

## ***Melogona voigtii* (Verhoeff, 1899): a millipede new for England (Chordeumatida, Chordeumatidae)**

Steve J. Gregory<sup>1</sup> & Nicola Garnham<sup>2</sup>

<sup>1</sup> 4 Mount Pleasant, Church Street, East Hendred, Oxfordshire, OX12 8LA, UK.

E-mail: [stevejgregory@btopenworld.com](mailto:stevejgregory@btopenworld.com)

<sup>2</sup> 4 Dixon Terrace, Nether Kellet, Lancs, LA6 1EX, UK.

E-mail: [garnhamnicola@hotmail.com](mailto:garnhamnicola@hotmail.com)

### **Abstract**

The Nationally Rare millipede *Melogona voigtii* (Verhoeff, 1899) is reported from its first English site; a woodland in West Lancashire. A brief description with illustrations is provided, and comparison is made with the widespread *M. gallica* Latzel. The ancient woodland habitat and associated species is in keeping with the idea that it may be an overlooked native species. Additional sites may be found in England. However, its status remains Data Deficient pending additional observations.

### **Introduction**

*Melogona voigtii* (Verhoeff, 1899) was recognised as a British species on the basis of specimens collected from three sites in the Lothians, Scotland, in 1988 and 1995 (Corbet, 1996). Subsequently, specimens were collected from Glasgow Necropolis (cemetery) by Davidson (2013). In light of the paucity of records, Lee (2015) designates *M. voigtii* as Nationally Rare and, solely within Britain, Data Deficient pending additional information. *M. voigtii* bears a strong resemblance to the widespread *M. gallica* Latzel and it is only possible to separate the two species by microscopic examination of mature male or female specimens (Corbet, 1996; Enghoff, 2016). Thus, it is quite probable that *M. voigtii* has been under recorded as a result of past taxonomic confusion. There is also uncertainty as to whether it is a native or introduced species (Lee, 2015).

Here we report the discovery of *M. voigtii* from an ancient woodland site in West Lancashire (VC60) in northern England.

### **First English observations**

In January 2019 NG collected three samples of *Melogona* specimens from West Lancashire (VC60) and Westmorland (VC69) from leaf-litter while searching for hoverfly (Syrphidae) larvae. This entailed filling a 'bag for life' type shopping bag (of approximately 22L in volume) with leaf-litter collected from the top layers of leaf-litter from a contiguous sampling area. Back home this was shaken through a sieve, through which most millipedes readily passed into a collecting tray below. Leaves and other coarse material held back by the sieve were then hand sorted to reveal additional specimens. The *Melogona* specimens thus obtained were sent SJG for identification.

The three samples (Table 1) comprised entirely of female specimens so determinations were undertaken from female bursal sclerites (the fused vulval bursae) as recently described and figured by Enghoff (2016). These are located between second and third pair of legs and were dissected from the specimens and mounted on temporary slides, in clove oil, for drawing. However, it is possible to view these in situ, without dissection, if the legs are gently teased out of the way (Enghoff, 2016).

A female specimen with 28 body rings collected from Yew Tree Tarn (NY321003, VC69, 26.i.2019) has a bursal sclerite that is much broader than long and has a convex distal margin (Fig. 1A). This is a good match with *M. scutellaris* as figured in Enghoff (2016, Fig. 3); a species widely distributed across Britain and Ireland (Lee, 2006).

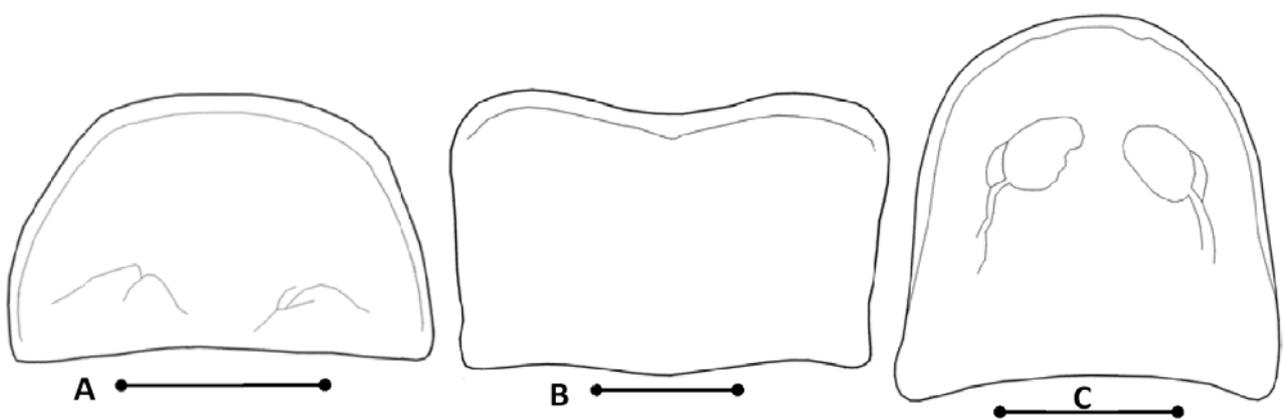
**Table 1: First English records of *Melogona voigtii* and other material of *Melogona* examined.**

N. Garnham, leg.; S.J. Gregory, det.

Locality	Grid Ref	VC	Number specimens	Date of Collection	Habitat
<b><i>Melogona voigtii</i></b>					
Dalton Craggs	SD546761	60	1♀	27.i.2019	Deciduous woodland at edge of limestone pavement.
Dalton Craggs	SD546763	60	1♂ 1♀	05.xi.2019	Mixed woodland; from Beech & Larch litter.
<b><i>Melogona gallica</i></b>					
Rabbit Lane, Arkholme	SD572707	60	2♀	22.i.2019	Mixed woodland: Beech, Larch, Pine, Hazel & Birch litter.
Lord's Lot, Capernwray	SD547707	60	1♂ 5♀	8.xi.2019	Mixed woodland: from Sycamore litter (near conifers).
<b><i>Melogona scutellaris</i></b>					
Yew Tree Tarn	NY321003	69	1♀	26.i.2019	Mixed deciduous and coniferous woodland.
Trowbarrow LNR	SD480756	60	1♂	26.x.2019	Mixed deciduous and coniferous woodland.
Middle Barrow	SD466770	69	6♂ 4♀	02.xi.2019	Mixed woodland; from Beech, Ash, Sycamore & Larch litter.
Dalton Craggs	SD547761	60	1♂ 1♀	05.xi.2019	Mixed woodland; from Beech & Larch litter.

Two female specimens with 30 body rings from Rabbit Lane, Arkholme (SD572707, VC60, 22.i.2019) have a bursal sclerite broader than long with straight lateral edges and broadest distally with a concave distal margin (Fig. 1B). This is interpreted as a female *M. gallica* (using Enghoff, 2016, Fig. 1), a species well known across much of western Britain (Lee, 2006).

A final female, also with 30 body rings, from Dalton Craggs (SD546761, VC60, 27.i.2019) (live specimen shown in Fig. 2A) has a bursal sclerite slightly longer than broad and with a convex distal margin (Fig. 1C). This is a reasonable match with *M. voigtii* as figured in Enghoff (2016, Fig. 2), but given its restricted Scottish distribution was only tentatively ascribed to this species (Gregory, 2019).

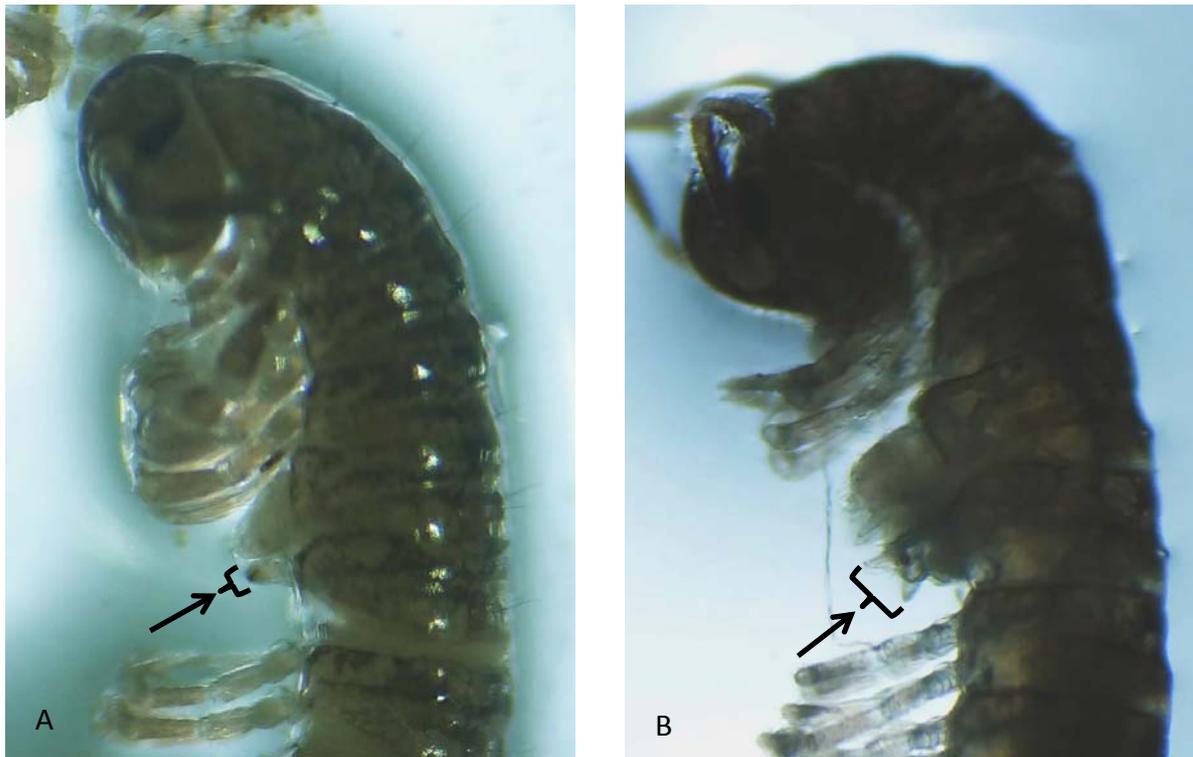


**Figure 1) Bursal sclerites of female *Melogona*.** A) *M. scutellaris* (Yew Tree Tarn); B) *M. gallica* (Rabbit Lane, Arkholme); C) *M. voigtii* (Dalton Craggs). Scale bars = 0.1mm.

In November 2019 NG returned to Dalton Craggs to collect additional litter samples, primarily to target *Melogona* millipedes. Here, the full depth of leaf litter was collected, including that from cavities within bedrock, such as limestone pavement grikes, and from around the base of trees and dead wood. One of the samples (Table 1) contained a male and female specimen with 30 body rings. In side view the male (Fig. 3A) lacked the prominent three-lobed paragonopod that typically is quite apparent in *M. gallica* (Fig. 3B). The specimens were, in life, more heavily pigmented and were noticeably larger than specimens of *M. scutellaris* when placed side by side (Fig. 2B). The specimens were forwarded to SJG for examination. The male (and female) specimen proved to be *M. voigtii*, thus confirming the occurrence of this species in England, some 200km south of previous Scottish observations (Fig. 6). The specimens are stored in 75% ethanol and are currently retained in the personal collection of SJG.



**Figure 2) *Melogona* females from Dalton Craggs.** A) Live specimen of *M. voigtii* collected 27.i.2019; B) Preserved specimen of *M. voigtii* (top) and *M. scutellaris* (bottom), collected 05.xi.2019 (images © Nicola Garnham).



**Figure 3) *Melogona* males showing gonopods, lateral view** (posterior paragonopods, modified leg pair 11, arrowed). A) *Melogona voigtii*, from Dalton Crags. B) *Melogona gallica*, from Lord's Lot, Capernwray (images © Nicola Garnham).

### Identification of *Melogona voigtii*

*M. voigtii* bears a superficial resemblance to *M. gallica* (and will key to that species in Blower, 1985). It can only be identified by examination of adult male or female specimens (Corbet, 1996; Enghoff, 2016). Corbet (1996) provides a brief description with figures of male *Melogona voigtii* collected from the Lothians, Scotland. A more detailed description (as *Microchordeuma voigti*) is provided by Brolemann (1935, pp 349-351). Both publications highlight the structure of the modified leg pair 11 (posterior paragonopods) and leg pair 12 (7<sup>th</sup> visible pair) as key features in separating *M. voigtii* from *M. gallica* (and also from *M. scutellaris*). These, and other, characters are briefly described and figured.

### Body size

The sizes of the specimens examined by Corbet (1996) or Davidson (2013) are not given. Of the three specimens collected from Dalton Crags in 2019, the male is 7.5mm in length by 0.7mm diameter (maximum ring height) and the two females 9.0mm and 9.5mm in length; both 0.8mm in diameter. Thus, these specimens are similar in size to *M. gallica* (as given by Blower, 1985) and noticeably larger than *M. scutellaris* (Blower, 1985; also see Fig. 2B above).

### Male: leg pairs 1-6

In the male, leg pairs 1 and 2 are slightly reduced in size (as in *M. scutellaris*), with leg pairs 3-6 much more robust.

### Male: leg pair 7 (anterior paragonopods)

Family Chordeumatidae is unique among other British millipedes of order Chordeumatida in that leg pair 7 is reduced in size and highly modified (Blower, 1985). Those of *M. voigtii* (Fig. 4A) are not

figured by Corbet (1996), but differ subtly in shape from those of *M. gallica* (Blower, 1985, Fig. 28B) and also *M. scutellaris* (Blower, 1985, Fig. 29B).

**Male: leg pair 8 (peltogonopods)**

These are figured in Corbet (1996, Fig. 3 & 4) and are not figured herein.

**Male: leg pair 9 (gonopods)**

These are figured in Corbet (1996, Fig. 2) and are not figured herein.

**Male: leg pair 10**

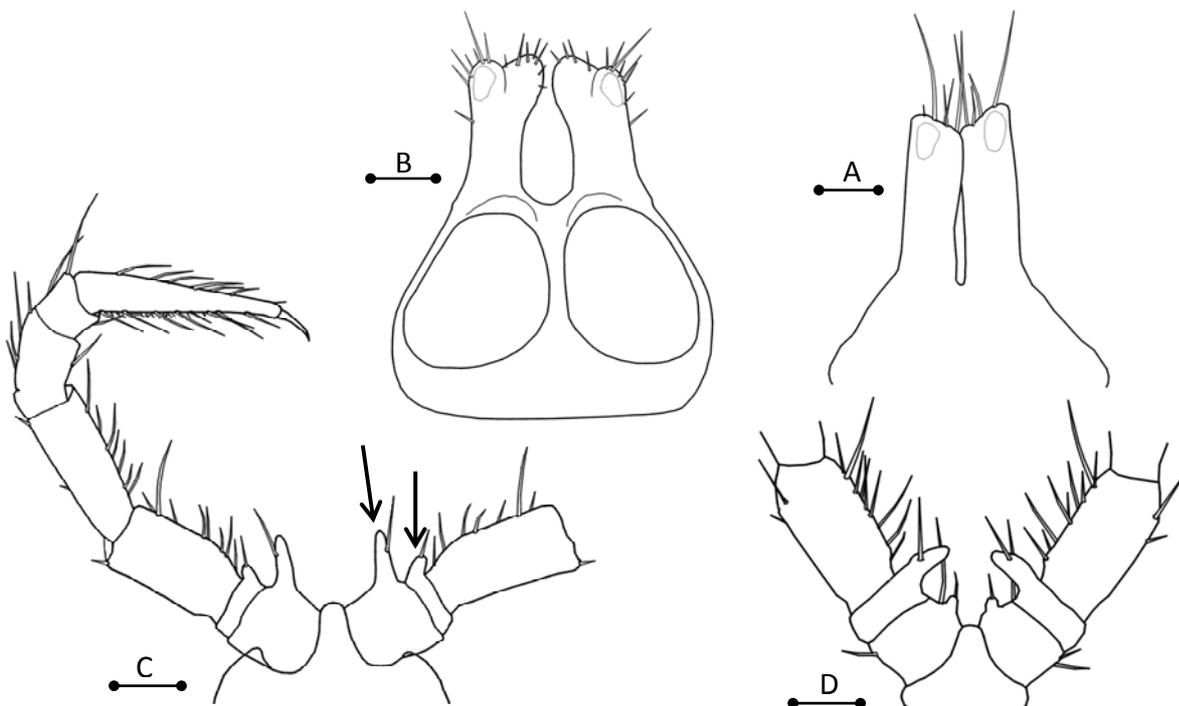
These are highly reduced in family Chordeumatidae (Blower, 1985; Brolemann, 1935) and considered to be of little taxonomic value.

**Male: leg pair 11 (posterior paragonopods)**

In *M. voigtii* these are weakly bilobed distally in anterior and posterior view (Fig. 4B; Corbet, 1996, Fig. 1), this being not obvious in lateral view (Fig. 3A). This contrasts with *M. gallica* where the posterior paragonopods are strongly tri-lobed in both anterior and posterior view and also in lateral view (Fig. 3B; Blower, 1985, Fig. 28E).

**Male: leg pair 12**

In *M. voigtii* the coxae of leg pair 12 (visible leg pair 7) bear a prominent projection that is much larger than that on the trochanter (Fig. 4C). The reverse is seen in *M. gallica* where the projection on the trochanter is much larger than that on the coxa (Fig. 4D). In contrast *M. scutellaris* lacks projections on both the coxa and trochanter of leg pair 12.



**Figure 4) *Melogona voigtii* male, Dalton Crags** (specimen shown in Fig. 3A). A) Modified leg pair 7 (anterior paragonopods); B) Modified leg pair 11 (posterior paragonopods); C) Leg pair 12, showing projection on coxa much larger than that on trochanter (arrows).

***Melogona gallica* male, Lord's Lot, Capernwray** (specimen shown in Fig. 3B). D) Leg pair 12, showing projection on coxa much smaller than that on trochanter. All scale bars = 0.1mm.

### Female: bursal sclerite

Female specimens of *M. voigtii* are readily identifiable by the shape of the bursal sclerite (Enghoff, 2016), which is slightly longer than broad and with a convex distal margin (Fig. 1C).

Female bursal sclerites, as figured in Enghoff (2016), have proved to be a relatively quick and easy method for determination of British *Melogona* species, since it is possible to view these in situ, without dissection, if the legs are gently teased out of the way.

### Habitat and associated species

Dalton Crag is a rural site, about 120ha in extent, lying on Carboniferous Limestone and comprises a mixture of limestone pavement, ancient deciduous woodland and recently planted beech *Fagus sylvaticus* L. and larch *Larix* sp. plantation (Forestry England, 2019). It lies on a gentle south west facing slope below the much larger Hutton Roof massif (which includes areas designated as SSSI, NNR and SAC).

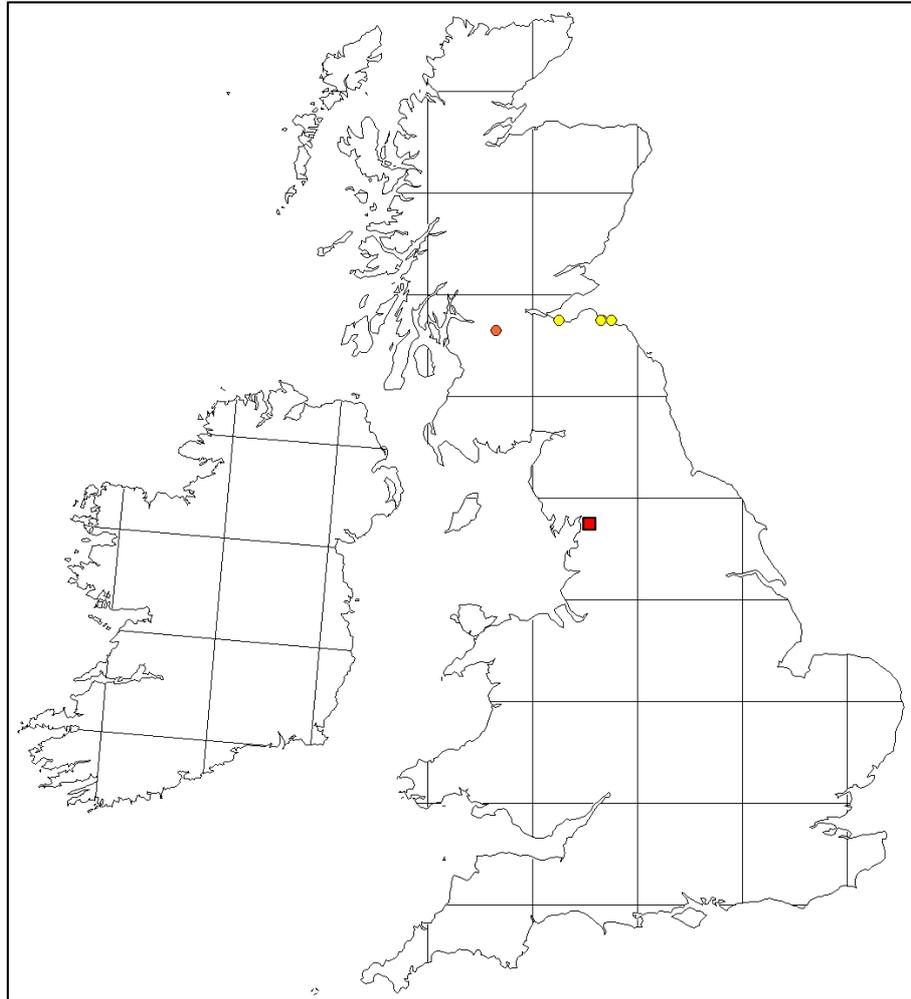
The specimens were collected from an area of mixed deciduous woodland lying on a south facing slope, including beech, ash *Fraxinus excelsior* L., sycamore *Acer pseudoplatanus* L. and birch *Betula* sp. (Fig. 5). The area is intermittently grazed by a small number of cattle and there is very little understorey. There are scattered limestone rocks and rotting dead wood. The ground is quite rocky with little soil, mainly accumulated between rocks, dead wood and around standing trees, etc.



**Figure 5: Dalton Crag, area of mixed deciduous woodland from which *Melogona voigtii* was recorded (image © Nicola Garnham).**

Associated millipedes recorded in the samples from Dalton Crag are *Glomeris marginata* (Villers), *Nanogona polydesmoides* (Leach), *Chordeuma proximum* Ribaut, *Melogona scutellaris* (Ribaut), *Brachydesmus superus* Latzel, *Polydesmus angustus* Latzel, *Proteroiulus fuscus* (Am Stein), *Julus scandinavicus* Latzel and *Tachypodoiulus niger* (Leach). Centipedes recorded are *Haplophilus*

*subterraneus* (Shaw), *Strigamia acuminata* (Leach), *Geophilus insculptus* Attems, *Lithobius variegatus* Leach, *L. microps* Meinert and the Nationally Scarce *L. muticus* C.L. Koch. This latter species, a characteristic animal of deciduous woodland, represents an isolated population beyond its typical south-eastern English range (A.D. Barber, pers. comm.).



**Figure 6: Known British and Irish distribution of *Melogona voigtii* plotted at 10km resolution**  
 ● Corbet, 1996 (plotted in Lee, 2006); ● Davidson, 2013; ■ First English record reported herein.

## Discussion

Lee (2015) highlights the uncertainty regarding the native status of *M. voigtii* in the UK. On the European continent the distribution of *M. voigtii* lies mainly to the north and east of *M. gallica*, but their ranges do overlap in the Low Countries (Kime, 1990; 2004). In the Netherlands *M. voigtii* is considered synanthropic (Jeekel, 2001). The three Lothian records were from either synanthropic sites (private gardens) or from semi-natural woodland (albeit with evidence of human disturbance) and both Corbet (1996) and Jeekel (2001) suggest that *M. voigtii* may have been introduced by human activity via trade from the continent. In keeping with this idea, the Glasgow site (Davidson, 2013) is also strongly synanthropic, being a large graveyard established in a disused quarry near the city centre. In Germany (and elsewhere in Europe) *M. voigtii* is an inhabitant of woodland (Spelda, 1999; Kime, 1990) and Kime (2001) considers its presence in Scotland to be a natural extension of its European range and that further populations may be discovered in eastern England.

There is little in the way of recent human disturbance at Dalton Crags other than public access and recent forestry plantings, although a few disused lime kilns are present nearby. In addition, the associated species recorded during the surveys include several species typical of undisturbed woodland, such as the centipede *Lithobius muticus*. However, it is not possible to rule out the introduction through human activity of *M. voigtii* (or even *L. muticus*) to this site. Indeed, the introduced terrestrial flatworm *Marionfyfea adventor* Jones, 2016 has been recorded nearby, but does seem to be generally widespread in this area (NG, pers. obsv.). The discovery of a population of *M. voigtii* at Dalton Crags would seem to support Kime's (2001) idea that this may be an overlooked native species in the UK. None-the-less, this isolated record does not alter this species' IUCN classification of Data Deficient in Britain (Lee, 2015) and additional information on its habitat preferences (whether it favours synanthropic or semi-natural sites) would help clarify the status of this rare millipede in the UK.

It can no longer be assumed that *M. voigtii* is restricted to Scotland and it may have been overlooked (as *M. gallica*) at other sites in northern England. Reliable determination of these two species should be based on examination of adult male or female specimens as detailed in this paper.

### Acknowledgements

We thank Paul Lee for his helpful comments about the identification and status of *M. voigtii*.

### References

- Barber, A.D. (2009) *Centipedes*. Linnean Society Synopses of the British Fauna (N.S.) **58**. Shrewsbury, Field Studies Council.
- Brolemann, H.W. (1935) Diplopodes (Chilognathes I). *Faune de France* **29**, 368 pp.
- Corbet, G.B. (1996) *Melogona voigti* (Verhoeff) from the Lothians: A millipede new to the British Isles. *Bulletin of the British Myriapod Group* **12**: 17-20.
- Davidson, M. (2013) Recent Millipede Finds at Glasgow Necropolis. *British Myriapod and Isopod Group Newsletter* No. **27**: 3-4 (unpublished).
- Enghoff, H. (2016) Identification of north European *Melogona* females, and the first record of *M. gallica* (Latzel, 1884) from Denmark (Diplopoda, Chordeumatida, Chordeumatidae). *Bulletin of the British Myriapod & Isopod Group* **29**: 42-43.
- Forestry England (2019) Forestry England website. <https://www.forestryengland.uk/dalton-crags-forest> (accessed 27th Nov. 2019)
- Gregory, S. (2019) Some interesting records from north-west Lancashire. *British Myriapod and Isopod Group Newsletter* No. **38**: p9 (unpublished).
- Jekeel, C.A.W. (2001) The Dutch millipede fauna compared with the British. *Bulletin of the British Myriapod and Isopod Group* **17**: 43-59.
- Kime, R.D. (1990) *A Provisional Atlas of European Millipedes, Part 1*. Fauna Europaea Invertebrata Vol. 1. (EIS-CIE-EEW publ.).
- Kime, R.D. (2001) The continental distribution of British and Irish millipedes, part 2. *Bulletin of the British Myriapod and Isopod Group* **17**: 7-42.
- Kime, R.D. (2004) The Belgian Millipede Fauna (Diplopoda). *Bulletin de l'Institut royal des Sciences Naturelles de Belgique, Entomologie* **74**: 35-68.
- Lee, P. (2006) *Atlas of the millipedes (Diplopoda) of Britain and Ireland*. Sofia & Moscow, Pensoft.
- Lee, P. (2015) *A review of the millipedes (Diplopoda), centipedes (Chilopoda) and woodlice (Isopoda) of Great Britain*. Species Status No. 23. Natural England Commissioned Reports, Number 186.

Spelda, J. (1999) *Verbreitungsmuster und Taxonomie der Chilopoda und Diplopoda Südwestdeutschlands. Diskriminanzanalytische Verfahren zur Trennung von Arten und Unterarten am Beispiel der Gattung Rhymogona, 1896 (Diplopoda: Chordeumatida: Craspedosomatidae)*. Unpublished PhD thesis, University of Ulm: 217pp.