

CYLINDROIULUS SAGITTARIUS (BRÖLEMANN, 1897) NEW FOR THE UK (DIPLOPODA, JULIDA: JULIDAE) AND A NEW HOST FOR RICKIA LABOULBENIOIDES (LABOULBENIALES)

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ABSTRACT

The millipede *Cylindroiulus sagittarius* (Brölemann) is recorded new for the UK. It was discovered in woodland near Wyllie in the Sirhowy Valley, Monmouthshire in December 2017 and has been shown to be distributed along at least a 6 km length of the valley. A description with figures is provided to enable identification. Comparison is made with *C. punctatus*, a species of similar appearance and habitat preferences. Information is provided about habitats and micro-sites inhabited and associated species. Given the coal mining heritage of the Sirhowy Valley it is considered most probable that *C. sagittarius* is an accidental introduction.

Key words: Diplopoda, Julidae, *Cylindroiulus sagittarius*, new for UK, identification, habitats.

INTRODUCTION

The genus *Cylindroiulus* Verhoeff, 1894 (Diplopoda, Julida: Julidae) displays high species diversity with over 100 described species occurring widely across Europe (Kime & Enghoff, 2017). In Britain and Ireland this is the most species diverse millipede genus. Lee (2006) lists nine species of *Cylindroiulus*, with two additional species recently added to the UK list; *C. apenninorum* (Brölemann) from southern England and northern Ireland (Barber & Read, 2016; Anderson, 2018) and *C. pyrenaicus* (Brölemann) from south Wales (Gregory, Owen, Jones & Williams, 2018).

During a series of recent collecting trips by CO to several woodland sites in the Sirhowy Valley (south Wales) specimens of *Cylindroiulus sagittarius* (Brölemann, 1897) were collected. Details of its discovery and a description based on material collected from south Wales is provided below.

DISCOVERY

On 3rd December 2017 CO collected a '*Cylindroiulus*' millipede that seemed to bear a projecting, but pointed, telson from woodland near the village of Wyllie in the Sirhowy Valley, Monmouthshire (ST177943, VC 35). Initially this was thought to be *Cylindroiulus punctatus* (Leach) with a damaged telson, but when numerous additional examples were found specimens were collected for closer examination. Dissection of a male confirmed that these were not aberrant *C. punctatus*, but a different species. The following day CO collected additional specimens from woodland south of Wyllie, from both sides of river Sirhowy, and at Craig y Prisiad, near Ynysddu, some ¾ km and 2 km downstream of the initial record, respectively. On 14th December CO discovered an additional site at Sirhowy Valley Country Park (ST203909, VC 35) a further 4 km downstream. A male and female specimen were forwarded to SJG who named them as *Cylindroiulus sagittarius* (Brölemann, 1897). This determination was confirmed by Hans Reip from images of male gonopods.

These are the first British occurrences of *Cylindroiulus sagittarius* (Brölemann, 1897). Details of these records are listed in Table 1. Additional specimens were collected by SJG in March 2018 during the BMIG field meeting to south Wales.

TABLE 1: The first British records of *Cylindroiulus sagittarius* in chronological order

Recorders: CO – Christian Owen; SJG – Steve Gregory; *Material examined for this paper

Locality	Grid Ref	VC	Number of specimens	Date of collection	Leg.
Wyllie Wood, north of Wyllie	ST 177 943	35	2♂, 5♀*	03.xii.2017	CO
Wyllie Wood, south of Wyllie	ST 176 936	35	Few ♂♀	04.xii.2017	CO
Craig y Prisiad, near Ynysddu	ST 177 926	35	Few ♂♀	04.xii.2017	CO
Sirhowy Valley Country Park	ST 211 913	35	Few ♂♀	14.xii.2017	CO
Sirhowy Valley C.P., Quarry Mawr	ST 204 909	35	2♂♂, 3♀♀*	23.iii.2018	SJG

IDENTIFICATION

Taxonomy

ORDER Julida Brandt, 1833

FAMILY Julidae Leach, 1814

TRIBE Cylindroiulini Verhoeff, 1930

GENUS *Cylindroiulus* Verhoeff, 1894

***Cylindroiulus sagittarius* (Brölemann, 1897)**

syn. *Iulus sagittarius* Brölemann, 1897

syn. *Cylindroiulus hispanicus* Ceuca, 1974

Diagnosis

Cylindroiulus sagittarius is a darkly pigmented brown millipede, lacking frontal setae and bearing a projecting telson that tapers to a bluntly pointed tip. Male gonopod diagnostic in lateral or mesal view.

In Bower (1985) this species will most likely key to *Cylindroiulus* (now *Allajulus*) *nitidus* (Verhoeff), a less well pigmented species with conspicuous body setae. Confusion is also possible with *Cylindroiulus punctatus*, but this species bears a characteristic bulbous (club-shaped) tip to the projecting telson.

Description

This description is based on recently collected material (as indicated in Table 1) preserved in 75% IDA.

Size

The three males examined are between 14-15 mm in length by 1.1-1.2 mm in diameter. The four females are between 15-17 mm in length by 1.2-1.4 mm in diameter. This is similar to the lower end of the dimensions given for *C. punctatus* by Blower (1985).



Figure 1: *Cylindroiulus sagittarius* from at Wyllie Wood, December 2017

A) Live female specimen, habitus (image © Keith Lugg); B) Male posterior body rings, showing apododous segments and projecting telson; C) Male gonopods (cleared in euparal), mesal view.

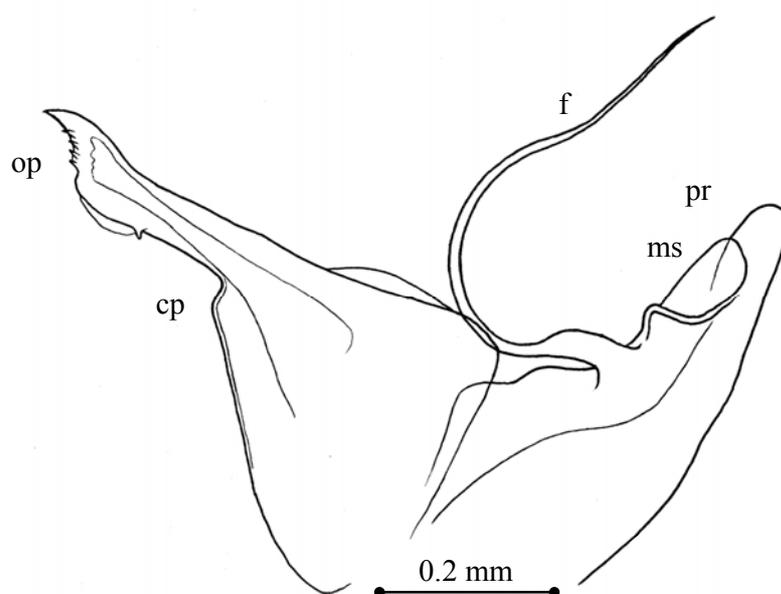


Figure 2: *Cylindroiulus sagittarius* from at Wyllie Wood, male gonopods, mesal view

op – opisthomerite; cp - coxal projection; f - flagellum; ms - mesomerite; pr – promerite

Colour

Fresh specimens are brown mottled with white giving an overall medium-brown colouration (Fig. 1A). Ozopores a reddish-brown colour. The head, collum, anal ring and legs are noticeably paler.

This colouration is more akin to that of *C. britannicus* (Verhoeff) and is noticeably darker than seen in typical *C. punctatus*, which typically ‘straw to light-brown’ (Blower, 1985).

Body rings

Specimens examined had between 45-50 body rings (including collum and telson), all with three apodous posterior body rings. Eyes comprise well pigmented ocelli arranged in a rounded trapezoid. The ocelli are indistinct and it is not easy to observe rows and hence to determine the stadia.

Metazonites bear relatively deep and closely set longitudinal striae (similar to seen in *C. punctatus*). In common with other *Cylindroiulus* species frontal setae on head and fringing setae on metazonites are absent and the ozopores lie on the suture between prozonites and metazonites.

Telson is produced into a stout caudal projection that is slightly swollen mid way along its length, but then tapers into a rounded and slightly down-turned tip (Fig. 1B). This contrasts with *C. punctatus* where the ‘club-shaped’ telson is widest towards its tip. The sub-anal scale is not projecting and closely adpressed to the ventral edge of the anal valves. Anal valves each bear three pairs of setae (as seen in *C. punctatus*).

Male: gonopods (leg pairs 8 and 9)

Male gonopods in mesal view are of characteristic shape (Fig. 1C & Fig. 2). Promerite (p) noticeably longer than mesomerite (m). Base of opisthomerite (op) well developed, broad, but narrows abruptly into a long slender mid-section which expands into a sub-triangular terminal structure (thus narrower at the mid-point than apically). The paracoxal process (cp) is reduced to a small rounded bump. Flagellum (f) well developed and elongated into a fine point.

This general shape of the opisthomerite is similar to that seen in *C. punctatus* (see Blower, 1985, pg. 153, Fig. 47D), but this later species differs in having a slender elongated paracoxal process, bearing a hooked tip, almost as long as opisthomerite.

Male: secondary sexual characters

In keeping with other species of the genus the stipes of mature males are expanded ventrally and leg pair 1 considerably reduced in size and modified into a pair of hook-shaped structures.

Female characters

Female vulvae were not examined.

DISTRIBUTION AND HABITATS

Occurrence in South Wales

Currently *C. sagittarius* has been recorded from several woodland sites along a 6 km length of the Sirhowy Valley between the former mining communities of Wyllie (near Blackwood) and Crosskeys (near Risca). Specimens have been collected from deciduous woodland; including Alder *Alnus glutinosa* carr on the flood plain of the River Sirhowy and within Oak *Quercus* sp., Beech *Fagus sylvatica* and Hazel *Corylus avanula* dominated stands on the valley sides. The underlying geology at all sites is coal-bearing carboniferous limestone.

In December 2017 *C. sagittarius* appeared to be the dominant millipede within dead wood and was readily found beneath logs and branches, including those partially embedded in silt on the river bank. Specimens were also recorded from dead wood lying on the free draining embankments of a disused railway line. Few other millipedes were found associated; mainly *Polydesmus angustus* Latzel, and the occasional *C. punctatus* and *Ophiulus pilosus* (Newport). In mixed deciduous/conifer woodland areas specimens of *C. sagittarius* were only found associated with deciduous logs and branches.

It was not found by searching through leaf litter, where *Melogona gallica* (Latzel), *M. scutellaris* (Ribaut) and *Chordeuma proximum* Ribaut were the most dominant species. Neither was it found in conifer plantations, where its congeners *C. punctatus* and *C. britannicus* (Verhoeff) were found instead.

The fact that good numbers of *C. sagittarius* were found associated with dead wood on the river bank suggests that it may have been dispersed considerably further downstream of the currently known 6km length of the Sirhowy Valley.

Foreign distribution and habitats

The known range of *Cylindroiulus sagittarius* is mainly centred on the western Pyrenees of France and Spain, but it is also known from the Cantabrian Mountains of northern Spain (Kime & Enghoff, 2017). It is typically associated with Montane forest, often on limestone, including Beech and Oak, and also Alder woodland along streams. It occupies a similar ‘dead-wood’ niche to *C. punctatus*, which it replaces at higher altitudes in the mountains, between 550–2000 m asl. In addition to being found beneath bark and within rotting wood, it has also been recorded from among leaf-litter and moss.

These habitats and associated microsites are in keeping with observations of this species in south Wales.

Native or Introduced?

The Sirhowy Valley has a strong industrial heritage due to the discovery of coal in the early 19th century (<https://en.wikipedia.org/wiki>). In the Crosskeys area coal mining was established in the 1830s when the community was built to serve the Black Vein and subsequently the New Risca coal mines. The village of Wyllie was later established further north up the valley in 1926 to house miners working for Tredegar Iron and Coal Company. This colliery closed in 1968.

Given the extent of former coal mining and steel production industries in the Sirhowy valley it is quite likely that *C. sagittarius* has been unintentionally introduced to this valley through importation of goods associated with these industries.

A NEW HOST FOR *RICKIA LABOULBENIOIDES* (LABOULBENIALES)

One male *Cylindroiulus sagittarius* collected by CO from Wyllie Wood on 3rd December 2017 was found to be infected with a Laboulbeniales fungus, which was confined to the anterior legs close to the head. This was identified by Henrik Enghoff as *Rickia laboulbenioides* De Kesel *et al.*, 2013.

This fungus, originally described from *Cylindroiulus latestriatus* (Curtis), has been widely, albeit rarely, reported from *C. punctatus* (Leach) in the UK, and recently confirmed from *C. pyrenaicus* (Brölemann) and *C. britannicus* (Gregory *et al.*, 2018; Storey, 2019). Here we formally add *Cylindroiulus sagittarius* as a host for *R. laboulbenioides*.

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