 1990 onwards in the HBRG database, all of which are (or will be) available on the NBN Atlas (<https://nbnatlas.org>). Additional data from the rest of Scotland on the NBN Atlas and

iRecord (<https://www.brc.ac.uk>) were considered only for assessing the wider Scottish context, as were records before 1990. HBRG records are casual and opportunistic with no systematic survey or monitoring. Reports from non-specialists were always confirmed, usually from photographs, and if confirmation of the species could not be obtained the record was entered as the genus.

Oil beetles in Highland

We need consider only *M. violaceus* and *M. proscarabaeus* here, to assess the past and current status in Highland of the latter. *M. proscarabaeus* was reported in Highland and more widely in Scotland in the past. Jackson (1955) reported six specimens from the island of Raasay off Skye in 1954, though these, like others from Skye, Rum and South Rona (VC 104), were not confirmed by Ramsay (2011). It was included in a faunal list for the Cairngorms though no details are provided and, curiously, *M. violaceus* is not listed (Edgar, 1995). Older published records exist from Fife in 1946, Moray (the farthest north), Aberdeen and Arran (Jackson, *loc. cit.*) and as far south as central Scotland (NBN Atlas). In Ayrshire there were two records of *M. proscarabaeus* in 1910 and 1939, with only *M. violaceus* recorded recently (B. Philp, pers. comm.). Ramsay (2011) considered the most recent confirmed Scottish record was the Fife record in 1946.

More recent records of *M. proscarabaeus* from Highland and more widely in Scotland are surrounded in confusion. In part this stems from the occasional occurrence of black-coloured adult *M. violaceus*, while Ramsay (2009) has pointed out that the commonly used features separating the species are not wholly reliable. Ramsay (2002) stated ‘there are ... no recent confirmed records for Scotland’, and Ramsay (2011) concluded ‘... in Scotland it appears that it may now be extinct’. All reports of that species to HBRG, when investigated, have been either inconclusive or clearly referred to *M. violaceus*. Of 13 Scottish reports of *M. proscarabaeus* on iRecord (accessed 30 June 2021), nine were clearly *M. violaceus*, showing a distinct deep depression at the rear of the pronotum, an indented rear margin, and fine punctures; two were probably that species; one presented no evidence; and one (the only one given expert verification as ‘Accepted as correct’) was based on yellow triangulins. Seven of these records were in Highland, and all were north and west of Perth. Conversely, none of 54 posts of *M. violaceus* with photographic evidence appeared to be misidentified. Though a few images lacked the clarity for confident identification to species, none appeared likely to be *M. proscarabaeus*. The images generally did not allow use of other characters mentioned by Ramsay (2009).

The NBN Atlas (accessed 30 June 2021) had 15 records of *M. proscarabaeus* since 1990. Seven (some the same as the iRecord posts just mentioned) were flagged as being either wrongly identified or identified from yellow larvae. The remainder were classed by the dataset provider as ‘Unconfirmed’.

The UK Beetles website (<https://www.ukbeetles.co.uk/meloe-proscarabaeus> accessed 30 June 2021) says of *M. proscarabaeus* ‘Triangulin larvae are mostly pale yellow and so are readily separated from those of *M. violaceus* which are mostly black’. Some internal confusion is evident, however, as the triangulins pictured on the

M. violaceus page are yellow. A Buglife species management sheet (<https://cdn.buglife.org.uk/2019/08/Violet-Oil-beetle-Meloe-violaceus.pdf>) on that species features black triungulins. This claimed distinction has been used widely to identify putative *M. proscarabaeus* simply from images of yellow triungulins.

It has been obvious to us in Highland for many years that larval colour cannot be as described. All our confirmed adults are *M. violaceus*, while all our triungulins are yellow. The debate about the colour of triungulins has persisted without resolution since Newport (1847a, b) recognised the problem, and it was taken up by Blair (1942) and van Emden (1943, 1958). These authors discussed explanations for the different colours including different subspecies, cryptic species only separable in the larvae, and developmental influences. Despite this long history, the persistence of the fallacious view that the two species can be separated confidently on larval colour has resulted in several unjustified reports of *M. proscarabaeus* in Scotland.

For the purposes of this paper, it is assumed that in Highland – and that is probably applicable more widely in Scotland – we currently have only one species: adults keying out as *M. violaceus* with yellow triungulins. If *M. proscarabaeus* persists here, it is exceptionally scarce, and any reports must be confirmed by an adult specimen or good image. The possibility of cryptic species must still be considered, but that is for others to resolve with DNA analysis (Lückmann & Scharf, 2004).

The data

The temporal range of the records analysed is summarised in Table 1.

Table 1 Temporal range of records of *Meloe* in northern Scotland since 1990 from the Highland Biological Recording Group database.

Years	Number of records	%
1990-99	5	3.8
2000-09	35	26.9
2010-19	69	53.1
2020-21	21	16.2
Totals	130	100

All but five of the records (96%) are from the 22 years since 2000, so should give a good indication of the current status of the species. No biological significance should be attached to the rising trend in records, which is simply due to increased recording effort and support generally within HBRG and with increased awareness through a national oil-beetle hunt run by Buglife.

Distribution in northern Scotland

The distribution of HBRG records of *Meloe* in Highland is shown in Fig. 2. *M. violaceus* is well distributed throughout the area, the gaps perhaps best explained by remoteness and limited recording effort.

The beetle was found from sea level to several hundred metres altitude and in a wide variety of habitat – meadow, woodland and moorland – the essential requirement presumably being the presence of the hosts.

It is worth highlighting its presence on the islands of Skye, Raasay, Rum and Eigg. It is recorded on other islands farther south (NBN Atlas; B. Philp, pers. comm.) in Mid Ebudes VC 102 and South Ebudes VC 103 (Mull, Colonsay, Islay, Arran, Cumbrae). It has not been recorded from the Western Isles, Orkney or Shetland.

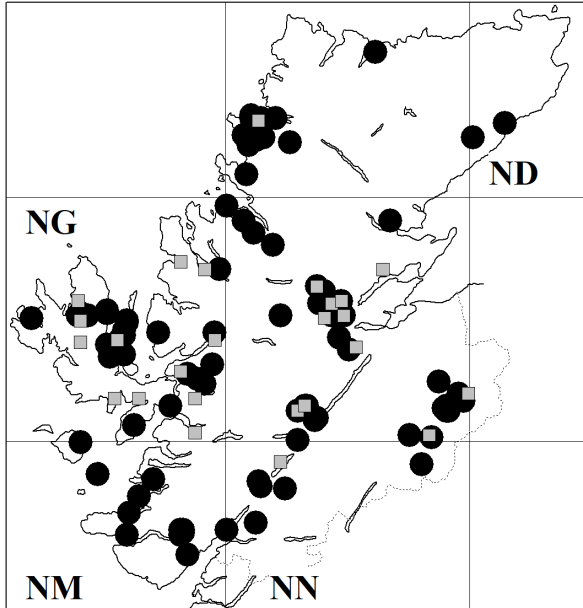


Fig. 2 Distribution of records of *Meloe* in the Highland Biological Recording Group database since 1990. Black circles - *Meloe violaceus*; grey squares - *Meloe*, species undetermined, including triungulins.

Phenology

Our dates for adults extend from 30 March to 20 July, with a peak in May (Fig. 3). 95% of adults (n=114) were recorded in the 77 days from 9 April to 24 June. NBN Atlas has a record, assumed to be an adult, from Aviemore on 14 March 1905. An exceptionally late adult was recorded on 23 August 1973 on Skye (B. Philp, pers. comm.). Both these are pre-1990, so are not included in this analysis. Triungulins were recorded between 8 April and 22 June (N=15).

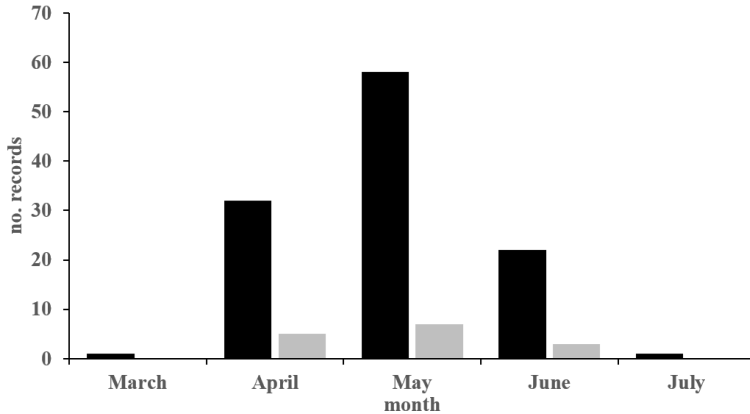


Fig. 3 Phenology of *Meloe violaceus* in northern Scotland from the Highland Biological Recording Group database since 1990. Black bars – adults; grey bars – triungulins assumed to be this species.

Potential hosts

Meloe larvae are egg-predators and kleptoparasites in the nests of solitary bees (Pinto & Selander, 1970). Yellow triungulin larvae, singly or in small numbers, were found on eight species of solitary bee (Table 2). They were also found on the head of the vespine wasp *Dolichovespula sylvestris* on Skye (N. Roberts, pers. comm.). That last observation demonstrates that mere presence on a bee does not necessarily mean that that bee is a true host. It is probable that larvae attach at least to some extent speculatively to any insect that they encounter. The wasp was heavily dusted with pollen and had presumably been feeding at flowers where the larvae had assembled.

Table 2 Bees on which yellow triungulin larvae assumed to be *Meloe violaceus* have been found in northern Scotland, from the Highland Biological Recording Group database.

Family	Species	sex	no. of records
Andrenidae	<i>Andrena barbilabris</i>	male	1
	<i>Andrena lapponica</i>	male	1
	<i>Andrena ruficrus</i>	male	1
	<i>Andrena similis</i>	female	1
	<i>Andrena sp.</i>	male	2
Halictidae	<i>Halictus rubicundus</i>	female	2
	<i>Lasioglossum albipes</i>	female	1
	<i>Lasioglossum fratellum</i>	female	2
Apidae	<i>Nomada marshamella</i>	male	1

I have also seen yellow triungulins from Argyll on *Lasioglossum calceatum* (7 May 2021) and *Andrena bicolor* (1 June 2021), both females collected by D.C. Jardine.

Discussion

Our Highland records of *Meloe violaceus* since 1990 suggest that it is widespread in the area, though not common, with presence in 62 of 351 hectads, and 104 monads. It is recognised as of minor conservation importance, with the following relevant designations in the UK Species Inventory version 50: Scottish Biodiversity List (watching brief only); Nationally Notable B; Biodiversity Action Plan UK list of priority species. Our data suggest that the beetle is not under any immediate threat that would justify increased concern, at least in the north of Scotland.

The main point arising from this analysis is the pressing need to establish the criteria on which *M. violaceus* and *M. proscarabaeus* can be separated as larvae, as the confusion outlined above has led, and unless corrected will continue to lead, to incorrect determinations being made and placed in the public domain. For now, it would seem prudent to reassess all past determinations throughout the UK made on larval colour. Detailed research on the long-acknowledged variation in larval colour and its relation to taxonomy is long overdue.

As far as Scottish records of *M. proscarabaeus* since 1960 are concerned, the common reporting of *M. violaceus* as *M. proscarabaeus* and the uncertainty surrounding the continued presence of the latter in Scotland requires a re-examination of existing records and a high degree of rigour in accepting any future record without clear and unambiguous confirmation. That would come only from expert assessment of a specimen, or of an image that shows clearly the thorax in top view to display the features described by Ramsay (2009).

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***Amphimallon fallenii* (Gyllenhal) (Scarabaeidae: Melolonthinae) rediscovered in south-west England**

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Over the course of three days in mid-July 2021, four specimens belonging to the chafer genus *Amphimallon* were encountered on the Rame Peninsula in south-east Cornwall (VC 2). The first of these specimens was caught by hand in flight over coastal grassland at Maker Heights (SX43635133), at 11.30 am on 14 July 2021. The following day, 15 July 2021, one specimen was found dead on the coastal path between Cawsand and Rame Head (SX44074884). Finally, two further specimens were caught by hand in flight at Maker Heights at 11.00 am on 16 July 2021. One of the latter two specimens (Fig. 1) was retained and transported back to be examined under a stereo microscope.

In the UK, the genus *Amphimallon* is represented by two species, *A. fallenii* (Gyllenhal) and *A. solstitiale* (Linnaeus). My initial suspicion was that the specimens encountered on the Rame Peninsula belonged to *A. fallenii* due to the habitat and the time of day the live specimens were found. *A. fallenii* inhabits unimproved coastal grassland with larvae feeding at the roots of grasses and the adults flying only in hot weather around midday. This is in contrast to *A. solstitiale*, which is found in habitats such as woodlands and gardens which have high trees, around which the adults swarm at dusk (Lamb, 1917; Lane, 2016). This suspicion was confirmed when the retained specimen was studied, as the antennal club was found to be 1.3 mm in length (1.57-2.00 mm in *A. solstitiale*) and the pygidium possessed mostly simple punctures (rasp-like or wrinkled in *A. solstitiale*) (Krell & Rößner, 2009).

The sole discrepancy between the specimens found by the author and the key in Krell & Rößner (2009) is the number of denticles on the protibiae. Three out of the four specimens found (with the exception being the dead adult on the path near Rame Head) had just a single denticle on the protibiae, with the dead specimen having three. Krell & Rößner (2009) mentions that the protibia of *A. fallenii* is 'mostly with two or three denticles,' while that of *A. solstitiale* is 'mostly with one denticle'. This observation would appear to confirm that the dentification of the