CYLINDROIULUS APENNINORUM (BRÖLEMANN, 1897) (DIPLOPODA, JULIDA: JULIDAE) NEW FOR THE UK FROM THE ISLE OF WIGHT AND SOUTH DEVON

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INTRODUCTION

During a collecting trip to Ventnor Botanical Gardens on the Isle of Wight by one of us (ADB) in September 2015 a species of millipede previously unknown from the UK with a very obviously projecting telson and ventral scale (similar to that in *Enantiulus armatus*) was found. Specimens were confirmed by Henrik Enghoff as *Cylindroiulus apenninorum* and an account of its discovery was published in a local journal (Barber, 2016). Whilst the present report was in draft, a second location at West Hoe Gardens, Plymouth was recorded (October 2016).

BACKGROUND & HISTORY

C. apenninorum was described by Brölemann in 1897 from Italy as *Iulus apennïnorum*, to distinguish it from *Iulus dicentrus* (Latzel, 1884) from Austria with which it had previously been confused. The latter is now considered as being in a different genus (Read, 1990) and is known as *Allajulus dicentrus*.

In his original description Brölemann describes *C. apenninorum* as being robust and having between around 49-53 body rings. The biggest females were 31-33mm in length and 3mm in diameter. As is usual in *Cylindroiulus*, the first pair of legs in mature males were transformed into crotchets and the cheek plate was expanded. He provided a figure of the gonopods (Fig. 1) and mentions that like *C. pyrenaicus* and *A. dicentrus* there are two 'points' projecting from the rear end of the animal, those of the telson and the ventral scale.

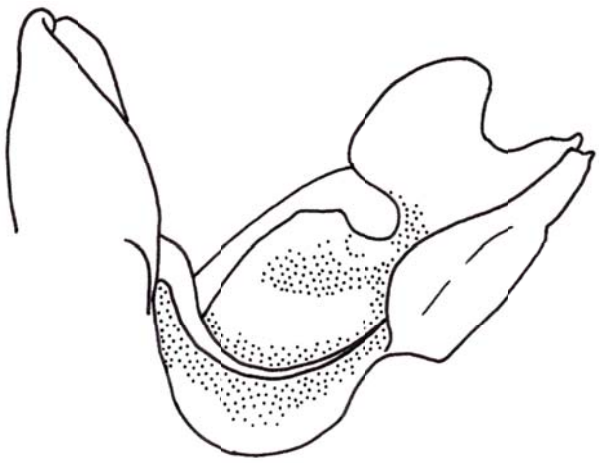

FIGURE 1: Redrawing of inside view of gonopod of *C. apenninorum* from Brölemann, 1897

A number of subspecies and varieties have been named at various times but the main reason for distinguishing different subspecies seems to have been on the basis of gonopodal characters, particularly the opisthomere. More recent studies of the gonopods of *Cylindroiulus* species have shown that they can be variable in shape (see for example *C. britannicus*, Blower 1985) and there can also be differences in body size too. It is therefore likely that today we would not distinguish between these various subspecies although specimens have not been studied.

DESCRIPTION

In the context of currently known British species, *C. apenninorum* is a medium to large julid, a little smaller than *C. caeruleocinctus*, and is medium brown to dark in colour (Fig. 2). However, it is worth noting that some specimens from the Isle of Wight were paler and more mottled (Fig. 3); it is possible that individuals were freshly moulted, but Berg (pers. comm.) notes that he has not seen pale individuals in any Dutch population. It has a straight, pointed dorsal projection on the telson and a ventral scale that is also pointed and projecting (Fig. 4). This same feature is also seen in another British species, *Enantiulus armatus* which tends to be rather smaller in size and paler in colour; some features of these two species are listed in Table 1. As noted by Brölemann, the cheek plate in mature males of *C. apenninorum* is expanded (although it does not appear as pronounced as in most other species of *Cylindroiulus*) and the first pair of legs are crotchet shaped (Fig. 5).

Unlike *Enantiulus* (and in common with other *Cylindroiulus* species), *C. apenninorum* lacks setae on the body rings; these are often most easily seen on the apodous rings close to the telson. Fig. 6 illustrates the telson and apodous rings of *E. armatus*.

TABLE 1. Comparison of some characteristics of *Cylindroiulus apenninorum* and *Enantiulus armatus*.

	C. apenninorum	***E. armatus* (from Blower, 1985)**
Size, up to	33mm x 3mm	15.1mm x 1.05mm
Colour	Medium to dark brown But note pale specimens	Light olive green due to gut pigments & light amber cuticle
Body rings	45 – 53	Up to 51
Setae on body rings	Absent	Present
Male first legs	Comma shaped	More angular and “elbow” shaped
Current known occurrence in Britain	Isle of Wight & Plymouth, Devon	South Devon & Cornwall

LOCATION AND ASSOCIATED SPECIES

The Isle of Wight in general and Ventnor Botanic Gardens in particular are known for their warm climate where a good number of exotic plants from various parts of the World are grown out-of-doors and it is apparently almost frost-free. Two specimens of *Oxidus gracilis* (normally a hot house species in the UK) were found out of doors underneath some timber in the "compost area" amongst rubbish. The garden is described as being influenced by the nearby chalk downs and with the majority at pH 7.5 and small, isolated and seasonally waterlogged pockets between pH 6.5 and 7 (Chris Kidd, pers. comm.). The first Plymouth location was a long established park in an old limestone quarry area at the western end of Plymouth Hoe where the quarry sides are south/south westerly facing. Various exotic

plants such as *Cordyline* are planted there. Animals were subsequently also found in a garden on Plymouth Hoe itself (limestone). In all cases they were under leaf litter.

Haplopodoiulus spathifer was found in good numbers in the Ventnor Gardens. This species seems to be quite widely found in botanic gardens in the south of England so was not perhaps unexpected and there is a connection between the Gardens and Kew where this species has been long established. *C. apenninorum* was very common in certain parts of these gardens, for example the palm garden and the 'Australia' section and specimens were found in wet litter over dry soil. They were comparable in size and shape to typical julids and appear markedly larger and fatter than *Enantiulus armatus*. The mature individuals were quite dark but there were some very pale examples too.

FIGURE 2: Habitus of mature *Cylindroiulus apenninorum*, specimen from Isle of Wight

ACTIVITY PERIOD

Both records of *C. apenninorum* were made in the autumn. Berg (pers. comm.) notes that most Dutch records have been collected between November and January and in April.

DISTRIBUTION IN EUROPE & HABITAT

The species was described from Italy where it is relatively common. Many of the earlier descriptions record it from sweet chestnut woodland.

C. apenninorum was apparently recorded in The Netherlands (as *Julus dicentrus*) as early as 1889 (Jeekel, 2001). Dr Jeekel (loc. cit.) recalled finding it in substantial numbers in Haagse Bos, an old park in the centre of The Hague, possibly a remnant of the old coastal deciduous woodlands behind the sand dunes. He also expressed surprise that this species had not been found elsewhere in Western Europe since it was not rare in those sites where he found it. There are now known to be several populations in the Netherlands (Berg 2008) where it is considered an alien species. It is described by Berg (pers. comm.) as being found in more or less 'natural' conditions around the west of the country (many sites

FIGURES 3-5: *Cylindroiulus apenninorum*, specimens from Isle of Wight
3) Pale specimen; 4) Posterior end showing projecting telson and ventral scale; 5) Head and first few legs of mature male (crotchet shaped first pair arrowed)

FIGURE 6 Posterior view of *Enantiulus armatus* – note prominent setae

around Den Haag and Delft) as well as further east, just north of Utrecht (about 5 sites) on a sand ridge deposited by the last ice age. All sites are on sandy soil in rather open forests. The western inland sites are *Populus alba* forests on dunes, with a dense understorey of *Urtica dioica*, *Hedera helix*, *Rubus fruticosus*, sometimes with *Anthriscus sylvestris*, *Silene dioica*, *Glechoma hederacea* and *Galium aparine*. The more central sites are also quite open deciduous forest growing on a lateral moraine but with a dense understorey. Berg notes that the species appears to like rather rich sandy soil and is absent from clay soils, also that the forest sites are often isolated and rather dry but that the species appears to be able to withstand a certain amount of disturbance. In the Netherlands the species is often accompanied by *Polydesmus denticulatus*, *Julus scandinavius* and *Allajulus nitidus.*

CONCLUSIONS

C. apenninorum appears to have been introduced to the UK but the fact that it has been found at several sites in the Netherlands suggests that it may occur in other places in the UK too. The Dutch habitat information suggests that the most promising places to look for the species is in areas with scattered trees on sandy soils (or botanic gardens!) but the two known British locations seem to be on alkaline soil. Juvenile specimens with a similar appearance were found in South Wales several years ago (Greg Jones, pers. comm.) but it was not possible to confirm the identification of these.

Specimens are currently deposited in the authors' and the BMIG collections.

ACKNOWLEDGEMENTS

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