

***Cylindroiulus bouvieri* (Brölemann, 1896) a long-overlooked synonym of *C. parisiorum* (Brölemann & Verhoeff, 1896) (Diplopoda: Julida: Julidae).**

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Introduction

In a recent study of *Cylindroiulus* from Spain (Read, 2022) HJR came across mention of *Cylindroiulus bouvieri* (Brölemann, 1896) because it was compared by Attems (1952) to two *Cylindroiulus* species he described, *C. franzi* Attems, 1952 and *C. unciger* Attems, 1952.

Cylindroiulus bouvieri (Brölemann, 1896) was described originally as *Julus (Anoploiulus) bouvieri* Brölemann, 1896 in the same paper as *C. parisiorum* (Brölemann & Verhoeff, 1896) and *C. parisiorum miraculus* (Verhoeff, 1896)*. The description was based on a single adult male specimen, collected in the warm greenhouses of the Muséum National d'Histoire Naturelle (MNHN), Jardin des Plantes, under a flower pot. Hence the real geographic and/or habitat origin of the specimen is unknown. It was designated by Brölemann as "an interesting form". The gonopods illustrated in the original description appear quite *Cylindroiulus*-like although they are not obviously clearly recognisable as those of any other well-known species.

Following its description *C. bouvieri* seems to have disappeared from the literature. It is not listed on the Fauna Europea website (www.fauna-eu.org) nor mentioned in the recent atlas of European Julids (Kime & Enghoff, 2017) but is cited as an accepted species in the Millibase (www.millibase.org) and Worms (www.marinespecies.org) databases. Recently the type specimen was relocated in the collection of the MNHN by J-JG and studied, with a view to trying to establish the true identify of this species.

Results

Several specimens of *C. bouvieri* were located in jar ED 041, the labelling of which had been changed during a re-organisation (previously the jar would have been labelled EB 041). The jar contained two vials, one containing 2 females, 1 juvenile male and 1 juvenile, all of them broken into several fragments, the other containing the holotype adult male, dissected, consisting of the anterior part with head and anterior segments, posterior part of the body and gonopods preserved and enclosed within a small sheet of paper.

Following examination, the following notes were made:

The specimens are weakly pigmented; however they have been preserved for a number of years in ethanol so the body, tegument and ommatidia are quite depigmented. The adults (male and females) bear 6-7 pairs of setae on the anal valves.

*Note that *C. parisiorum* was described by both Brölemann and Verhoeff despite this being in a paper authored solely by Brölemann (1896).

The two pairs of male gonopods, left and right, while separated, are stuck together and they seem to have been partly crushed and twisted. One gonopod is quite similar to the drawing given by Brölemann in the original description (1896): fig. IX p. 5 (Figure 1). However, when observed from a different orientation, the part indicated as "h" by Brölemann is quite similar to the brachite of *Cylindroiulus parisorum* drawn by Blower (1985) in fig. 50C (Figure 2). Blower (*loc. cit*) attributed the variation in the detail of the opisthomerite in his drawings to coverslip pressure which altered the appearance of the tip of the brachite (see pages 160-161 for detail).

If the gonopods are turned to another orientation, particularly that not figured by Brölemann (1896), it clearly shows an obvious coxal projection quite similar to the part "a" shown by the drawing by Brölemann and Verhoeff 1896 (fig. VII p. 4). It also appears quite similar to the drawing by Blower (1985) in fig. 50D (Figure 3), those by Lohmander (1925) and also unpublished sketches which are noted as 'Brade-Birks del. Angleterre' and were probably by Brade-Birks and sent to Brölemann (the two were certainly in contact, A. Barber pers. com.). These latter sketches are held in the iconographic file in Paris but have probably not been published.

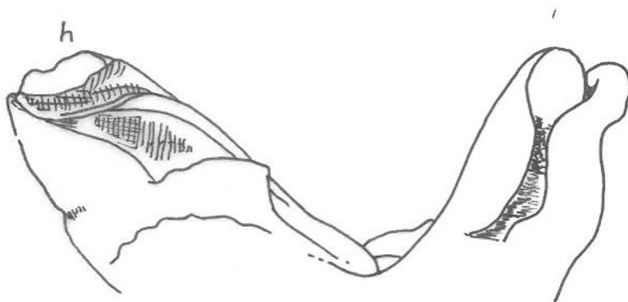


Figure 1:

External view of male gonopods of *C. bouvieri* redrawn from Brölemann (1896) but reversed so same orientation as Figures 2 and 3 (see text for details).

Figure 2:
Internal view of male gonopods of *C. parisorum* redrawn from Blower (1985, figure 50C). B – brachite.

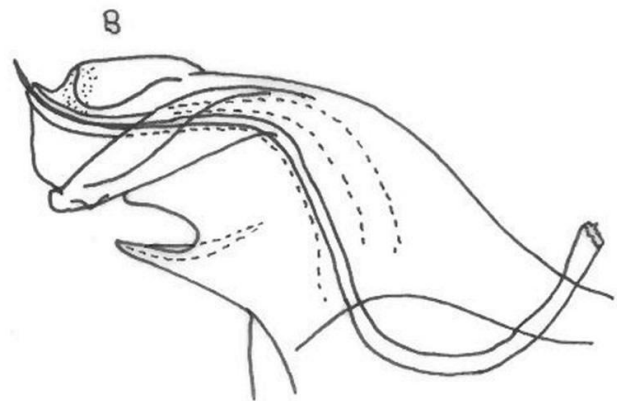
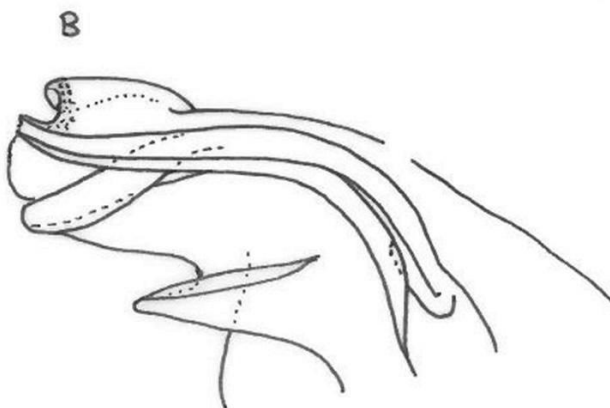


Figure 3:

External view of male gonopods of *C. parisorum* redrawn from Blower (1985, figure 50D) showing impact of coverslip pressure on brachite (B).

Another species that *C. bouvieri* might potentially be considered as synonymous with is *Cylindroiulus truncorum* (Silvestri, 1896).

However, the gonopods differ in the length of the paracoxal process, which is not as long as that depicted in *C. truncorum* (see Verhoeff's 1926 illustration of *Cylindroiulus luscus salicis* which is now regarded as a synonym of *C. truncorum*; Lohmander 1925). In addition, the brachite of the gonopod does not show any details similar to *C. truncorum* published by Blower 1985 (Fig. 51A, B), Akkari & Enghoff (2008: 14) or Akkari *et al.* (2009: 6).

There are also differences in the somatic characters:

- The number of setae on the anal valves is 6 or 7 (similar to *C. parisiorum*) and not as numerous as *C. truncorum* (which has more than 7 and generally 9-12).
- In the original description the striation of the body rings was described as being denser in *bouvieri* than in *parisiorum*. Well-developed striae are a characteristic of *truncorum* (Korsós & Enghoff 1990) however, when examined in the holotype male as well as the females it was found to be scarcely different to that of *C. parisiorum*.
- In addition, *Cylindroiulus truncorum* is rare in France, known from just a few locations in Nièvre, Val-d'Oise and Brittany (Finistère and Loire-Atlantique), some of which are unconfirmed. In contrast *C. parisiorum* is well known from various locations in Paris and France.

Verhoeff (1896) following his description of different variations in *Iulus parisiorum miraculus*, questioned if they were all the same species. Since 1896, no further specimens of *Cylindroiulus bouvieri* have been collected from the Jardin des Plantes, while many other specimens belonging clearly to *Cylindroiulus parisiorum* have been collected from the MNHN greenhouses, the MNHN catacombs and also from other subterranean galleries under Paris (Geoffroy & Ferrand 2020). As the different forms found by Verhoeff (1896) were found in the same location, living together in the same habitat one might think that only one species is represented, showing some variation.

In conclusion, *Cylindroiulus bouvieri* (Brölemann, 1896) should be considered as a junior synonym of *Cylindroiulus parisiorum* (Brölemann & Verhoeff, 1896) and possibly to *Cylindroiulus parisiorum miraculus* (Verhoeff, 1896). However, the latter has currently been considered as a junior synonym of the close species *Cylindroiulus latestriatus* (Curtis, 1845) which is known to live together with *C. parisiorum* in the same soil and subterranean habitats in Paris.

The Julid collection in Paris Museum was relatively recently reorganised by Jean-Paul Mauriès and the relevant collections were moved in the storage as follows:

Anoploiulus parisiorum miraculus Verh. was transferred from Jar EB 213 to Jar ED 146 which is labelled *Cylindroiulus latestriatus* (Curtis).

Julus (Anoploiulus) miraculus Verhoeff was transferred from Jar EB 180 to Jar ED 146 which is labelled *Cylindroiulus latestriatus* (Curtis).

Cylindroiulus latestriatus (Curtis) was transferred from Jar EB 147 to Jar ED 147 which is labelled *Cylindroiulus latestriatus* (Curtis).

These have been checked by J-JG and it is confirmed that the specimens in Jar ED 147, all labelled *Cylindroiulus latestriatus*, are clearly *C. latestriatus*.

Specimens in Jar ED 146 are labelled *Iulus (Anoploiulus) miraculus*, *Julus* or *Cylindroiulus frisius*, *Julus* or *Cylindroiulus luscus* (or *luscus miraculus*). Many of these specimens were collected in France and/or Italy (mainly Lombardia). They seem clearly to belong to *Cylindroiulus latestriatus* (Curtis). The gonopods are similar to those illustrated by Blower 1985 (Fig. 48B p. 157) and the number of setae on the anal valves is 3 (4) vs. 6-7 in *Cylindroiulus parisiorum*. Unfortunately, the number of setae on the anal valves were not clearly documented in Verhoeff's (1896) original description of *Julus (Anoploiulus) parisiorum miraculus*.

The synonymy of *C. parisorum* is therefore:

***Cylindroiulus parisorum* (Brölemann & Verhoeff, 1896)**

Iulus (*Anoploiulus*) *Parisorum* Brölemann & Verhoeff, 1896

Iulus (*Anoploiulus*) *Bouvieri* Brölemann, 1896, **new synonym**

Cylindroiulus bouvieri (Brölemann, 1896)

Cylindroiulus ignoratus Attems, 1927

The synonymy of *C. latestriatus* remains therefore:

***Cylindroiulus latestriatus* (Curtis, 1845)**

Iulus latestriatus Curtis, 1845

Iulus hortensis Wood, 1864

Iulus frisius Verhoeff, 1891

Cylindroiulus frisius (Verhoeff, 1891)

Iulus parisorum miraculus Verhoeff, 1896 In: Brölemann & Verhoeff 1896

Iulus owenii Bollman, 1887

Iulus luscus Meinert, 1868

Iulus hesperus Chamberlin, 1914

Neottiulus striatus Loomis, 1972

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