The Cylindroiulus truncorum-group (Diplopoda: Julidae)

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the four species of the C. truncorum-group are reviewed: Cylindroiulus truncorum (Silvestri, 1896), C. parasiiorum (Brölemann & Verhoeft, 1896), C. bellus (Lignau, 1903) and C. arborum Verhoeft, 1928. Male gonopods and female vulvae of each species are fully described and illustrated. Non-sexual characters such as developmental stadia, numbers of segments and anal setae, and metazonital sculpture, are also discussed. A key to the species is given, and a new synonymy: C. costatus Verhoeft, 1941 = C. bellus (Lignau, 1903), is established. As an addendum, Julius luscus Meinert, 1868 is reconsidered, and a lectotype is designated.

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Introduction

The genus Cylindroiulus Verhoeft, 1894, as recently defined by Read (1990), is one of the largest genera in the millipede family Julidae, see, e.g., Attens (1927) and Enghoff (1982). Numerous subgenera have been proposed, one of the largest being Aneuloboiulus Verhoeft, 1899 (regarded as full genus by Mauriès 1987). The Cylindroiulus truncorum-group belongs to Aneuloboiulus. The group as such has not been generally recognized, although it was characterized already by Verhoeft (1930). Thus the two group–members occurring in the British Isles (C. truncorum (Silvestri, 1896) and C. parasiiorum (Brölemann & Verhoeft, 1896)) were grouped by Blower (1985) in the so-called "luscus–group" which also includes C. latesriatus (Curtius, 1845) and C. britannicus (Verhoeft, 1991). Whereas the latter two species agree with those of the C. truncorum-group in most external characters, they differ in having only 3 setae on each anal valve (cf. below). C. truncorum and C. parasiiorum have at least 5 such setae (with rare exceptions) and furthermore extremely similar gonopods. They share these characteristics with two more eastern species: C. arborum Verhoeft, 1928, and C. bellus (Lignau, 1903). These four species are very closely related, rarely distinguishable by external characters. They form the subject of the present paper, which includes a detailed comparison of them as well as descriptions and illustrations of male gonopods and female vulvae.

Hoffman (1977, 1979) rightly maintained that in its current conception, the genus in question should be called by the name Allajulus C. L. Koch, 1847, rather than the much younger Cylindroiulus, and several authors have recently followed Hoffman's suggestion. However, Read's recent analysis (1990) restores Cylindroiulus as the valid name for the majority of species, including the truncorum-group, formerly assigned to Allajulus.

Material and methods

A total of 183 specimens of Cylindroiulus truncorum (3 ♀ syntypes, 46 ♂, 114 ♀, 20 juveniles), 11 of C. parasiiorum (6 ♂, 5 ♀), 16 of C. bellus (8 ♂, 8 ♀) and 45 of C. arborum (1 ♀ paratype, 21 ♂, 16 ♀, 7 juveniles) has been examined. The numbers of podous segments, of ocelli in the left ocular field, and of setae on the left anal valve, were recorded for most specimens. Midbody vertical diameter was measured to the nearest 0.02 mm, and metazonital structure was observed. Data on the number of podous segments (p.s.), body length (L.), and midbody vertical diameter (H) listed in the descriptive notes of each species paragraph, are a combination of literature records and of our own observations, these latter being shown in...
Table 1. Post-embryonic developmental stadia were determined by counting the rows of ocelli (Blower 1970, Enghoff 1982), i.e. stadium number is equal to number of rows plus one. A limited number of specimens was used for closer analysis of male gonopods and female vulvae. Either permanent slides or mounts for scanning electron microscopy (Jeol JSM-840) were made at the Zoological Museum, University of Copenhagen.
Abbreviations: L = body length, H = midbody vertical diameter, p.s. = pedous segments.

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Characterization of the truncorum-group
The truncorum-group is a distinctive group of species within the genus Cylindrodiulus, subgenus Aneuloboiulus. Verhoeff (1930) was the first to employ the term "die truncorum-Gruppe", to which he referred truncorum, ignoratus and arborom. The only distinguishing character for the truncorum-group given by Verhoeff (1930) was an anteriorly projecting, rounded accessory lamella externally on the mesosomites. This lamella ("la" in Figs 7, 11) is obvious in truncorum, parisiorum and arborom, but not in bellus. The absence of the lamella in bellus may explain why Verhoeff (1941), when he described costatus (a synonym of bellus) did not include this species in the truncorum-group, although he specifically mentioned the similarity of costatus gonopods to truncorum, parisiorum, and arborom. Strasser (1966) opposed bellus to the species of the truncorum-group because of the lack of a mesosomal lamella in the former species. However, in light of the great overall similarity between the four species involved, it seems better to broaden the definition of the truncorum-group slightly. We thus understand the truncorum-group to include four species: truncorum, parisiorum (= ignoratus), arborom, and bellus (= costatus). Two
gonopodal characteristics may serve as diagnostic characters, probably even autapomorphies, of the truncorum-group:

1. The oblique crest running from anterior basis to posterior apex of the lateral side of the opisthomerite ("c" in Figs 10, 14). This crest was termed a false phylacum by Verhoeff (1930).

2. The apical-anterior, laterally bent brachite on the opisthomerite ("b" in Figs 6, 10).

The gonopods in the truncorum-group further agree in the presence of a well-developed paracoxal process ("p" in Fig. 5). Such processes, however, occur in numerous other Cylindroiulus-species. Also in characters of the female vulvae the four species in the truncorum-group are very much alike: the comparatively narrow operculum is devoid of setae, and the (sub-)spherical receptaculum seminis is connected to the surface through a coiled apodemetic tube. In somatic characters the species in the truncorum-group agree with many other species of subgenus Aneuloloboiulus in being small (<22 mm long, <1.6 mm in diameter), brownish, and without a preanal projection (Fig. 31). They differ from most of these in the enlarged number of setae (5-17, very rarely <5 in adults) on each anal valve.

**The species of the truncorum-group**

*Cylindroiulus truncorum* (Silvestri, 1896)  
(Figs 1, 5-8, 21, 30, 31)

*Diploius truncorum* Silvestri, 1896: 160.

*Iulus (Anoploius) africanus* Brölemann, 1897: 271  
(synonymized by Attems 1927 (?)).

*Cylindroiulus truncorum*: Attems 1908: 112.

*Cylindroiulus lasius salticus* Verhoeff, 1926: 126.

*Cylindroiulus saligis*: Verhoeff 1928 (synonymized by Verhoeff 1930).

*Cylindroiulus truncorum* var. *striatulus* Schubart, 1931: 163 (synonymized by Schubart 1934).

Diagnosis. - Promerite of male gonopods slightly longer than mesomerite, without a deep mesal incision. Opisthomerite with laterad bent smooth brachite, without hairs or protuberances. Paracoxal process long, slender and pointed, almost reaching end of solenomerite. Bursa of female vulva with 13–14 setae, ampulla with sac-like appendix opposite to apodematic tube. Most males with characteristic metazonital structure (Fig. 30).

Notes on synonymy. - Attans (1927) listed africanaus as a synonym of truncorum, but we have been unable to find out, whether he was the first to synonymize these two names. Brölemann (1921) included both species in his list of North African myriapods. Verhoeven (1926) described the subspecies salcis of what he thought to be Latzel's Julis luscus. It was elevated by him to species rank in 1928, but later he admitted that salcis is a junior synonym of truncorum (Verhoeven 1930). The variety striatulus refers to those males which have female-like, unspecialized metazonital sculpture (see below).


Schubart's drawing and description (1934) are quite satisfactory for this species. The promerite is broad and rounded in posterior view, with large, smooth posterior surface (Fig. 8), and has no deep mesal incision, unlike parisorum and bellus (Fig. 1). The mesomerite has a conspicuous distal "hook" on its anterior side (Fig. 7). The lateral oblique crest on the posterior part of opisthomerite is not so strong as in parisorum and bellus and is not separated from the end of solenomerite, as it is figured by Silvestri (1986) and Attans (1908). The operculum of the vulva is broad, almost parallel-sided. The bursa has 5–7 setae on the mesal and 7–8 on the lateral valve; the ampulla has a sac-like appendix; the coils of the apodematic tube are complicated (Fig. 21).

Distribution and biology. - Originally described from North Africa (Tunisia and Algeria), but also known from many countries in north and northwest
Europe (probably introduced in most of these): there are records from France, Belgium, Holland, the British Isles, Denmark, Germany, Switzerland, Poland, Sweden and the European part of the USSR. Introduced also into Madeira (Demange 1970), the Canary Islands (HE, unpublished), the USA and Brazil (Schubart 1934, Blower 1985). Its habitats are mainly synanthropic: greenhouses, gardens, parks, etc.

_Cylindrolius parisiomum_ (Brölemann & Verhoeff, 1896)

(Figs 2, 9-12, 22, 32)

[ _Julius_ latestriatius Curtis, 1845 (in part); Blower 1953.]

[ _Julius_ luscus Meinert, 1868: sensu Latzel 1884: 283.]  

_Julus_ ( _Anoplopius_) _parisiomum_ Brölemann & Verhoeff, 1896: 214.  

_Cylindrolius parisiomum:_ Brade–Birks & Brade–Birks 1918.  


_Diagnosis._ – Promerite of male gonopods equal in length to mesomerite, with a deep incision on mesal side, delimiting a broad lobe at basis of promerite (Fig. 2). Opisthomerite with definite, lateral bent brachite, with slightly structured surface (Fig. 10). Paracoal process bulky and blunt, shorter than in other group–members, not reaching 3/4 of length of solenomerite. Operculum of female vulva tapering, apodematic tube of bursa a simple spiral (Fig. 22, and also Blower 1953). Metazonital sculpture of both sexes unspecialized (Fig. 32).

_Notes on synonymy._ – The identity of the original material of Curtis (1845) was clarified by Blower (1953). The role of _Julius luscus_ Meinert, 1868, a name involved here as well as with _arborum_, is discussed later in this paper. _Cylindrolius ignotatus_ is, based on Attems' (1927) original drawings, clear-
ly parisiorum (for more references, see Schubart 1931a).

Descriptive notes. - $\sigma$: 30–37 p.s., L: 8–12.3 mm, H: 0.7–0.9 mm. $\varphi$: 30–43 p.s., L: 9–15 mm, H: 0.9–1.1 mm. Number of setae on left anal valve 5–7.

Blower (1953) published very good comparative drawings from different views on male gonopods as well as on female vulvae. The only dubious point is the relation of lengths of promerite and mesomerite: in Blower's drawing promerite is slightly longer than mesomerite, we found the two to be of equal length. The promerite is broad in posterior view, its apical margin being truncated (Fig. 12). The mesomerite, in anterior view, is more slender than in truncorum (Fig. 11). The lateral oblique crest of the opisthomerite is well-developed and comes off from the solenomerite at the end. This character was used in a key already by Verhoef (1930). The relatively slender operculum of the female vulva has a very small apical incision. The bursa has 3–4 setae on the mesal, and 2–4 on the lateral valve; the ampulla has a saclike appendix; the apodematic tube is characteristically spiralled (Fig. 22).

Distribution and biology. - A rare species, being sporadically recorded from most of Europe: France, Belgium, Holland, the British Isles, Jersey, Denmark, Germany, Austria, Italy, Yugoslavia, Czechoslovakia, Poland and the USSR (Blower 1953, 1985). Also recorded from the African island Saint Helena, on the basis of a single female (Hoffman 1977) (misidentification of the more widespread truncorum?). It is mainly confined to greenhouses, graveyards, parks and similar places: a synanthropic species.

Cylindrioisulus bellus (Lignau, 1903)
(Figs 3, 13–16, 23, 33)

Cylindrioisulus bellus: Lohmander 1939.
Cylindrioisulus (Aeneulobotulus) costatus Verhoef, 1941: 5, syn.n.

Material examined. - TURKEY: Nilic ormani, 6 $\sigma$, 7 $\varphi$, 2 vii.1949, Kossigów leg.; Istanbul, 2 $\sigma$, 1 $\varphi$, 18 iii.1950. (Zool. Inst. Mus. Hamburg).

Diagnosis. - Slightly larger than other group-members (Figs 27–28). Promerite of male gonopods slightly longer than mesomerite, with a deep mesal incision delimiting a basal lobe (Fig. 3).

Mesomerite without a lateral lamella covering promerite. Brachite of opisthomerite with laterad and mesal flanges of equal size, its margins with strong fingerlike protuberances and fringes (Fig. 14). Paracoxal process relatively long, longer than $\frac{1}{3}$ of length of solenomerite. Operculum of female vulva very slender, long and tapering, ampulla without sac-like appendix. Males with strong longitudinal ribs on metazonites (Fig. 33).

Notes on synonymy. - Although the identity of bellus with costatus has not been previously published, it is obvious from the descriptions of both nominal species.

Descriptive notes. - $\sigma$: 42–50 p.s., L: 14.5–23.5 mm, H: 1.1–1.5 mm. $\varphi$: 47–50 p.s., L: 20–22 mm, H: 1.2–1.5 mm. Number of setae on left anal valve 11–17.

In Lignau's drawing (1903) promerite and mesomerite are of equal length. This was, however, discussed and corrected by Strasser (1966), who gave more details about the opisthomerite as well. The promerite is rounded in posterior view like truncorum (Fig. 16). The mesomerite is broad in anterior view (Fig. 15) without a lateral lamella. The lateral oblique crest on the opisthomerite is well-developed and sometimes apically separated from the end of the solenomerite (Fig. 13). The operculum of female vulva is very narrow; the bursa has 5 and 5–7 setae on the lateral and mesal valve, respectively. The number of setae on the mesal valve is usually higher than that on the lateral one, in contrast to the other three species.

Distribution and biology. - Described from the Western Caucasus, USSR, and later recorded from quite a coherent range: Turkey (Anatolia, Bosphorus) (Lohmander 1939, Verhoef 1941), and Southeast-Bulgaria (Mts. Strandzha) (Strasser 1966). It seems to occur in natural woodland habitats (Lignau 1903).

Cylindrioisulus arborum Verhoef, 1928
(Figs 4, 17–20, 24)

[Julius luschii Meinert, 1868: sensu Verhoef 1899, 1907.]
[Cylindrioisulus luschius: sensu Verhoef 1926.]
Cylindrioisulus arborum Verhoef, 1928: 291.
Cylindrioisulus arborum var. dentata Strasser, 1966: 353.

Figs 17–20. Male gonopods of *Cylindrioulus truncorum*: (17) right opisthomerite, mesal view, paracoxal process has been broken during preparation; (18) left opisthomerite, lateral view, paracoxal process has been omitted; (19) left mesomerite, anterior view; (20) left promerite, posterior view. Scanning electron micrographs. Scales = 10 μm.

**Diagnosis.** Slightly smaller than other group-memners (Figs 27–28). Promerite and mesomerite of male gonopods of more or less equal length; opisthomerite with triangular apical projection behind a laterally bent spinose brachite (Fig. 18). Paracoxal process apparently short, being thick and broad at its basis (Fig. 17), but longer than 1/4 of the length of the solenomerite. Operculum of female vulva broad and short, bursa with 6–8 setae. Metazonital sculpture of both sexes unspecialized (as Fig. 32).

**Notes on synonymy.** *Cylindrioulus truncorum* is a replacement name for *Julius luscus* sensu Verhoeff (1899, 1907, 1926, 1928). For more details about *Julius luscus* Meintert, 1868, see final section of this paper. A list of synonymies was published by Schubart (1960), his findings from a cave in France, however, being not considered as *arborum* by Strasser (1966). This latter author at the same time distinguished a variety from the surroundings of Sofia (Bulgaria), the males of which have a small tooth on their brachite.

**Descriptive notes.** -♂: 32–39 p.s., L: 8–10 mm, H: 0.7–0.8 mm. ♀: 32–43 p.s., L: 9–12.5 mm, H: 0.8–1.1 mm. Number of setae on left anal valve 2–7.

No good illustration of the male gonopods exists. Those of Schubart (1934, 1960) are inaccurate, not emphasizing the important diagnostic triangle at the end of solenomerite. The promerite is short and broad in posterior view, subtrapeziform, truncated at the end (Fig. 20), without a deep mesal incision (Fig. 4). The mesomerite is slender in anterior view (Fig. 19), and has the lateral lamella partly covering the promerite in situ. The opisthomerite has a well-developed oblique crest which is curved slightly distad. On the edge of solenomerite in front of the characteristic triangle, there is a laterally bent projection with a group of fingerlike fringes (Fig. 18). At the top of the operculum of female vulva there is a small incision (Fig. 24, and also Bielak 1965). The number and arrangement of setae on the bursa is as in *parisorum*. The ampulla has a sac-like appendix opposite to the apodematic tube.

**Distribution and biology.** A central and eastern
European species, occurring in Germany, Czechoslovakia, Poland, USSR, Hungary, Rumania and Bulgaria. Little is known about its biology, but it seems to be found mainly in forests, sometimes in man-made habitats as well (Schubart 1934).

Analysis of characters

Post-embryonic development

The studied material is insufficient for a proper analysis of the postembryonic development. However, some characters pertaining to the postembryonic development, and of potential taxonomic value, can be extracted from the data.

Developmental stadium of mature specimens. – In species of the truncorum-group, the developmental stadium of an individual is easily determined by counting the rows of ocelli and adding one. The most frequent stadium of mature specimens of the four species is shown in Table 1, together with the total range of stadia. It may be noted that in parisorum, males appear in an earlier stadium than females, as is commonplace in Julidae (Blower 1985).
In spite of wide overlap, there are indications of interspecific differences in stadium number of mature males. Thus, 81% of the *arborum* males are stadium 7, 43% of *truncorum* and 66% of *parisiorum* males, stadium 8, and 63% of *bellus* males, stadium 9. In *truncorum*, a few females belong to very high stadia (2 ♀: stadium 11; 2 ♀: stadium 13; 1 ♀: stadium 14). This agrees with a general tendency in *Cylindroiulus*: whereas males die after having reached maturity, females may moult into further mature stadia (Blower & Gabbett 1964, Blower 1969, Enghoff 1982). The absence of females in high stadia in the other three species may be due to the small sample size. Summarizing, the stadium number is useless as a taxonomic character in the *truncorum*-group.

**Number of podous segments according to stadia.** – Whereas the number of podous segments per se is a dubious character in julids, when it is related to the developmental stadium of the specimen it may be taxonomically useful (e.g., Enghoff 1982). Fig. 25 shows segment number as a function of stadium number in the studied material. When for instance the number of segments in stadium 10 is considered, the material suggests interspecific differences
(truncorum: 43–47, parisiorum: 40–42, bellus: 48–50, arborum: 39 segments). The difference between arborum and parisiorum on one side and bellus on the other appears significant, whereas truncorum (which is the only species represented by many individuals) bridges the gap. The full range of podous segments of mature specimens is shown in Table 1.

**Number of ocelli according to stadia.** - In the number of ocelli of the left ocular field plotted against stadia (Fig. 26) we could not find significant differences in the four species. In stadium 8, for instance, all four species have specimens with 25–30 ocelli on one side. See also Table 1.

**Other somatic characters**

**Body diameter.** - Body diameter as a function of number of segments is a potentially useful taxonomic character in juliformian millipedes. Figs 27 and 28 shows this relationship of the four species separately for adult males and females. Specimens of arborum, having low segment numbers and thin bodies, are well separated from those of bellus which are many-segmented and thick; truncorum and parisiorum are in intermediate positions, but nearer to bellus.

**Number of anal setae.** - The number of anal setae of each anal valve has for a long time been considered an important character separating the members of the truncorum-group. Schubart (1934) enumerated 5–6 (on one side) for arborum and truncorum and 3 for parisiorum; Blower (1985) corrected the number in parisiorum to “more than five”, and counted 7–12 setae in truncorum. (See also Introduction). Our data (Fig. 29, Table 1) support the current view that species of the truncorum-group have more than 5 setae per anal valve, although there are a few exceptions (2 out of 134 mature truncorum and 3 out of 36 mature arborum had only 2–4 setae on the left anal valve). C. bellus with 11–17 setae is clearly separated from parisiorum and arborum (2–7 setae). C. truncorum (large material) again bridges the gap (3–17 setae).

**Metazonital structure.** - Already in the original descriptions of truncorum and bellus, and its synonym costatus (Silvestri 1896, Lignau 1903, Verhoeff 1941), the characteristic metazonital surface with longitudinal ribs in adult males was emphasized (Figs 30 and 33). Although transitions do occur, it is in general easy to decide whether a particular specimen shows such a ribbed pattern or not. Of the four species, neither parisiorum nor arborum has this feature, but in the males (and only in the males) of bellus it is most striking. In truncorum, the usual situation is the same. We have found, nevertheless, missing ribs in 3 of 42 adult truncorum males (“var. striatulus”), and ribs were present in 1 of 112 mature females.

**Genital characters**

**Male gonopods.** - The gonopods of the four species are relatively well-known, but we have been able to add a few details, e.g., the characteristic tri-
Fig. 25. Number of podous segments in each stadium. Black columns indicate mature animals.

Fig. 26. Number of ocelli in the left ocular field in each stadium.
Fig. 27. Midbody vertical diameter and number of podous segments in males. Each point represents an individual.

angular projection on the solenomerite of arborum. See also the descriptive notes under each species.

Female vulvae. – Comparatively little attention has so far been given to the sexual organs as diagnostic characters of female millipedes. Those of the members of the truncorum–group have scarcely been illustrated (Blower 1953, Bielak 1965, Bielak–Oleksy & Stojdowska 1968). Only Blower's drawings of truncorum and parisiorum (1953, 1985) are of a standard rendering them taxonomically useful. Bielak's illustrations of truncorum, parisiorum and arborum do not show enough details to be of much use. We here present illustrations of all four species (Figs 21–24). They agree in having no setae on the operculum. (In this respect Bielak's data are quite strange, she repeatedly refers to bristles occurring on the operculum). The two valves of the bursa, on the contrary, are provided with rows of setae (Table 1). The ampulla in the bursa of truncorum, parisiorum and arborum has a sac–like appendix in addition to the coiled apodematic tube; parisiorum and arborum further agree in having quite few setae (6–8) on the bursal valves in similar arrangements; bellus stands alone with its almost perfectly spherical ampulla without an appendix, with a relatively high number (10–12) of bursal setae and very slender, tapering operculum. It seems that the number of bursal setae is positively correlated with body size in the truncorum–group. For more detailed characterization of the vulvae, see the descriptive notes under each species.

To facilitate comparison of the numerical characteristics of the four species, our data are summarized in Table 1.
Key to the species

1. Males ......................................................... 2
   - Females .................................................. 6
2. With strong longitudinal ridges on metazonites (Figs 30, 33) ................................ 3
   - Without well-developed metazonital ridges ......................................................... 4
3. Metazonital structure very well-developed (Fig. 33). Promerite with deep mesal incision (Fig. 3); brachite of opisthomerite with a mesal and a lateral flange with fringes and protuberances (Fig. 14) .............................................. C. bellus
   - Metazonital structure not so strong (Fig. 30). Promerite without deep incision (Fig. 1), opisthomerite with smooth and only laterally bent brachite (Fig. 6) .............................................. C. truncorum
4. Paracoaxal process short and blunt, in length less than ⅓ of solenomerite. Promerite with deep mesal incision (Fig. 2) .............................................. C. parisorum
   - Paracoaxal process long and pointed, longer than ⅓ of solenomerite. Promerite without deep mesal incision ................................................................. 5
5. Brachite of opisthomerite smooth; no triangular projection behind brachite (Figs 1, 5-6) ................................................................. C. truncorum
   - Brachite of opisthomerite spinose; a triangular projection behind brachite (Figs 4, 18-19) ................................................................. C. arborum
6. Ampulla a perfect sphere, without an appendix (Fig. 23 B & C) ........................................... C. bellus
   - Ampulla with sac-like appendix, opposite to the apodometric tube ............................................. 7
7. Operculum tapering, the single apodometric tube simple, characteristically spiralled, 6-8 setae on bursa (Fig. 22) ........................................... C. parisorum
   - Operculum broader, course of apodometric tube more complicated ............................................. 8
8. 13-14 setae on bursa ........................................... C. truncorum
   - 6-8 setae on bursa ........................................... C. arborum

What is Julius luscus Meinert, 1868?

The name Julius luscus Meinert, 1868 has been out of general use for half a century, but the exact identity of Meinert's species has never been settled. Meinert's description did not include notes on gonopods. The first to publish gonopod drawings on purported luscus was Latzel (1884), who,
however, had a different species before him. Since *luscus* sensu Latzel is a member of the *truncorum*-group, although *luscus* Meinert is not, we take the occasion to designate a lectotype of *luscus* so as to finally tie this name down.

Schubart (1926) examined Meinert's original material of *luscus*, housed in Zoologisk Museum, Copenhagen. According to Schubart, this consisted of 13 ♂ and 50 ♀. Schubart identified 11 ♂ as *Cylindroaulus frisius* (Verhoeff, 1891), and 2 ♂ as *C. britannicus* (Verhoeff, 1891). Although *luscus* predates both these names, Schubart (1926) recommended not to reinstall *luscus*, influenced by the confusion created by Latzel's misidentification of the species.

Schubart placed each of Meinert's *luscus*-males in a separate tube labelled either "*Cylindroaulus frisius*" or "*Cylindroaulus britannicus*" and further labelled with the segment and leg numbers recorded in his paper (1926). Under Meinert's original label, only the females were left. There must have been another original label in the tube that originally held the 13 males, since the label in the tube with females bears a "♀" sign. However, because the perfect correspondence between the published segment and leg numbers and those on the labels of the individual males, we do not hesitate to regard these males as part of the type series of *luscus* (1 male, the one with "42 (-3) Segm. 71 Beinp" (Schubart 1926) could not be found). We have selected one of these males as lectotype of *Julius luscus* Meinert, 1868. It is a *Cylindroaulus latestriatus* (Curtis, 1845) (=
frisius Verhoeff, 1891) with “39 (-3) Segm. 65 Beinp.” in Schubart's notation. *Julus luscus* Meinert, 1868 thus enters into synonymy of *Cylindroiulus latestriatus* (Curtis, 1845). This is in accordance with Blower (1953), who was the first to point out that Schubart had been incorrect, in the strict sense of the Code, in rejecting the name *luscus*; and that the only possibility to overcome this ominous name would be to select an appropriate lectotype.

Problems remain with *Julus luscus* sensu Latzel 1884. Attems (1927) proposed, referring to Schubart (1926), the new name *Cylindroiulus ignoratus* to replace it. From Latzel's gonopod drawings (1884: figs. 177-178) it is difficult to decide whether they represent *parisorum* or *arborum* in the sense of the present paper. The spinose "brachite" would speak in favour of *arborum*, the short paracoxal process, in favour of *parisorum*. To further complicate the matter, Attems (1927) gave some gonopod drawings of his *ignoratus*, based on his own material. These are clearly *parisorum*. Attems (1927) did not consider *parisorum* (published in 1896) in his "revision" of *Cylindroiulus*, although he did consider its subspecies, *p. miraculus* Brölemann & Verhoeff, 1896 (= *C. latestriatus* (Curtis, 1845)). Also Verhoeff (1930) ignored *parisorum* (of which he was co-author) in his key to members of the *truncorum* group. But two years earlier Verhoeff (1928) decided to give a replacement name for the species he had considered to be *Julus luscus*, since Schubart (1926) pointed out that Meinert's original specimens are two other species. They were not *luscus* sensu Verhoeff (1899, 1907, 1926), so he introduced the name *arborum*. Following him, Schubart (1934, 1960) mentioned *Julus luscus* sensu Latzel in the synonymy of *arborum*.

A re-examination of Latzel's specimens of *luscus* might solve the problem, but unfortunately we have been unable to find such specimens in Zoologisches Museum, Hamburg, and in Naturhistorisches Museum, Vienna (where, according to the catalogues, a sample of *luscus* bought from Latzel has once been present (J. Gruber pers. comm.)).

Thus the question whether *ignoratus* Attems,
1927 is a junior synonym of *parisiorum* Brölemann & Verhoeff, 1896, as stated by Blower (1953) and Bielak (1965), or a senior synonym of *arborum* Verhoeff, 1928, or perhaps still a third species, as hinted by Schubart (1934: 225, footnote), cannot be settled. The best solution will be, acknowledging that both *arborum* and *parisiorum* may have more or less spinose gonopod brachites, and emphasizing that Attens' (1927) drawing of *ignoratus* are clearly *parisiorum*, to refer *Julus luscus* sensu Latzel, and hence *ignoratus*, to *Cylindroiulus parisiorum* (Brölemann & Verhoeff, 1896).

References


