

## The millipede *Ophiulus pilosus* (Newport, 1842) (Diplopoda: Julidae) new for the Belgian fauna

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### Abstract

We report a new species of millipede for the Belgian fauna: *Ophiulus pilosus* (Newport, 1842). This species has been expected to occur in Belgium because of its occurrence in neighboring countries. Surprisingly, the first record was made in a deciduous forest in the center of the country. We argue that the species is possibly widespread but rare in Belgium and has probably been overlooked for some time. Although, the sickle shaped first pair of legs of the male is very distinctive from closely resembling species. Additional records can be done by searching in both deciduous forest and anthropogenic habitat.

**Keywords:** *Ophiulus pilosus*, Belgium, Diplopoda, distribution, millipede

### Samenvatting

We vermelden de vondst van een nieuwe miljoenpootsoort voor de Belgische fauna: *Ophiulus pilosus* (Newport, 1842). De soort was te verwachten in België doordat ze ook in de meeste van onze buurlanden gevonden is. Verrassend genoeg werd de soort voor het eerst in een loofbos in het midden van het land gevonden. We denken dat de soort mogelijks wijdverspreid voorkomt in België, maar lange tijd over het hoofd gezien werd. De soort is nochtans goed te onderscheiden van gelijkende soorten doordat het eerste pootpaar sikkelvormig is. Nieuwe waarnemingen kunnen gedaan worden in zowel loofbos als antropogeen habitat.

### Résumé

Le mille-pattes, *Ophiulus pilosus* (Newport, 1842), a été observé pour la première fois en Belgique, dans une forêt de feuillus au centre du pays. On pouvait s'attendre à la trouver dans notre pays en raison de sa présence dans les pays voisins. Cette espèce est probablement répandue mais rare en Belgique. Elle a peut-être été négligée, malgré que la première paire de pattes en forme de faucille des mâles soit très distinctive de celle des espèces qui lui ressemblent. Des observations supplémentaires pourraient être faites en recherchant dans les forêts de feuillus et dans les habitats anthropiques.



Fig. 1. Adult *Ophiulus pilosus*. © Anne Krediet.

### Introduction

The Belgian millipede fauna has been thoroughly investigated at the end of the 20<sup>th</sup> century (KIME, 2004). Since then only two new species have been recorded being *Blaniulus dollfusi* (Brölemann, 1894) (ENGHOFF, 2010) and *Cylindroiulus britannicus* (Verhoeff, 1891) (PROESMANS & DE SMEDT, 2015). The millipede *Ophiulus pilosus* (Newport, 1842) has been expected to occur in Belgium for a long time because of its presence in neighboring countries (DE QUEKER, 1962; KIME & ENGHOFF, 2017). It was reported in 2005 but this record could not be confirmed (ZWERTVAEGER *et al.*, 2005). The species is very common and widespread in the UK (BMIG, 2021) and rather common in Germany where it occurs up to 60 km from the Belgian border (HAUSER & VOIGTLÄNDER, 2019). In the Netherlands the species is rather rare and most records are from the western part of the country, although there is one record from the province of Zuid-Limburg in the south of the Netherlands at less than 15 km from the Belgian border (BERG *et al.*, 2008). The species is also known from Northern France where it is limited to the Pas-de-Calais and Somme departments about 70 km from the Belgian border (KIME & ENGHOFF, 2017). Therefore, the species could be expected in the east or west of Belgium, but here we report the first record for Belgium in the middle of the country. Not only the location of this first record is surprisingly but also its discovery. This paper describes the identification and habitat of the species in Belgium. *Ophiulus pilosus* brings the number of millipedes known from Belgium to 53.

### Material and methods

The species was discovered in nature reserve Mispeldonk (Bonheiden, province of Antwerp). The second author, only six years old but an entomologist with ambition, always takes some small tubes on the road to collect arthropods. During a family walk in the nature reserve, the

young entomologist stopped every now and then to turn stones or logs collecting arthropods along the road. The next day, both authors examined the catch including bugs, woodlice, spiders, beetles and a good share of millipedes. The woodlice included common species such as *Porcellio scaber*, *Oniscus asellus* and *Philoscia muscorum*. The millipedes included an individual of *Proteroiulus fuscus*, a bunch of *Cylindroiulus punctatus* and six individuals (three males and three females) of another Julid (Julidae) species. After examining the first and modified pair of legs of the males, these individuals proved to be *O. pilosus*, a new species for the Belgian fauna. Following days, the authors went back to check all possible spots where a population of this species could be hiding and after seven days they managed to find an additional male in a forest next to their garden.

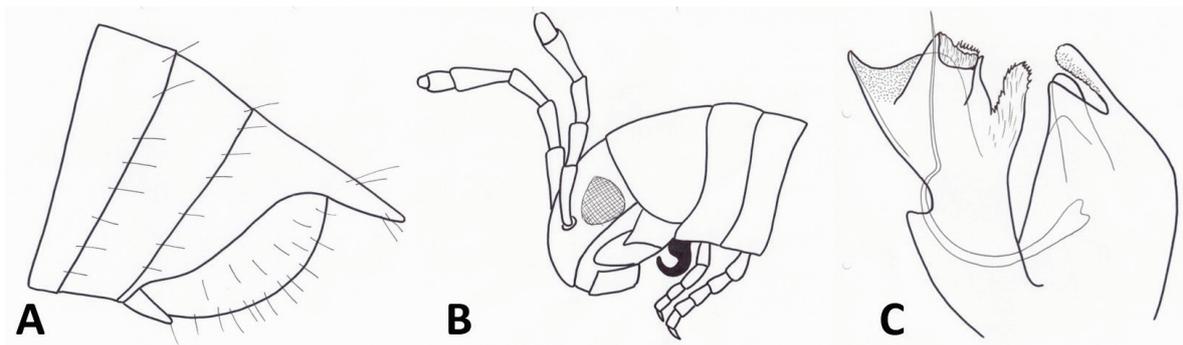


Fig. 2. *Ophiulus pilosus*. A) Tail end, B) Head with modified first pair of legs in black and C) Left gonopods. © Harald Hauser from HAUSER & VOIGTLÄNDER (2019).

## Results

### BELGIAN SPECIMENS STUDIED

Antwerpen: Bonheiden (Mispeldonk), deciduous forest, 31UFS05, 26.IV.2021, 3♂♂ 3♀♀, leg. Kas De Smedt & det. Pallieter De Smedt – Bonheiden (Mispeldonk), deciduous south-facing forest edge, 31UFS05 (Lat. 51.00721558, Long. 4.54632318), 02.V.2021, 1♂, leg. & det. Pallieter De Smedt. The species has been reported from forest habitat in the nature reserve Bos 't Ename in Oost-Vlaanderen on 30.VI.2005 but the identification of the species was never verified and finally got lost (ZWERTVAEGER *et al.*, 2005).

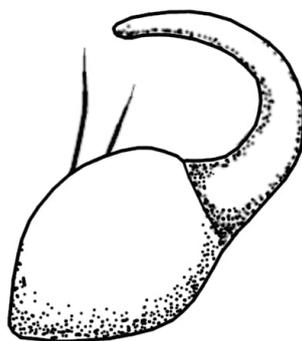


Fig. 3. Detail of the modified first leg (left leg) from one of the Belgian male individuals. © Stijn Segers.

### IDENTIFICATION

(Following: BLOWER, 1985; ANDERSSON *et al.*, 2005; HAUSER & VOIGTLÄNDER, 2019)

Adults are large Julid millipedes, black to blackish brown colored (Fig. 1) with lighter prozonites. Lower parts of the metazonites have light colored spots. The hairs at the posterior end of the metazonites are long (longer than e.g. *Julus scandinavicus*). It is a Julid millipede with a long and pointy “tail” (backward projection of the pre-anal ring) (Fig. 2 A). Length is very variable from 13 to 20 mm for adult males and 20 to 40 mm for adult females. As for other closely resembling Julid species, the first pair of legs of the males are deformed, but the ones from *O. pilosus* are very distinct. They are almost perfectly sickle-shaped (black colored in Fig. 2 B) with a ventrally swollen gnathochilarium (Fig. 3). The male gonopods (Fig. 2 C) are characteristic and allow to distinguish between this species and males of *J. scandinavicus*, *Leptoiulus kervillei* and *L. proximus*. Females are much more challenging to distinguish (see BLOWER, 1985). Additionally, *O. pilosus* has a more slender appearance and in general more body segments (generally above 50 for females, previously mentioned species generally below 50).

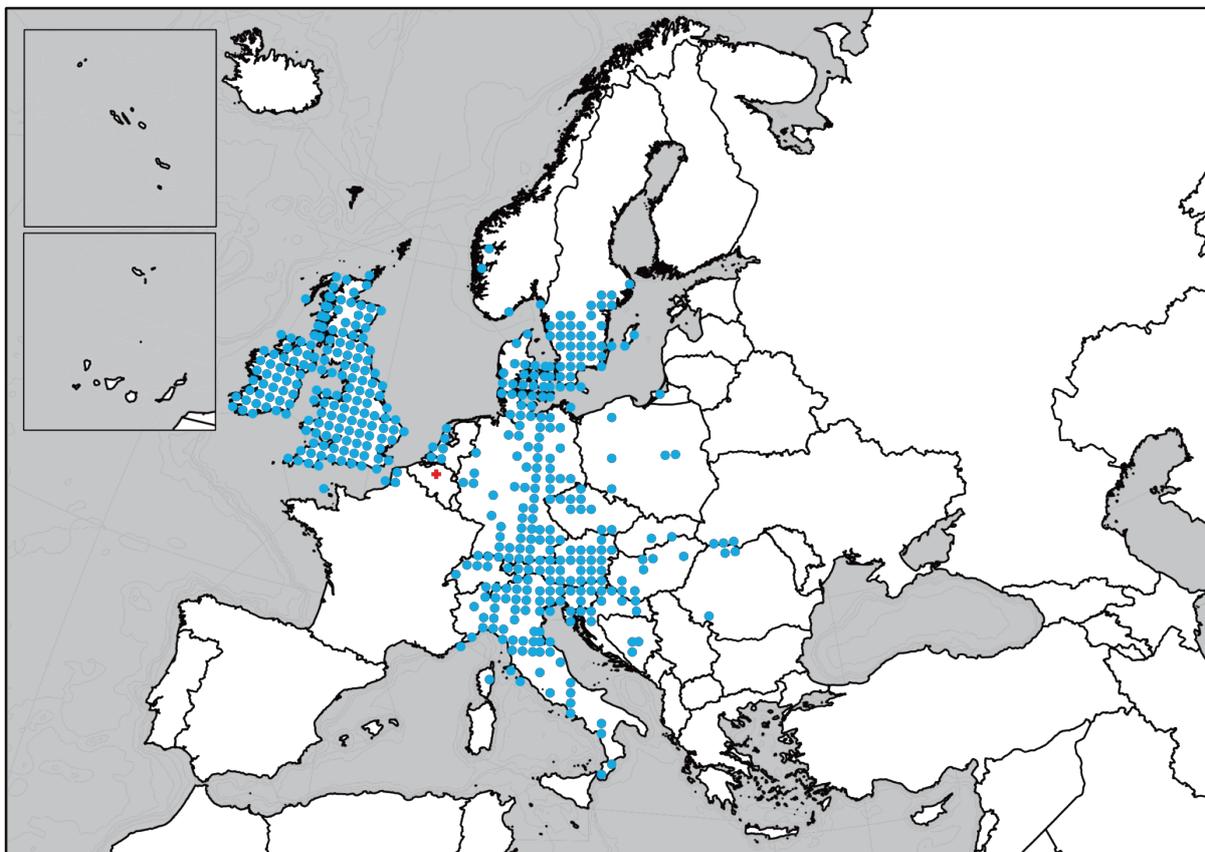


Fig. 4. Distribution of *Ophiulus pilosus* in Europe. The red cross represents the Belgian record. Modified with permission from KIME & ENGHOFF (2017).

#### DISTRIBUTION AND HABITAT

*Ophiulus pilosus* has a very peculiar distribution (Fig. 4) (KIME & ENGHOFF, 2017). The species is very common in the UK and Ireland but rather rare in France and the Netherlands at the Atlantic coast. In France it is only known from the extreme north-west. In the Netherlands it is mainly distributed near the coast in Noord- and Zuid-Holland. Although, there are some observations in the east of the country. The species is not yet recorded from the Grand Duchy of Luxembourg. The species is not rare in Germany where it is mainly found in the center and south of the country. Southwards the German populations are connected to the ones in Austria and Northern Italy where the species seems to be very common. Its distribution goes as far

south as the southern-most tip of mainland Italy. In the East, the species gets rarer but occurs up to Northern Romania and Southern Ukraine, west from Moldova. In the North, it reaches up to Stockholm in Sweden and Bergen in Norway where the species is more confined to the coast. Because of this peculiar distribution with large gaps, KIME (1999) suggested that the species might have been introduced in large parts of Europe and being a successful invader. It probably originates from Italy. It could have reached the UK, Ireland, Northern Europe and Western Europe via accidental human transportation. The first sightings in Belgium are, at first sight, somewhat unexpected in the middle of the country. We would rather have expected the species to be found at the coast or the east of the country, where it connects to French or Dutch populations. However, this could support KIME's (1999) findings that the species is frequently transported via human transportation and easily establishes new populations.

The species was found at the southern forest edge of an old deciduous forest patch that is wooded for at least 100 years in the nature reserve "Mispeldonk" in the southern tip of the province of Antwerp. The area of the patch is only about 0.75 ha and embedded in a lowland valley landscape of the river Dijle. The forest is located on an historic natural river dune on sandy soil. The locality is dry and has a warm microclimate (southern forest edge). The forest edge is about 120 m long and borders a ditch which maintains water the whole year except in dry summer months (Fig. 5). The opposite side of the ditch borders a wet agricultural grassland dominated by *Holcus lanatus*. The dominant tree species in the forest is *Quercus robur* intermingled with a smaller proportion of *Quercus petraea*. The shrub layer at the edge is varied and consists of *Quercus robur*, *Sorbus aucuparia*, *Amalanchier lamarckii*, *Prunus serotina*, *Quercus rubra*, *Betula pendula*, *Robinia pseudoacacia*, *Pinus sylvestris*, *Crataegus monogyna* and *Citrus scoparius*. The herb layer close to the edge had a cover of 50 to 90 % and mostly consisting of the grass *Deschampsia flexuosa*, tree seedlings, and some forest edge species like *Hieracium umbellatum*, *Hypericum perforatum* and *Linaria vulgaris* (Fig. 6). The male individual of *O. pilosus* that was captured by hand on 02.V.2021, was found underneath a very old wooden post that was once part of a fence. The other specimens captured on 26.IV.2021 were probably found underneath dead wood, which is relatively abundant in the forest patch.

On the British Islands, where the species is very common, it can reach high densities in deciduous woodland where it is often the dominant species (BLOWER, 1985). However, unlike e.g. *J. scandinavicus*, *O. pilosus* can be frequently found in gardens and other anthropogenic areas as well (BLOWER, 1985). Flexibility in habitat use of *O. pilosus* is also found in other countries like the Nordic countries (ANDERSSON *et al.*, 2005), the Netherlands (BERG *et al.*, 2008) and Germany (VOIGTLÄNDER, 2011). This ability to adapt to anthropogenic habitat can probably explain its success of establishing populations in- and outside Europe (e.g. North America and New Zealand) (KIME, 1999; KIME & ENGHOFF, 2017). Along the coast of northern France and the Netherlands, the species is found in more natural habitat being damp woodlands behind the dunes. Therefore, the species could be expected along the Belgian west-coast, where a population would be more or less connected to French populations. The species seems to prefer calcareous soils in most of our neighboring countries (BLOWER, 1985; BERG *et al.*, 2008). In Belgium the species was found on a more acid sandy soil in a dry biotope and matches the habitat requirements described by VOIGTLÄNDER (2011). VOIGTLÄNDER (2011) classifies *O. pilosus* as a species from generally dry biotopes. The location of the Belgian record never floods while the surrounding valley grounds do annually.

At the location of the record, houses and other anthropogenic habitat are rather far away (> 100 m) and a small walking trail next to the locality was only established a few years ago. It is therefore likely that the population already persists for a longer period of time and can be considered as an established population, particularly because multiple individuals were found.



Fig. 5. Location where *Ophiulus pilosus* was found at a southern forest edge of an oak- (*Quercus robur/petraea*) dominated forest. © Pallieter De Smedt.



Fig. 6. Inner forest edge where *Ophiulus pilosus* was found next to a recently (< 5 years) created forest track. © Pallieter De Smedt.

The millipede community in this forest patch is dominated by *Cylindroiulus punctatus* and *Proteroiulus fuscus*. Other accompanying species were *Craspedosoma rawlinsii*, *Cylindroiulus latestriatus*, *Cylindroiulus caeruleocinctus* and *Ommatoiulus sabulosus*. This millipede community is a combination of forest and open landscape species, characteristic for a forest edge community. Additionally, also the woodlice *Oniscus asellus*, *Porcellio scaber*, *Philoscia muscorum*, *Trichoniscus pusillus* and *Hyloniscus riparius* were present which are all more or less eurytopic species.

### Conclusion

The presence of *O. pilosus* in Belgium was expected because of its presence in neighboring countries. It was discovered in the middle of the country far from possible source populations. Was it sheer luck to stumble upon this rare species or is the species more common but strongly overlooked? Probably both. *O. pilosus* could occur widespread in the northern part of the country in both natural and anthropogenic habitat based on its habitat requirements. However, if the species would be widespread, it is probably rare since the species was not recorded across Belgium during extensive field inventories carried out by KIME (2004) more than twenty years ago. It is therefore possible that the species will get more common and widespread in Belgium due to human transportation in the future, supporting the view of KIME & ENGHOF (2017) that the species has a strong ability to establish populations once it reaches suitable habitat.

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