



A review of the native keeled millipedes (Diplopoda: Polydesmida: Paradoxosomatidae) from tropical Western Australia

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Abstract

Compared to many other regions of Australia, the paradoxosomatid fauna of Western Australia is rather depauperate at the generic level with only three native genera, *Antichiropus* Attems, 1911 (72 spp), *Boreohesperus* Shear, 1992 (9 spp) and *Stygiochiropus* Humphreys & Shear, 1993 (4 spp). We studied available museum specimens from tropical Western Australia to assess diversity at both species and genus level, and here recognise 12 new genera and 13 new species, and reinstate *Boreohesperus* as a monotypic genus for *B. capensis* Shear, 1992 from the Cape Range region. We remove *Helicopodosomella* Verhoeff, 1924 and *Otoplacosoma* Verhoeff, 1924 from the synonymy of *Helicopodosoma* Verhoeff, 1924 and reinstate them as valid genera. The following new taxa are described: *Apodesmus* gen. nov. for *A. simplex* sp. nov. (type species); *Cirridesmus* gen. nov. for *Boreohesperus alcyonis* Car & Harvey, 2017 (type species), *B. psittacinus* Car & Harvey, 2017, *B. vascellus* Car & Harvey, 2017 and *C. spiralis* sp. nov.; *Coelodesmus* gen. nov. for *C. spelaeus* sp. nov. (type species); *Dolodesmus* gen. nov. for *Boreohesperus dubitalis* Car & Harvey, 2013 (type species) and *B. undulatus* Car & Harvey, 2013; *Engyodesmus* gen. nov. for *E. cracens* sp. nov. (type species); *Furcadesmus* gen. nov. for *Boreohesperus curiosus* Car & Harvey, 2013, *B. delicatus* Car & Harvey, 2013 and *B. furcosus* Car & Harvey, 2013 (type species); *Helicopodosomella fanda* sp. nov.; *Heligomodesmus* gen. nov. for *H. pampinatus* sp. nov. (type species); *Juxtadesmus* gen. nov. for *J. hospitalis* sp. nov. (type species); *Metadesmus* gen. nov. for *M. seductus* sp. nov. (type species) and *M. secundus* sp. nov.; *Otoplacosoma damula* sp. nov.; *Pictodesmus* gen. nov. for *P. concinnus* sp. nov. (type species); *Serratidesmus* gen. nov. for *S. prionotes* sp. nov. (type species); and *Vexatodesmus* gen. nov. for *V. pisinnus* sp. nov. (type species). All are assigned to the subfamily Australiosomatinae.

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Introduction

The millipede family Paradoxosomatidae is an abundant and conspicuous component of Australian ecosystems, especially in forests and woodlands where they feed on decomposing plant and fungal material. The Australian fauna is represented by 44 endemic genera as well as two synanthropic species [*Orthomorpha coarctata* (De Saussure, 1860) and *Oxidus gracilis* (C.L. Koch, 1847)] that have been accidentally introduced into the country, presumably among the cargo of ships. The majority of the endemic genera are included in the subfamily Australiosomatinae, apart from two genera of tropical millipedes (*Desmoxytoides* Mesibov, 2006 and *Tholerosoma* Mesibov, 2006) that are currently not assigned to any subfamily (Mesibov 2006).

With only four native genera, the Western Australian paradoxosomatid fauna is far less diverse at the generic level than the eastern Australian fauna, which comprises 41 genera. The western fauna is dominated by the genus *Antichiropus* Attems, 1911 with 72 described species ranging from the south coast to the Pilbara region (Attems 1911; Car & Harvey 2014; Car et al. 2013, 2019; Shear 1992), although numerous undescribed species are also known from museum collections (MSH, CAC, KAC, unpublished data). The other native genera include *Boreohesperus* Shear, 1992 which is historically represented by nine species from Cape Range, the Pilbara and the Kimberley regions (Car & Harvey 2013, 2017; Shear 1992), *Helicopodosoma* Verhoeff, 1924 with two species from the Kimberley region (Verhoeff 1924), and *Stygiochiropus* Humphreys and Shear, 1993 with four highly modified troglobitic species from the Cape Range karst ecosystems (Humphreys & Shear 1993; Shear & Humphreys 1996). In addition to the native fauna, both of the globally distributed synanthropic species *Orthomorpha coarctata* (De Saussure, 1860) and *Oxidus gracilis* (C.L. Koch, 1847) are present in Western Australia, as well as four species apparently introduced from eastern Australia, *Akamptogonus novarae* (Humbert & de Saussure, 1869) (Attems 1911; Rowe & Sierwald 2006), *Hoplatessara clavigera* Verhoeff, 1928 (Rowe & Sierwald 2006), *Solaenodolichopus pruvoti* (Brolemann, 1931) and *Taxiditiosoma portabile* Mesibov & Car, 2015 (Mesibov & Car 2015).

Ongoing research into the Australian paradoxosomatid fauna has included a comprehensive molecular phylogeny of more than 20 genera including all of the named genera from Western Australia (MSH, unpublished data). The detailed results from this phylogeny will be presented elsewhere. The new taxa described here are established on the basis of morphological differentiation. Comparison of the images supplied by Car & Harvey (2013, 2017) support the formation of the new taxa presented here.

To better understand the diversity of the native paradoxosomatid fauna of north-western Australia, we have

revised their taxonomy in the region but have excluded *Antichiropus* and *Stygiochiropus* as they have been comprehensively studied in previous publications (Car et al. 2019; Humphreys & Adams 2001; Humphreys & Shear 1993; Shear & Humphreys 1996). We propose a revised definition of *Boreohesperus* based on the type species *B. capensis*, assign the eight other species of *Boreohesperus* to four new genera, and describe 12 additional new genera and 13 new species. Although these species were not accompanied by molecular data, conventional morphological methodology is more than sufficient to assign them to genera.

Methods

The material examined for this study is mostly preserved in 75% ethanol with some specimens or parts thereof stored in 100% ethanol at -80°C for molecular research. All are lodged in the Western Australian Museum, Perth, Australia (WAM). The type specimens of the species described by Verhoeff (1924) are lodged in the Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS). Specimens were examined with a Leica 205C stereomicroscope and the images generated with an automontage imaging system using Leica Application Suite Version 3.7.0 software. The method of image capture follows that of Car et al. (2013, 2019) and Car & Harvey (2014): images of each whole animal and its dorsal view are presented here, and a set of images of each gonopod from four orientations was captured for each species. Usually, the holotype was imaged. Some of the species originally described in *Boreohesperus* by Car & Harvey (2013, 2017) are augmented with images of the somatic body parts.

Male genitalia were examined by dissecting one or both gonopods from the body which were later stored in 12×3 mm glass genitalia microvials (BioQuip Products, Inc.). The labelling of the different parts and processes on the gonopod follows that adopted by Car et al. (2013, 2019) and Car & Harvey (2014), as follows: coxa (C); femorite (F); non-seminiferous branch (NSB); subdistal sclerite (nsbp); prefemur (PF); posterior process (pp); prolongation of the femorite (prof); solenomere (S); solenomere process (sp). Females could only be identified positively as the same species as males in any area if they were collected with males.

The genera and species are arranged alphabetically, and terminology and mensuration follow Car et al. (2013). The maps were generated with ArcMap version 10.1 (ESRI Inc.).

Results

Verhoeff's genera

The millipedes collected by Eric Mjöberg in 1910–1911 and 1912–1913 during his expeditions to Australia were later studied and described by Verhoeff (1924). Among these were three tropical species of Paradoxosomatidae

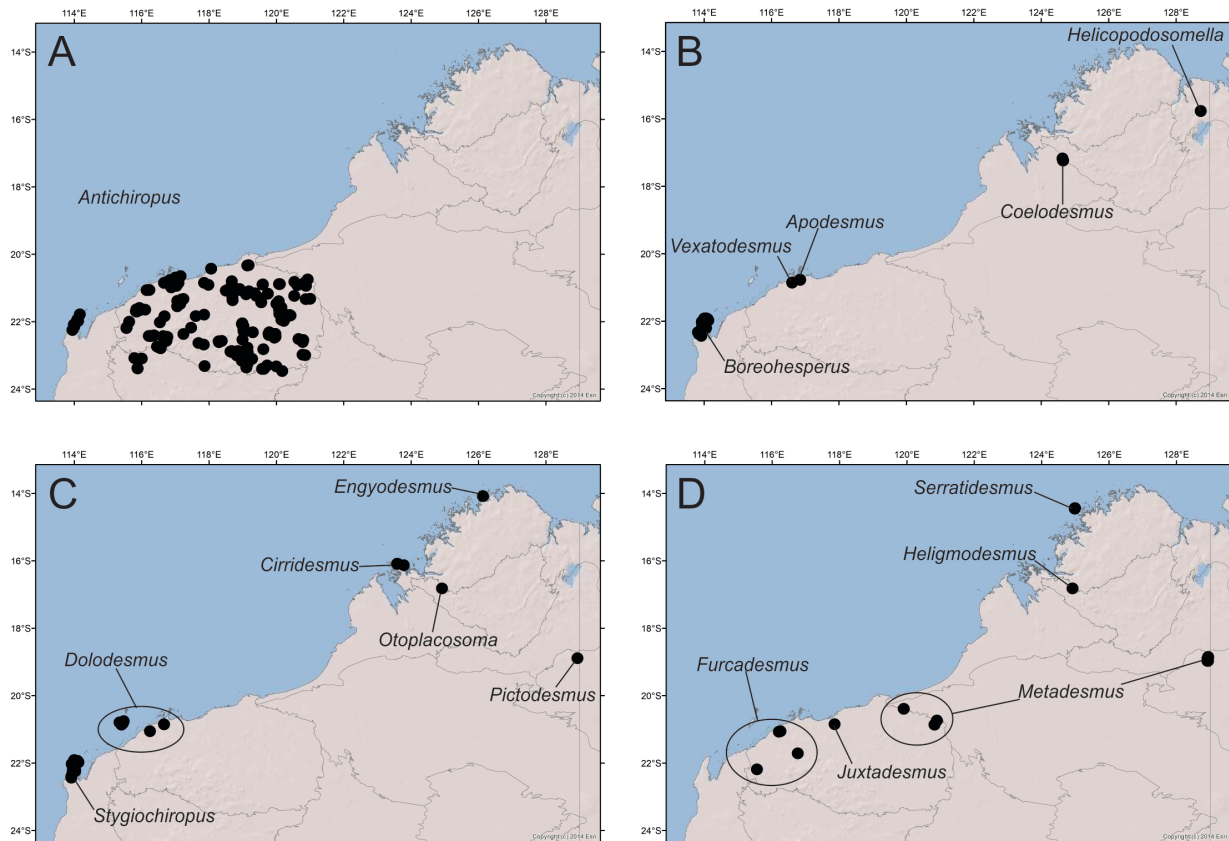


Figure 1. Map of tropical Western Australia showing the recorded distribution of the 17 native paradoxosomatid genera. The type localities of *Helicopodosomella melas* and *Otoplacosoma bivittatum* are not known with certainty and could not be included. The IBRA bioregions are shown. A, *Antichiropus*; B, *Apodesmus*, *Boreohesperus*, *Coelodesmus* and *Helicopodosomella*; C, *Cirridesmus*, *Dolodesmus*, *Engyodesmus*, *Otoplacosoma*, *Pictodesmus* and *Stygiochiropus*; D, *Furcadesmus*, *Heligmodesmus*, *Juxtadesmus*, *Metadesmus* and *Serratidesmus*.

with rather simple gonopods that were attributed to three different genera: *Helicopodosoma vittigerum* Verhoeff, 1924 from the Wet Tropics of northern Queensland, and *Helicopodosomella melas* Verhoeff, 1924 and *Otoplacosoma bivittatum* Verhoeff, 1924 from the Kimberley region of Western Australia. Despite the original descriptions containing good evidence that they represent valid genera, they were regarded as synonyms by Attems (1937) based on the morphology of the gonopods which lacked many of the apophyses found in other paradoxosomatids. *Helicopodosoma* Verhoeff, 1924 was nominated as the senior synonym, presumably by page precedence.

The type specimens of these three species have not been available for study, but comparison of the illustrations provided by Verhoeff (1924) with some more recently collected specimens from the Kimberley provide ample evidence to support Verhoeff's original hypothesis of three separate genera. Despite the simplicity of the male gonopods, the subtle differences are here regarded as sufficient evidence to remove the Western Australian genera *Helicopodosomella* and *Oto-*

placosoma from the synonymy of *Helicopodosoma* from northern Queensland.

Key to the genera of Australiosomatinae recorded from tropical Western Australia

Males only

It has not been possible to include the new genera from *Atropisoma* Silvestri, 1897 from Queensland which is only known from female specimens (Silvestri 1897).

- 1 Metazonites with 8 tubercles on posterior margins (Figure 29D); femur of leg I without ventral tubercle (Figure 29F)

***Serratidesmus* gen. nov.**

- 1 Metazonites without tubercles on posterior margins (e.g. Figures 4D, 15D); femur of leg I with ventral tubercle (e.g. Figures 4F, 15F) **2**
- 2 Gonopod with prominent non-semiferous branch (NSB) (Figure 8C) **3**
- 2 Gonopod without non-semiferous branch (NSB) (e.g. Figures 3C, 18C) **6**
- 3 Solenomere (S) with posterior process (pp) (Figure 8C) **4**
- 3 Solenomere (S) without posterior process (pp) **5**

- 4 Tip of solenomere (S) terminating in two or three broad processes ***Dolodesmus* gen. nov.**
- 4 Tip of solenomere (S) tapering to fine, coiled point (Figure 8C) ***Cirridesmus* gen. nov.**
- 5 Tip of solenomere (S) terminating in two or three processes ***Furcadesmus* gen. nov.**
- 5 Tip of solenomere (S) tapering ***Boreohesperus* Shear**
- 6 Solenomere (S) terminating in two broad processes (Figures 2A–D) ***Apodesmus* gen. nov.**
- 6 Solenomere (S) terminating in single process (e.g., Figures 10C, 24C) **7**
- 7 Tergites/body rings with paranota, usually prominent (e.g. Figures 25D, 31D) **8**
- 7 Tergites/body rings without paranota, although small paranota sometimes present (e.g. Figures 12D, 21D) **13**
- 8 Paranota triangular (Figure 31D) ***Stygiochiropus* Humphreys & Shear**
- 8 Paranota rounded (e.g. Figures 9D, 25D) **9**
- 9 Paranota small, restricted to posterior half of segment (Figure 9D); gonopod with prolongation of the femorite (prof) (Figure 10D) ***Coelodesmus* gen. nov.**
- 9 Paranota large, extending full length of segment (e.g. Figures 17D, 25D); gonopod without prolongation of the femorite (e.g. Figures 18C, 25C) **10**
- 10 Paranota extremely prominent (Figure 25D) ***Otocladosome* Verhoeff**
- 10 Paranota less prominent (e.g. Figures 15D, 17D, 27D) **11**
- 11 Gonopod with thick solenomere that loops backwards, forming semi-circle (Figures 16C, 18C) **12**
- 11 Gonopod with narrow solenomere that is mostly straight with a distal prolongation (Figure 28C) ***Pictodesmus* gen. nov.**
- 12 Solenomere terminating in tapering point (Figure 16C) ***Heligmodesmus* gen. nov.**
- 12 Solenomere with blunt tip (Figure 18C) ***Helicopodosomella* Verhoeff**
- 13 Femorite laterally compressed (Figures 13C, 22C, 24C) **14**
- 13 Femorite not laterally compressed (Figure 20C) **15**
- 14 Solenomere strongly recurved (Figures 22C, 24C); metazonites with transverse line (Figures 21D, 23D) ***Metadesmus* gen. nov.**
- 14 Solenomere not recurved (Figure 13C); metazonites without transverse line (Figure 12D) ***Engyodesmus* gen. nov.**
- 15 Main femoral process present ***Antichiropus* Attems**
- 15 Main femoral process absent (Figure 20C) ***Juxtadesmus* gen. nov.**

Taxonomy

Family Paradoxosomatidae Daday, 1889

Subfamily Australiosomatinae Brölemann, 1916

Genus *Antichiropus* Attems, 1911

urn:lsid:zoobank.org:act:D297950C-27AB-4F22-897B-2AC26A8F08D3

Antichiropus Attems 1911: 168.

Type species

Antichiropus variabilis Attems, 1911, by subsequent designation of Brölemann (1916).

Diagnosis

Antichiropus is one of only a few australiosomatine genera that lack paranota or where they are highly reduced (*Aethalosoma* Jeekel, 2006, *Aulacoporus* Verhoeff, 1924, *Boreohesperus*, *Cirridesmus*, *Dicranogonus* Jeekel, 1982, *Engyodesmus*, *Howeosoma* Jeekel, 2006, *Juxtadesmus*, *Metadesmus*, *Notodesmus* Chamberlin, 1920, *Pogonosternum* Jeekel, 1965, *Pseudostrongylosoma* Verhoeff, 1924, *Solaenodolichopus* Verhoeff, 1924, *Taxidiotisoma* Mesibov & Car, 2015 and *Walesoma* Verhoeff, 1928). It differs from these genera as follows: from *Aethalosoma*, *Aulacoporus*, *Boreohesperus*, *Cirridesmus*, *Dicranogonus*, *Engyodesmus*, *Howeosoma*, *Metadesmus*, *Notodesmus*, *Pogonosternum*, *Pseudostrongylosoma*, *Solaenodolichopus*, *Taxidiotisoma* and *Walesoma* by the long, coiled solenomere; and from *Juxtadesmus* by the presence of a main femoral process.

Description

See Car et al. (2013).

Remarks

Antichiropus is widely distributed in Western Australia and even extends to the Eyre Peninsula in South Australia. The north-western Australian fauna comprises 33 species from the Pilbara bioregion (Car et al. 2019) and *A. humphreysi* Shear, 1992 from Cape Range (Car et al. 2013; Shear 1992).

See Car et al. (2013, 2019) and Car & Harvey (2014) for descriptions and images of the 72 named species.

Genus *Apodesmus* gen. nov.

urn:lsid:zoobank.org:act:45E3ED27-044C-493F-AFD0-C38ADF4890A6

Type species

Apodesmus simplex sp. nov.

Diagnosis

Apodesmus most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 3A–D). Among the Antichiropodini it resembles *Australodesmus*, *Bro-*

chopeltis, *Coelodesmus*, *Helicopodosoma*, *Helicopodosomella*, *Heligmodesmus*, *Otoplacosoma*, *Pictodesmus*, *Serratidesmus*, *Stygiochiropus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 2D). *Apodesmus* differs from all these genera in the shape of the gonopods in which the solenomere and the posterior process are of equal length and uniformly curved (Figures 3A–D).

Description

General (Figure 2A): colour in ethanol uniformly pale brown; with 20 segments; segments 5, 7, 9, 10 and 12 with ozopores (remaining segments missing from all specimens); small australiosomatines, with distinct waist between prozonite and metazonite (Figure 2D); metazonites with barely imperceptible transverse line and without median sagittal line. Paranota present. Anterior spiracles at mid-body flat and ovoid. Sternal lamella wider than long, subquadrate and medially indented.

Head (Figure 2C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 2E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$; 6 thickest; 7 short.

Legs: legs medium length (Figure 2A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 2F).

Gonopod (Figures 3A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) not flattened and with only slight curvature in lateral view; non-seminiferous branch (NSB) absent; solenomere (S) and posterior process (pp) uniformly curved; solenomere with slightly broadened tip; posterior process with 3 distal serrations.

Remarks

Apodesmus is only known from a single species collected from the western Pilbara region of Western Australia (Figure 1B).

Etymology

The generic name refers to the distinctiveness of this species from other paradoxosomatids (*apo*, Latin, from, off, away, after, without, separate) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Apodesmus simplex sp. nov.

Figures 2, 3

urn:lsid:zoobank.org:act:2002AB14-EF69-4D2E-9F37-CFFD3744DB15

Type material

Holotype: AUSTRALIA: Western Australia: ♂, crown land reserve, NW. of Mt Prinsep, Pilbara Biological Survey site DRC2, 20°46'18"S, 116°50'59"E, 12 November 2003–10 May 2004, wet pitfall traps, CALM staff (Pilbara Biological Survey) (WAM T162308).

Paratypes: AUSTRALIA: Western Australia: 6 ♂, collected with holotype (WAM T76147, T146742, T162304–162307).

Diagnosis

As for the genus *Apodesmus*.

Description

Male

General (Figure 2A): colour in ethanol uniformly tan brown (Figures 2A–D); specimens incomplete but presumably with 20 segments; segments 5, 7, 9, 10 and 12 with ozopores (remaining segments missing from all specimens); length unknown; mid-body ring approximately 1.3mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 2D); paranota present. Anterior spiracles at mid-body flat and ovoid. Sternal lamella much wider than long, quadrate, anterior margin concave.

Head (Figure 2C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.2 \times$ socket diameter. Antennal segments (Figure 2E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$; 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 2F).

Gonopod (Figures 3A–D): coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) not flattened and with only slight curvature in lateral view; non-seminiferous branch (NSB) absent; solenomere (S) and posterior process (pp) uniformly curved; solenomere with slightly broadened tip; posterior process with 3 distal serrations.

Female

Unknown.

Remarks

Apodesmus simplex is only known from a single location in the western Pilbara region of Western Australia (Figure 1B). All of the available specimens were collected in a long-term pitfall trap and are in poor condition; all are missing the posterior segments.



Figure 2. *Apodesmus simplex* sp. nov., holotype male (WAM T162308): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B), 0.5 mm (C, D, E), 0.2 mm (F).

Etymology

The specific epithet is an adjective that refers to the rather simple morphology of the male gonopods (*simplex*, Latin, simplicity) (Brown 1956).

Genus *Boreohesperus* Shear, 1992

urn:lsid:zoobank.org:act:44A06229-E1DF-4D33-B4F6-07666592AE3B

Type species

Boreohesperus capensis Shear, 1992, by original designation.

Diagnosis

Boreohesperus is one of only a few australiosomatine genera that lack paranota or where they are highly reduced (*Aethalosoma*, *Antichiropus*, *Aulacoporus*, *Cirridesmus*, *Dicranogonus*, *Engyodesmus*, *Howeosoma*, *Juxtadesmus*, *Metadesmus*, *Notodesmus*, *Pogonosternum*,

Pseudostrongylosoma, *Solaenodolichopus*, *Taxidiotisoma* and *Walesoma*). It differs from these genera by the very simple gonopod with only two sclerites, a styliform main femoral process and a long solenomere that is distally curved.

Description

General (Figure 4A): colour in ethanol dark brown, prozonites slightly paler (Figures 4A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 4D); metazonites without transverse or median sagittal lines. Paranota absent from all except segment 2. Anterior spiracles at mid-body flat and elliptical. Sternal lamella wider than long, subquadrate, without medial indentation. Pre-anal ring sparsely setose; epiproct extending



Figure 3. *Apodesmus simplex* sp. nov., holotype male (WAM T162308), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 4C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus barely visible, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 4E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 = 4 = 5 > 6$); 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 4F).

Gonopod: coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) long, twisted; posterior process (pp) absent; non-seminiferous branch (NSB) about 2/3 the length of solenomere (S), without subdistal sclerite (nsbp); solenomere (S) relatively straight, with terminal curvature at right angles to main shaft, with a single small solenomere process (sp).

Remarks

Boreohesperus is here restricted to the type species *B. hesperus* Shear, 1992, which is only known from the Cape Range region of Western Australia (Figure 1B).

Boreohesperus capensis Shear, 1992

urn:lsid:zoobank.org:act:22009272-FC58-4420-9D0B-4083DFF55BD2

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Cave C-324, Cape Range, 22°23'S, 113°51'E, 27 August 1989, M. East (WAM T23659, 91/1408).

Paratypes: AUSTRALIA: *Western Australia*: 1 ♀, collected with holotype (WAM T23660, 91/1409); 1 ♂, Cave C-203, Cape Range, 22°26'S, 113°55'E, 19 July 1989, W.F. Humphreys

(WAM T23661, 91/1410); 1 ♂, Cave C-203, Cape Range, 22°26'S, 113°55'E, 19 July 1989, W.F. Humphreys (WAM T23662, 91/1411).

Diagnosis

As for the genus *Boreohesperus*.

Description

See Shear (1992) and Car & Harvey (2013).

Other material examined

AUSTRALIA: *Western Australia*: 1 ♂, Cape Range area, cave C-15, 22°13'S, 113°59'E, 13 August 1992, W.F. Humphreys, R.D. Brooks, R.L. L'Heureux (WAM T71476); 1 ♂, Cape Range, Papillon Cave, C-15, doline, 22°12'44.67"S, 113°58'41.53"E, 18 June 2019, walking on ground, N. Tatarnic (WAM T148007); 1 ♀, Cape Range, Papillon Cave, C-15, doline, 22°12'44.67"S, 113°58'41.53"E, 18 June 2019, walking on ground, M.S. Harvey (WAM T148008); 1 ♂, Cape Range National Park, outside Spiral Cave, C-18, 22°05'14"S, 113°59'42"E, 18 August 2016, eucalypt litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T141991); 1 ♂, Cape Range National Park, outside Spiral Cave, C-18, 22°05'14"S, 113°59'42"E, 18 August 2016, eucalypt litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T141993); 1 ♂, Cape Range National Park, outside Spiral Cave, C-18, 22°05'14"S, 113°59'42"E, 18 August 2016, eucalypt litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T141994); 1 ♂, Cape Range National Park, outside Spiral Cave, C-18, 22°05'14"S, 113°59'42"E, 18 August 2016, eucalypt litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T141998); 1 ♀, North-West Cape Peninsula, cave C-18, 22°05'S, 114°00'E, 26 June 1989, B. Vine, M.S. Harvey, R.D. Brooks (WAM T71479); 1 ♀, North-West Cape Peninsula, cave C-21, 22°14'S, 113°58'E, 10 July 1989, A.J. Humphreys, R. Wood (WAM T71472); 1 ♀, North-West Cape Peninsula, cave C-21, 22°14'S, 113°58'E, 10 July 1989, A.J. Humphreys, R.



Figure 4. *Boreohepus capensis* Shear, holotype male (WAM T23659): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B), 0.5 mm (C, D, E), 0.2 mm (F).

Wood (WAM T71473); 1 ♀, Cape Range National Park, outside cave C-62, 22°09'24"S, 113°59'10"E, 26 August 2016, F. Head, I. Collette, B. Wiltshire (WAM T141796); 1 ♂, North-West Cape Peninsula, cave C-68, 22°06'S, 113°59'E, 26 June 1989, R. Wood (WAM T71487); 1 adult (damaged), Cape Range National Park, outside cave C-79, 22°05'31"S, 114°00'13"E, 18 August 2016, sifted litter, J.M. Waldock, W.F. Humphreys, R.D. Brooks (WAM T142002); 1 ♂, Cape Range National Park, outside Shot Pot, cave C-106, 22°04'20"S, 114°00'42"E, 19 August 2016, eucalypt litter, J.M. Waldock, W.F. Humphreys, R.D. Brooks (WAM T142015); 1 ♀, Cape Range National Park, outside Shot Pot, cave C-106, 22°04'20"S, 114°00'42"E, 19 August 2016, J.M. Waldock, W.F. Humphreys, R.D. Brooks (WAM T142016); 1 juvenile, North-West Cape Peninsula, cave C-107, 22°07'S, 114°00'E, 30 June 1989, B. Vine, E. Bowra (WAM T71489); 1 ♀, Cape Range, cave

C-111, Breakdown Maze, 21°55'08"S, 114°00'17"E, 5 July 1989, R. Wood, M. East (WAM T71464); 1 ♀, Cape Range, cave C-111, Breakdown Maze, 21°55'08"S, 114°00'17"E, 5 July 1989, R. Wood, M. East (WAM T71469); 1 ♂, Cape Range area, 4m outside cave, C-118, 22°09'S, 113°59'E, 23 July 1989, pitfall traps, E.C. Pryor (WAM T71474); 1 ♂, 1 ♀, Cape Range area, outside cave, C-118, 22°09'S, 113°59'E, 27 July 1989, wet pitfall traps, E.C. Pryor (WAM T71475); 1 ♂, Cape Range National Park, outside cave C-119, 22°02'08"S, 114°01'07"E, 20 August 2016, W.F. Humphreys, R.D. Brooks, I. Collette, J.M. Waldock (WAM T141405); 1 ♀, Cape Range National Park, outside cave C-119, 22°02'08"S, 114°01'07"E, 20 August 2016, W.F. Humphreys, R.D. Brooks, I. Collette, J.M. Waldock (WAM T141406); 1 ♀, North-West Cape Peninsula, outside cave C-161, 22°13'S, 113°58'E, 2 August 1989, E.C. Pryor, M. East (WAM T71480); 1 ♂, North-West Cape Peninsula,

cave C-162, 22°09'S, 114°00'E, 20 June 1989, M.S. Harvey (WAM T71486); 1 ♂, Cape Range, outside Spiral Cave, C-167, entrance doline, 22°09'04"S, 113°59'48"E, 24 August 2016, sifting litter, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142059); 1 ♂, Cape Range, outside Spiral Cave, C-167, entrance doline, 22°09'04"S, 113°59'48"E, 24 August 2016, sifting litter, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142060); 1 ♂, Cape Range, outside Spiral Cave, C-167, entrance doline, 22°09'04"S, 113°59'48"E, 24 August 2016, sifting litter, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142061); 1 ♂, Cape Range, outside Spiral Cave, C-167, entrance doline, 22°09'04"S, 113°59'48"E, 24 August 2016, sifting litter, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142062); 1 ♂, Cape Range, outside Spiral Cave, C-167, entrance doline, 22°09'04"S, 113°59'48"E, 24 August 2016, sifting litter, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142063); 6 ♂, Cape Range, Dugite Cave, C-168, 21°58'44"S, 114°07'30"E, 9 May 2015, W.F. Humphreys, R.D. Brooks (WAM T136615); 1 ♀, North-West Cape Peninsula, cave C-177, 22°06'S, 113°58'E, 7 July 1989, M. East, R. Wood (WAM T71482); 1 ♂, North-West Cape Peninsula, near cave C-201, 22°10'S, 113°58'E, 19 June 1990, R.D. Brooks (WAM T71484); 2 ♀, 1 juvenile, North-West Cape Peninsula, cave C-203, 22°26'S, 113°55'E, 19 July 1989, B. Jones (WAM T71483); 1 ♂, Cape Range National Park, outside cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, deep fig litter in entrance, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142116); 1 ♂, Cape Range National Park, entrance of cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, sifting, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142134); 1 ♂, Cape Range National Park, entrance of cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, sifting, fig litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142135); 1 ♀, Cape Range National Park, outside cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, deep fig litter in entrance, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142098); 1 ♀, Cape Range National Park, outside cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, deep fig litter in entrance, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142099); 1 ♀, Cape Range National Park, outside cave C-215, 22°01'38"S, 113°56'02"E, 28 August 2016, deep fig litter in entrance, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142117); 1 ♂, 1 ♀, Cape Range area, cave C-222, 21°56'S, 114°06'E, 10 August 1992, W.F. Humphreys, R.D. Brooks (WAM T71477); 1 ♂, N-W Cave Peninsula, cave C-222, 21°56'S, 114°06'E, 3 June 1989, A.J. Humphreys (WAM T71481); 1 ♂, North-West Cape Peninsula, cave C-232, 21°56'S, 114°05'E, 10 July 1989, E. Bowra (WAM T71478); 1 ♂, Cape Range National Park, outside cave C-254, 22°02'14"S, 114°01'33"E, 29 August 2016, under rock, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142091); 1 ♀, Cape Range National Park, outside cave C-254, 22°02'14"S, 114°01'33"E, 29 August

2016, *Solanum* & *Corymbia* litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142089); 1 ♀, Cape Range National Park, outside cave C-254, 22°02'14"S, 114°01'33"E, 29 August 2016, sifting litter, *Solanum* & *Corymbia* litter, J.M. Waldoock, W.F. Humphreys, R.D. Brooks (WAM T142090); 1 ♂, North-West Cape Peninsula, cave C-328, 22°01'S, 113°56'E, 28 August 1989, M. East (WAM T71488); 1 ♂, 2 ♀, 17 juveniles, Cape Range area, on damp soil, near cave C-499 (WAWA Bore 43 Cave), 21°56'S, 114°06'E, 19 May 1993, W.F. Humphreys, R.D. Brooks (WAM T71471); 1 ♂, Cape Range, track off Charles Knife Road, 22°05'06.16"S, 113°59'53.06"E, 17 June 2019, walking on ground, M.S. Harvey, N. Tatarnc (WAM T147989); 2 ♂, 1 ♀, Cape Range, track off Charles Knife Road, 22°05'23.21"S, 114°00'09.54"E, 17 June 2019, under rocks, M.S. Harvey (WAM T147990, T147991, T147997); 1 ♂, Cape Range, Cape Range #1 Well, 22°05'43.01"S, 113°59'41.65"E, 17 June 2019, under rocks, M.S. Harvey (WAM T147998); 1 ♀, North-West Cape Peninsula, Well #2, Charles Knife Road, 22°06'S, 113°59'E, 3 June 1990, J.M. Waldoock (WAM T71490); 1 ♂, 1 ♀, Cape Range, Cape Range #2 Well, 22°05'52"S, 113°59'44"E, 17 June 2019, walking on ground at night, R. Ellis, L. Umbrello, P. Doughty (WAM T148013, T148014); 1 ♀, Cape Range, Exmouth Gulf Station, 22°12'06.60"S, 114°03'24.80"E, 18 June 2019, walking on ground, M.S. Harvey (WAM T148001); 1 ♀, Cape Range, Yardie Creek, gorge walk, 22°19'36.8"S, 113°49'05.2"E, 18 June 2019, on ground at night, L.S. Umbrello (WAM T148032); 3 ♂, 1 ♀, Cape Range, Yardie Creek, gorge walk, 22°15'28.19"S, 113°57'04.00"E, 20 June 2019, walking on ground, daytime, R. Ellis (WAM T148040–T148043); 1 ♀, Cape Range, Shothole Canyon Road, lookout, 22°03'52.01"S, 114°00'38.42"E, 22 June 2019, under rocks, M.S. Harvey (WAM T148072); 1 ♂, Cape Range, Shothole Canyon Road, 22°03'31.06"S, 114°00'55.28"E, 22 June 2019, walking on ground, M.S. Harvey (WAM T148085); 2 ♂, Cape Range, 21°59'31.20"S, 114°01'20.03"E, 24 June 2019, walking on ground, M.S. Harvey (WAM T148125, T148126); 1 ♀, Cape Range, 21°59'34.27"S, 113°58'27.35"E, 24 June 2019, walking on ground, daytime, M.S. Harvey, N. Tatarnc, A.L. McMahon (WAM T148133); 1 ♂, Cape Range, 22°10'04.54"S, 113°56'22.42"E, 25 June 2019, on soil, M.S. Harvey (WAM T148148); 1 ♂, Cape Range, 22°09'57.91"S, 113°56'19.26"E, 25 June 2019, walking on ground, M.S. Harvey (WAM T148154); 1 ♀, Cape Range, 22°10'08.7"S, 113°56'28.2"E, 25 June 2019, walking on ground, P. Doughty (WAM T148168); 1 ♂, Cape Range, 22°09'58.18"S, 113°56'22.31"E, 25 June 2019, walking on ground, M.S. Harvey (WAM T148169); 1 ♂, 1 ♀, Cape Range, 21°55'S, 114°04'E, May 1965, A. Saar (WAM T44397); 1 ♂, Cape Range, top of range, S. of Shothole Canyon, 22°02'S, 114°01'E, 26 July 1967, W.F. Humphreys (WAM T71462); 1 ♀, east coast plain, 21°57'S, 114°07'E, 28 July 1993, W.F. Humphreys, R.D. Brooks (WAM T71463); 1 juvenile, Cape Range area, WAWA Bore 43, cave C-499, 21°56'S, 114°06'E, 7 July

1993, R.D. Brooks (WAM T71470); 1 ♀, Cape Range area, without further data (WAM T71485).

Remarks

Boreoesperus capensis has only been recorded from the Cape Range region of Western Australia (Figure 1B).

Genus *Cirridesmus* gen. nov.

urn:lsid:zoobank.org:act:6390E862-2F9F-4BDD-8665-15420CDE2333

Type species

Boreoesperus psittacinus Car & Harvey, 2017.

Diagnosis

Cirridesmus differs from other genera of Australiosomatinae by the coiled tip of the solenomere (Figures 8C, D).

Description

General (Figure 5A, 6A, 7A): colour in ethanol uniformly brown (Figures 5A–D, 6A–D, 7A–D); with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 5D, 6D, 7D); metazonites with barely imperceptible median and transverse lines. Paranota absent. Anterior spiracles at mid-body small, flat and circular. Sternal lamella much wider than long, quadrate. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 5C, 6C, 7C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 5E, 6E, 7E): strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths (2) > (3 = 4 = 5 = 6); 6 thickest but 5 and 6 subequal in apical width; 7 short.

Legs: legs medium length (Figure 7A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 5F, 6F, 7F).

Gonopod (Figures 8A–D): coxa (C) robust; prefemur (PF) ovoid, ca. 1/3 femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 1/2 acropodite length, very broad, lanceolate; posterior process (pp) a slender curved blade arising from about halfway along solenomere, curved, and about third length of solenomere; non-seminiferous branch (NSB) slightly shorter than solenomere (S), strongly lanceolate, and with a short, medial sclerite (nsbp); solenomere (S) long and thin, gently curved, with a subdistal solenomere process (sp), and tipped with a single coil.

Remarks

Cirridesmus is known from four species taken from the western Kimberley region of Western Australia (Figure 1B).

Etymology

The generic name refers to the curled terminal process of the solenomere (*cirrus*, Latin, curl, ringlet, tendril) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Cirridesmus alcyonis (Car & Harvey, 2017), comb. nov.

Figure 5

urn:lsid:zoobank.org:act:0D2CB02B-91F7-4C02-903B-FC4C7B9D8530

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Kingfisher Island, 16°04'55"S, 124°04'15"E, 9 February 2010, vine thicket, R. Teale (WAM T108780).

Paratypes: AUSTRALIA: *Western Australia*: 2 ♂, collected with holotype (WAM T140186, T153934).

Diagnosis

Cirridesmus alcyonis differs from the other species of the genus by the large, loose solenomere coil which is small and tightly coiled in the other species (Car & Harvey 2017, figures 2C–F).

Description

See Car & Harvey (2017).

Remarks

Cirridesmus alcyonis has only been recorded from Kingfisher Island, in the Kimberley region of Western Australia (Figure 1B).

Cirridesmus psittacinus (Car & Harvey, 2017), comb. nov.

Figure 6

urn:lsid:zoobank.org:act:4E2A401B-20E9-4958-8E12-56C743E7F64F

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Cockatoo Island, 16°05'03.88"S, 123°35'15.26"E, 8 February 2014, hummock grassland, G. Owen (WAM T132609)

Paratypes: AUSTRALIA: *Western Australia*: 2 ♂, collected with holotype (WAM T132608).

Diagnosis

Cirridesmus psittacinus differs from *C. alcyonis* by the small, tightly coiled tip of the solenomere which is large and loosely coiled in *C. alcyonis*, from *C. spiralis* by the short nsbp which is long in *C. spiralis*, and from *C. vascel-*



Figure 5. *Cirridesmus alcyonis* (Car & Harvey), holotype male (WAM T108780): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B, D), 0.5 mm (C, E), 0.2 mm (F).

lus by the broader base of the gonopodal femorite and the NSB is broader at its base than at its midpoint (Car & Harvey 2017, figures 3C–F).

Description

See Car & Harvey (2017).

Other material examined

AUSTRALIA: *Western Australia*: 2 ♂, 1 juvenile, collected with holotype (WAM T132611, T132613, T132614); 1 juvenile, Cockatoo Island, 16°05'28.40"S, 123°36'03.70"E, 7–12 February 2014, pitfall, *Eucalyptus* woodland, G. Owen (WAM T132612).

Remarks

Cirridesmus psittacinus has only been recorded from Cockatoo Island, in the western Kimberley region of Western Australia (Figure 1B).

Cirridesmus spiralis sp. nov.

Figures 7, 8

urn:lsid:zoobank.org:act:4774C9ED-F1EE-48EC-94FC-B4EE8908A294

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Walcott Inlet, 6 km E. of Mt Talbot, CALM site 19/2, 16°27'30"S, 124°50'30"E, 25–31 January 1989, rainforest litter, CALM staff (Kimberley Survey) (WAM T32489).

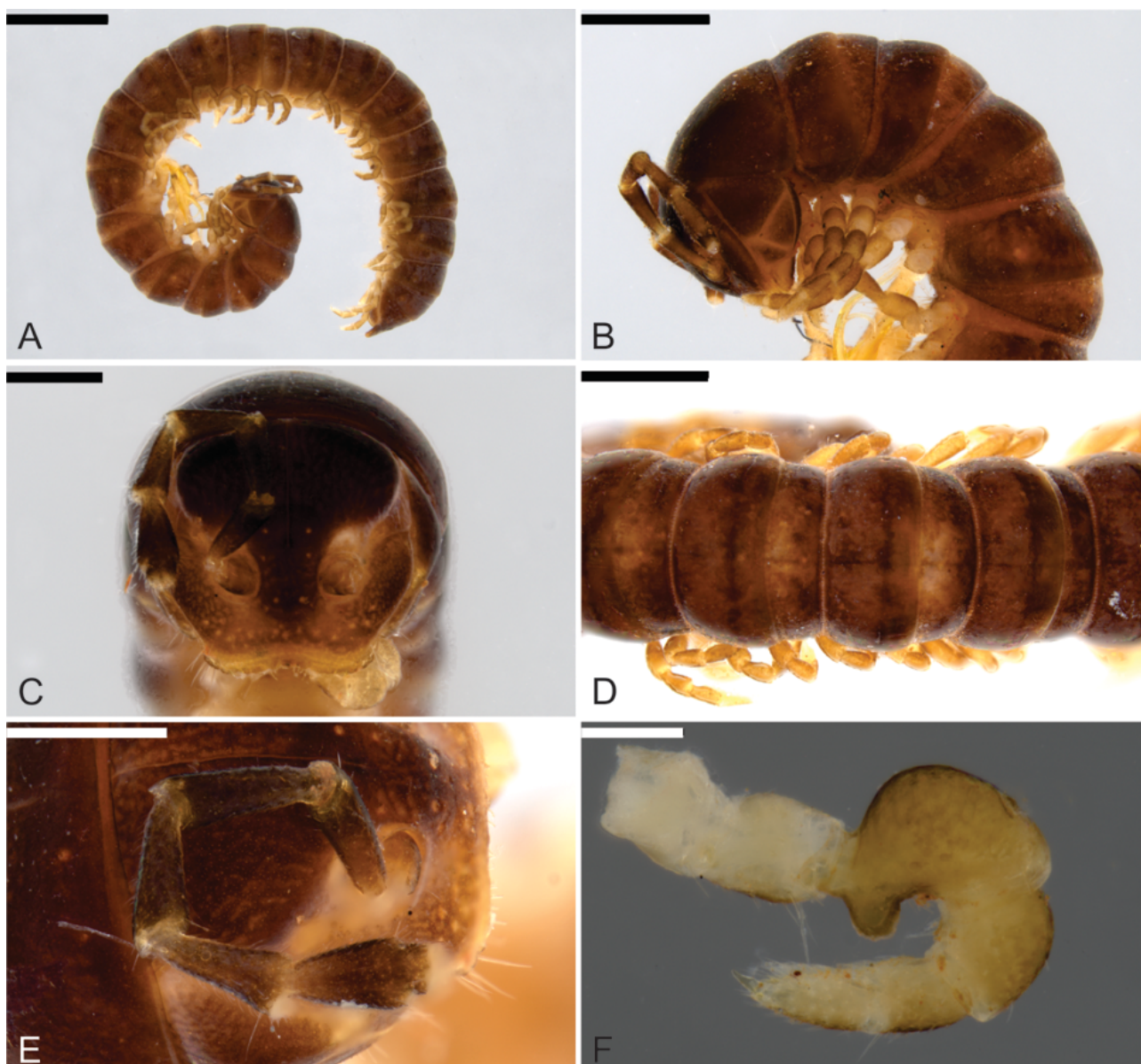


Figure 6. *Cirridesmus psittacinus* (Car & Harvey), A, B, D, holotype male (WAM T132609), C, E, F paratype male (WAM T132614): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B, D), 0.5 mm (C, E), 0.2 mm (F).

Diagnosis

Cirridesmus spiralis differs from *C. psittacinus* and *C. vascellus* by the long nsbp which is short in the other species, and from *C. alcyonis* by the tightly coiled tip of the solenomere which is loosely coiled in *C. alcyonis* (Figures 8C, D).

Description

Male

General (Figure 7A): colour in ethanol uniformly red brown (Figures 7A–D); unknown number of segments, but likely 20 (posterior half of specimen missing; segments 5, 7, 9 and 10 with ozopores; length unknown; mid-body ring approximately 1.9 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure

7D); paranota absent. Anterior spiracles at mid-body flat and ovoid.

Head (Figure 7C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.1 \times$ socket diameter. Antennal segments (Figure 7E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 = 4 > (5 = 6)$; 5 and 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 7F).

Gonopod (Figures 8A–D): coxa (C) robust; prefemur (PF) ovoid, ca. $1/2$ femorite length, leading directly into femorite with no noticeable process at femorite base;

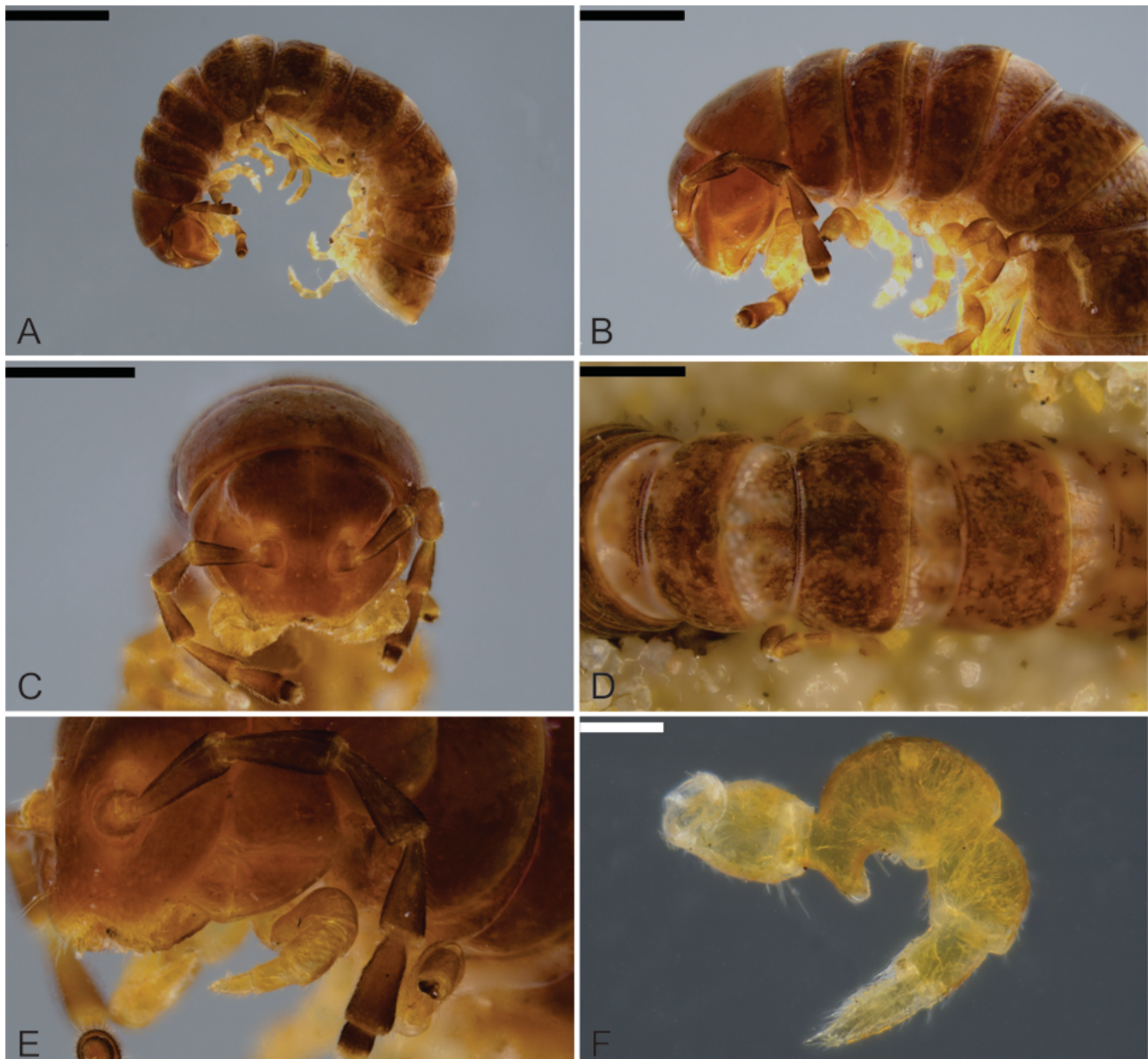


Figure 7. *Cirridesmus spiralis* sp. nov., holotype male (WAM T32489): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 0.5 mm (B–E), 0.2 mm (F).

femorite (F) ca. 2/3 acropodite length, straight, flattened in lateral view; non-seminiferous branch (NSB) longer than solenomere (S), with acute tip, thin in lateral view; process on medial surface of NSB (nsbp) thin and curved; solenomere (S) tubular, terminally coiled, with prominent tubular posterior process (pp).

Female

Unknown.

Remarks

Cirridesmus spiralis has only been recorded from a single rainforest patch at Walcott Inlet, Western Australia (Figure 1C). The collection site was one of many localities sampled as part of a comprehensive assessment of the biodiversity values of rainforests in the Kimberley region (McKenzie et al. 1991).

Etymology

The specific epithet is a Latin adjective that refers to the coiled tip of the solenomere (*spiralis*, Latin, coil, twist) (Brown 1956).

Cirridesmus vascellus (Car & Harvey, 2017), comb. nov.

urn:lsid:zoobank.org:act:75C21DCD-E403-4B9E-A72E-DFEA369EEED7

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Koolan island, 16°07'45"S, 123°46'49"E, 20–24 January 2006, dry pitfall, B. Maryan (WAM T137095).

Paratypes: AUSTRALIA: *Western Australia*: 2 ♂, collected with holotype (WAM T73954).

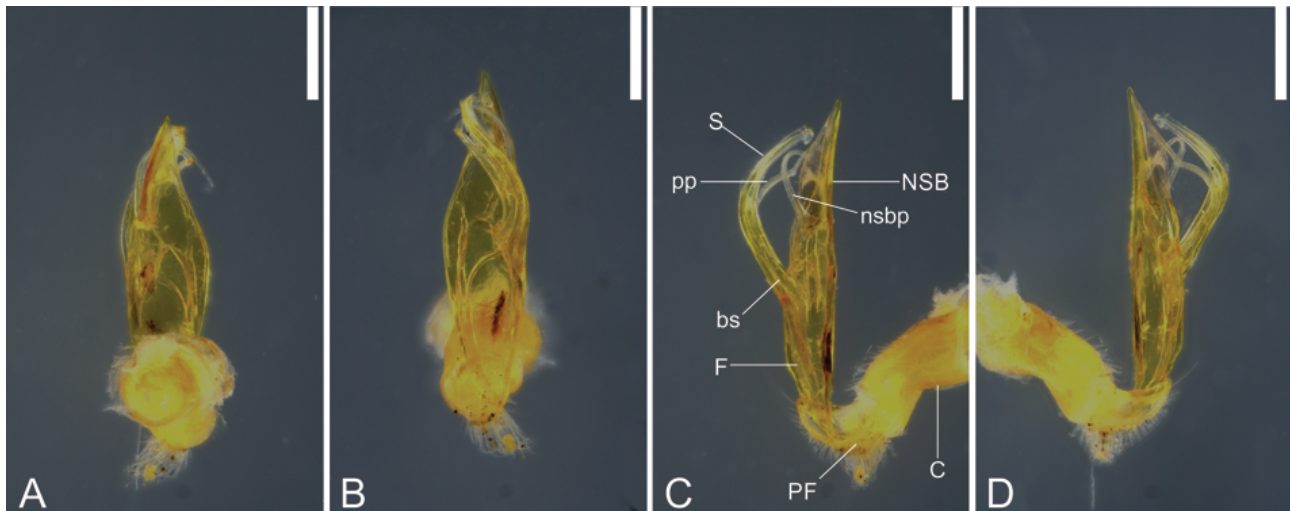


Figure 8. *Cirridesmus spiralis* sp. nov., holotype male (WAM T32489), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Diagnosis

Cirridesmus vascellus differs from *C. alcyonis* by the small, tightly coiled tip of the solenomere which is large and loosely coiled in *C. alcyonis*, from *C. spiralis* by the short nsbp which is long in *C. spiralis*, and from *C. psittacinus* by the narrower base of the gonopodal femorite and the NSB is broader medially than at its base (Car & Harvey 2017, figures 4C–F).

Description

See Car & Harvey (2017).

Remarks

Cirridesmus vascellus has only been recorded from Koolan Island, in the western Kimberley region of Western Australia (Figure 1C).

Genus *Coelodesmus* gen. nov.

urn:lsid:zoobank.org:act:AAA5EAA7-A4B3-40EB-A96A-DB1A02F7BF8E

Type species

Coelodesmus spelaus sp. nov.

Diagnosis

Coelodesmus most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 10A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Helicopodosoma*, *Helicopodosomella*, *Heligmodesmus*, *Otoplacosoma*, *Pictodesmus*, *Serratidesmus*, *Stygiochiropus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 9D). *Coelodesmus* differs from all these genera by the unique shape of the gonopods which are simple, lacking any processes except for a prolongation of the femorite, and have a noticeably twisted solenomere (Figures 10A–D).

Description

General (Figure 9A): colour in ethanol pale yellow brown (Figures 9A–D); with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 9D); metazonites without transverse or median sagittal lines. Paranota present, but quite small and restricted to posterior half of segment. Anterior spiracles at mid-body small, flat and circular. Sternal lamella wider than long, subquadrate, with medial indentation. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 9C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus barely discernible, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 9E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$; 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 9F).

Gonopod (Figures 10A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) flattened and slightly curved in lateral view; posterior process (pp) absent; prolongation of the femorite present; non-semiferous branch (NSB) very short, flat, distally rounded, and without medial sclerite (nsbp); solenomere (S) long and flat, noticeably twisted, without subdistal solenomere process (sp).

Remarks

Coelodesmus is only known from a single species that occurs in cave ecosystems in the Kimberley region of Western Australia (Figure 1B).

Etymology

The generic name refers to the presence of this species in cave ecosystems (*koilos*, Greek, hollow) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Coelodesmus spelaeus sp. nov.

Figures 9, 10

urn:lsid:zoobank.org:act:AFEFDA3D-CC0C-44B0-81D7-590E94B8E263

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 16 June 1998, on mudbanks, S.M. Eberhard (WAM T162310).

Paratypes: AUSTRALIA: *Western Australia*: 1 ♂, Napier Range, Wagon Pass, drillhole NRD82, 17°10'31"S, 124°37'50"E, 17 June 1998, S.M. Eberhard (WAM T71779); 1 ♂, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 16 June 1998, on mudbanks, S.M. Eberhard (WAM T162309); 1 ♂, Napier Range, Old Napier Downs Cave, KN-1, 17°13'45"S, 124°38'40"E, 28 May 2008, on mud bank near water, J. Anderson (WAM T153911).

Diagnosis

As for the genus *Coelodesmus*.

Description

Male

General (Figure 9A): colour in ethanol extremely pale (Figures 9A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 13.8 mm long; mid-body ring approximately 0.9 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 9D); with small paranota on all body rings. Anterior spiracles at mid-body flat and circular.

Head (Figure 9C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by 2.5 × socket diameter. Antennal segments (Figure 9E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths (2 = 3) > (4 = 5 = 6); 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 9F).

Gonopod (Figures 10A–D): coxa (C) robust; prefemur (PF) ovoid, ca. 1/3 femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 2/3 acropodite length, gently curved, cylindrical; non-seminiferous branch (NSB) much short-

er than solenomere (S), rounded, very thin in lateral view; solenomere (S) flat, twisted, without processes.

Female

Similar to male, except for genitalic features.

Other material examined

AUSTRALIA: *Western Australia*: 3 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°15'S, 124°42'E, 20 June 1998, on roots and soil, S.M. Eberhard (WAM T71778); 1 ♀, Napier Range, Old Napier Downs Cave, KN-1, 17°13'45"S, 124°38'40"E, 19 July 2010, on mud bank, J. Anderson (WAM T160849); 1 ♀, 2 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'45"S, 124°38'40"E, 28 May 2008, on mud bank near water, J. Anderson (WAM T95877); 5 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 16 June 1998, on mudbanks, S.M. Eberhard (WAM T71776); 4 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 23 June 1998, on water surface, S.M. Eberhard (WAM T71777); 1 juvenile, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 13 June 1998, S.M. Eberhard (WAM T71773); 2 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 25 June 1998, on water surface, A. Minchin, P. Cornish, S.M. Eberhard (WAM T71774); 1 juvenile, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 9 June 1998, on mud, S.M. Eberhard (WAM T71775); 1 [m], 1 [f], 2 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'38"S, 124°38'41"E, 14 July 2004, J. Anderson (WAM T129420); 1 ♂, 2 juveniles, Napier Range, Old Napier Downs Cave, KN-1, 17°13'45"S, 124°38'40"E, 19 July 2010, on mud bank, J. Anderson (WAM T160848); 1 ♂, Napier Range, Old Napier Downs Cave, KN-1, 17°14'S, 124°39'E, 11 July 1996, A. Minchin (WAM T164193); 2 ♀, Napier Range, Old Napier Downs Cave, KN-1, 17°14'S, 124°39'E, 5 July 1996, R. Webb (WAM T164194); 2 ♀, 1 juvenile, Napier Range, Old Napier Downs Cave, KN-1, 17°14'S, 124°39'E, 11 July 1996, B. Vine, R. Foulds (WAM T164195).

Remarks

Coelodesmus spelaeus has only been collected in the dark zone of Old Napier Downs cave KN-1, which is located in the Napier Range in north-western Australia (Figure 1B). The specimen labels mention the presence of specimens on mudbanks or near water within the cave.

Etymology

The specific epithet is a noun that refers to the presence of this species in caves (*speleum*, Latin, cave, cavern, den, grotto) (Brown 1956).

Genus *Dolodesmus* gen. nov.

urn:lsid:zoobank.org:act:13A0088B-11D0-4FD9-9063-8EEDEC0EFF2E



Figure 9. *Coelodesmus spelaeus* sp. nov., holotype male (WAM T162310): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 0.5 mm (B–E), 0.2 mm (F).

Type species

Boreohesperus dubitalis Car & Harvey, 2013.

Diagnosis

Among the Australiosomatinae, *Dolodesmus* most closely resembles the genera *Apodesmus* and *Furcadesmus* as the solenomere of all three terminates in a pair of large, hooked processes. *Dolodesmus* differs from *Apodesmus* and *Furcadesmus* by the presence of a thin posterior process emanating from the base of the solenomere. It further differs from *Apodesmus* by the presence of NSB which is lacking in *Apodesmus*.

Description

General (Figure 11A): colour in ethanol dark brown, prozonites slightly paler (Figures 11A–D); 20 segments; seg-

ments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 11D); metazonites with incomplete transverse and sagittal lines. Paranota on all but first few body rings small. Anterior spiracles at mid-body flat and circular. Sternal lamella wider than long. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Legs: legs short (Figure 11A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 11F).

Head (Figure 11C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal

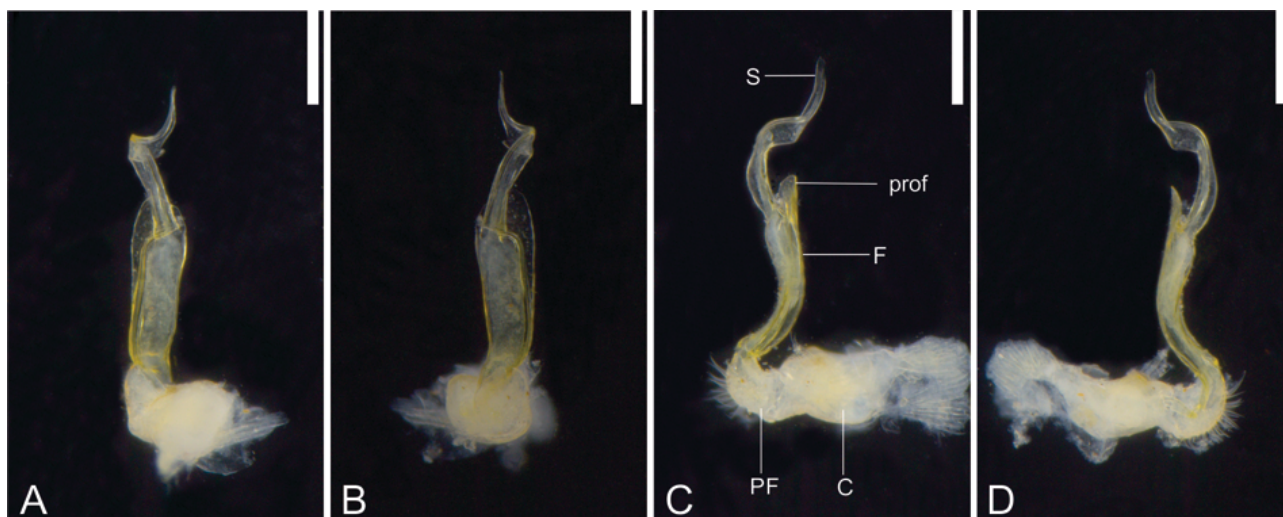


Figure 10. *Coelodesmus spelaeus* sp. nov., holotype male (WAM T162310), right gonopod (images reversed): A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

groove moderately deep. Antennal segments (Figure 11E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3$) > ($4 = 5 = 6$); 6 thickest but 5 and 6 subequal in apical width; 7 short.

Gonopod: coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) short, cylindrical; posterior process (pp) a slender acuminate blade adpressed against solenomere, and about half length of solenomere; non-seminiferous branch (NSB) much shorter than solenomere (S), with a subdistal sclerite (nsbp) that is longer than NSB; solenomere (S) undulate, with subdistal solenomere process (sp), and terminating in two large equal-sized hooked processes.

Remarks

There are only two known species of the genus *Dolodesmus*, one of which is restricted to Barrow Island (*D. dubitalis*) and the other to adjacent landforms near the western edge of the Pilbara region (*D. undulatus*) of Western Australia (Figure 1C).

Etymology

The generic name refers to the mistaken inclusion of these two species in the genus *Boreohesperus* (*dolus*, Latin, artifice, guile, deceit, bait, trap) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Dolodesmus dubitalis (Car & Harvey, 2013), comb. nov.

Figure 11

urn:lsid:zoobank.org:act:0D0F45E5-7CB3-435E-9F83-D45D8B4F9B73

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Barrow Island, WSW. of Latitude point, 20°46'51"S, 115°26'28"E, 11 August

2002, mostly limestone & rocks, little soil, S. Slack-Smith (WAM T57637).

Paratypes: AUSTRALIA: *Western Australia*: 2 ♂, 3 ♀, Barrow Island, 500 m E. of Base, 20°49'02.0"S, 115°23'24.4"E, 26 March 2012, dry pitfall, R. Teale (WAM T126126).

Diagnosis

Dolodesmus dubitalis differs from *D. undulatus* by the narrower NSB (Car & Harvey 2013, figures 6C–F).

Description

See Car & Harvey (2013).

Other material examined

AUSTRALIA: *Western Australia*: 1 ♂, Barrow Island, 500 m E. of Base, 20°49'02.0"S, 115°23'24.4"E, 26 March 2012, dry pitfall, R. Teale (WAM T123094); 1 ♂, 1 ♀, 1 juvenile, Barrow Island, 20°51'50"S, 115°24'23"E, 1 May 2007, Winkler sac, S. Callan, K. Edwards (WAM T56353); 2 ♀, 3 juveniles, Barrow Island, old administration building, 20°49'09"S, 115°23'40"E, 1 May 2007, Winkler sac, S. Callan, K. Edwards (WAM T56354); 1 ♂, Barrow Island, 20°48'S, 115°24'E, 31 March 1971, A.A. Burbidge, W.H. Butler (WAM T73900); 1 ♀, Barrow Island, 4.5 km N. of Chevron Texaco Camp, 20°47'14"S, 115°26'41"E, 8 March–20 May 2006, staff from Biota Environmental Sciences (WAM T83026); 4 ♂, 1 ♀, 1 juvenile, Barrow Island, 20°46'59"S, 115°27'03"E, 15 March 2006, winkler sac, high limestone flats, S. Callan, R. Graham (WAM T121015); 1 ♂, Barrow Island, 20°47'51"S, 115°26'27"E, 15 March 2006, winkler sac, limestone ridge to drainage line, S. Callan, R. Graham (WAM T121016); 12 ♂, 1 ♀, Barrow Island, 20°49'02"S, 115°26'24"E, 10–15 March 2006, wet pitfall traps, low limestone flats, S. Callan, R. Graham (WAM T121017); 3 ♂, 2 ♀, 10 juveniles, Barrow Island, 20°47'59"S, 115°27'00"E, 15 March 2006, winkler sac, low limestone ridge, S. Callan, R. Graham (WAM T121018); 2 ♂, Barrow Island, 20°47'51"S, 115°26'27"E,



Figure 11. *Dolodermus dubitalis* (Car & Harvey), holotype male (WAM T57637): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; paratype male (WAM T126126): F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B–D), 0.2 mm (E), 0.1 mm (F).

10–15 March 2006, wet pitfall traps, limestone ridge, S. Callan, R. Graham (WAM T121019); 1 ♀, 3 juveniles, Barrow Island, 20°47'03"S, 115°27'33"E, 15 March 2006, winkler sac, low limestone flats, S. Callan, R. Graham (WAM T121020); 1 ♂, Barrow Island, 20°46'59"S, 115°27'03"E, 10–15 March 2006, wet pitfall traps, high limestone flats, S. Callan, R. Graham (WAM T121021); 1 ♂, 1 juvenile, Barrow Island, 20°48'08"S, 115°26'48"E, 17 May 2005, winkler sac, S. Callan, et al. (WAM T121022); 1 ♂, Barrow Island, 20°49'00"S, 115°26'16"E, 17–22 May 2005, wet pitfall traps, S. Callan, et al. (WAM T121023); 2 ♀, Barrow Island, 20°47'59"S, 115°27'00"E, 10–15 March 2006, wet pitfall traps, low limestone ridge, S. Callan, R. Graham (WAM T121024); 3 ♂, Barrow Island, 20°49'01"S, 115°26'15"E, 10–15 March 2006, wet pitfall traps, valley flats, S. Callan, R. Graham (WAM T121025); 1 ♂, 1 ♀, 15 juveniles, Barrow Island, 20°49'02"S, 115°26'24"E, 15

March 2006, winkler sac, low limestone flats, S. Callan, R. Graham (WAM T121026); 1 ♂, Barrow Island, old rubbish dump, 20°47'51"S, 115°20'55"E, 17 May 2005, winkler sac, S. Callan, et al. (WAM T121027); 1 ♀, Barrow Island, 20°49'02"S, 115°26'24"E, 15 March 2006, low limestone flats, S. Callan, R. Graham (WAM T121028); 2 ♀, Barrow Island, 20°47'12"S, 115°27'17"E, 17 May 2005, S. Callan, et al. (WAM T121029); 1 ♂, Barrow Island, Chevron Texaco camp, 20°49'43"S, 115°26'36"E, 7 May 2005, S. Callan, et al. (WAM T121030); 1 ♂, Quarantine Interception from Barrow Island, WAPET Landing, offices, 20°45'29"S, 115°28'19"E, 8 January 2013, on path between vegetation & building, K. Cullen (WAM T126113).

Remarks

Dolodermus dubitalis has only been recorded from Barrow Island, Western Australia (Figure 1C).

***Dolodesmus undulatus* (Car & Harvey, 2013), comb. nov.**

urn:lsid:zoobank.org:act:90586ED4-0AAD-4173-A958-D16655A5B3CA

Boreohesperus undulatus Car & Harvey, 2013: 15–17, figures 1F, 8A–F, 9.**Type material***Holotype*: AUSTRALIA: *Western Australia*: ♂, 3.5 km N. of Karatha Station, Pilbara Biological Survey site DRW05, 20°51'14.1"S, 116°40'07.9"E, May 2004, wet pitfall traps, CALM staff (Pilbara Biological Survey) (WAM T76056).*Paratypes*: AUSTRALIA: *Western Australia*: 4 ♂, 1 ♀, 1 juvenile, collected with holotype (WAM T126119); 1 ♂, 1 ♀, 11 km ESE. of Marda Pool, Pilbara Biological Survey site DRW07, 21°03'20.4"S, 116°15'06"E, May 2004, wet pitfall traps, CALM staff (Pilbara Biological Survey) (WAM T76072).**Diagnosis***Dolodesmus undulatus* differs from *D. dubitalis* by the broader NSB (Car & Harvey 2013, figures 8C–F).**Description**

See Car & Harvey (2013).

Remarks*Dolodesmus undulatus* has been recorded from Cane River Conservation Park and near Marda Pool, which are both located in the western Pilbara region of Western Australia (Figure 1C).**Genus *Engyodesmus* gen. nov.**

urn:lsid:zoobank.org:act:1787E1D8-0BB4-4AA8-BED3-8B3B7B2B6ECE

Type species*Engyodesmus cracens* sp. nov.**Diagnosis***Engyodesmus* differs from other genera of Australiosomatinae by the shape of the gonopods which have a flattened femorite (F), a short solenomere (S), a long non-seminiferous branch (NSB) and processes on the solenomere and tip of the femorite (Figures 13A–D).**Description***General* (Figure 12A): colour in ethanol pale yellow brown; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 12D); metazonites without transverse or median sagittal lines. Paranota absent. Spiracles inconspicuous, small and circular. Sternal lamella evenly convex, without median indentation. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.*Head* (Figure 12C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct,ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 12E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3$) > ($4 = 5 = 6$); 6 thickest; 7 short.*Legs*: legs medium length (Figure 12A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 12F).*Gonopod* (Figures 13A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) gently curved, flattened in lateral view; non-seminiferous branch (NSB) much longer than solenomere (S), foliate with bifurcate tip, very thin in lateral view; solenomere (S) flat, terminally truncate, with small, acute lateral process and small, rounded lateral process; with 2 thin curved processes, one with a small lateral process.**Remarks***Engyodesmus* is known from a single species from the Kimberley region of Western Australia (Figure 1C).**Etymology**The generic name refers to the similarity of this species to other paradoxosomatids (*engys*, Greek, near, at hand, hard by) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.***Engyodesmus cracens* sp. nov.**

Figures 12, 13

urn:lsid:zoobank.org:act:0C69E074-14BC-4AD5-BFAA-9EA71423ACE7

Type material*Holotype*: AUSTRALIA: *Western Australia*: ♂, 10 km SW. of September Point, Cape Bougainville, 14°04'55"S, 126°08'00"E, 25–31 January 1989, rainforest litter, CALM Staff (WAM T75156).**Diagnosis**As for the genus *Engyodesmus*.**Description****Male***General* (Figure 12A): colour in ethanol uniformly pale brown (Figures 12A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 26 mm long; mid-body ring approximately 2.0 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 12D); paranota absent. Anterior spiracles at mid-body flat and ovoid.*Head* (Figure 12C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.3 \times$ socket diameter. Antennal segments (Figure



Figure 12. *Engyodesmus cracens* sp. nov., holotype male (WAM T75156): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B, D), 0.5 mm (C, E), 0.2 mm (F).

12E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$; 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 12F).

Gonopod (Figures 13A–D): coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. $2/3$ acropodite length, gently curved, flattened in lateral view; non-seminiferous branch (NSB) much longer than solenomere (S), foliate with bifurcate tip, very thin in lateral view; solenomere (S) flat, terminally truncate, with small, acute lateral process and small, rounded lateral process; with 2 thin curved processes, one with a small lateral process.

Female

Unknown.

Remarks

The holotype and only known specimen of *E. cracens* was collected from a rainforest habitat at Cape Bougainville in the Kimberley region of Western Australia (Figure 1C).

Etymology

The specific epithet is an adjective that refers to the narrow male gonopod when viewed laterally (*cracens*, Latin, slender, graceful) (Brown 1956).

Genus *Furcadesmus* gen. nov.

urn:lsid:zoobank.org:act:A38A1FF8-C05D-45E7-B0AA-06E52D3FA958

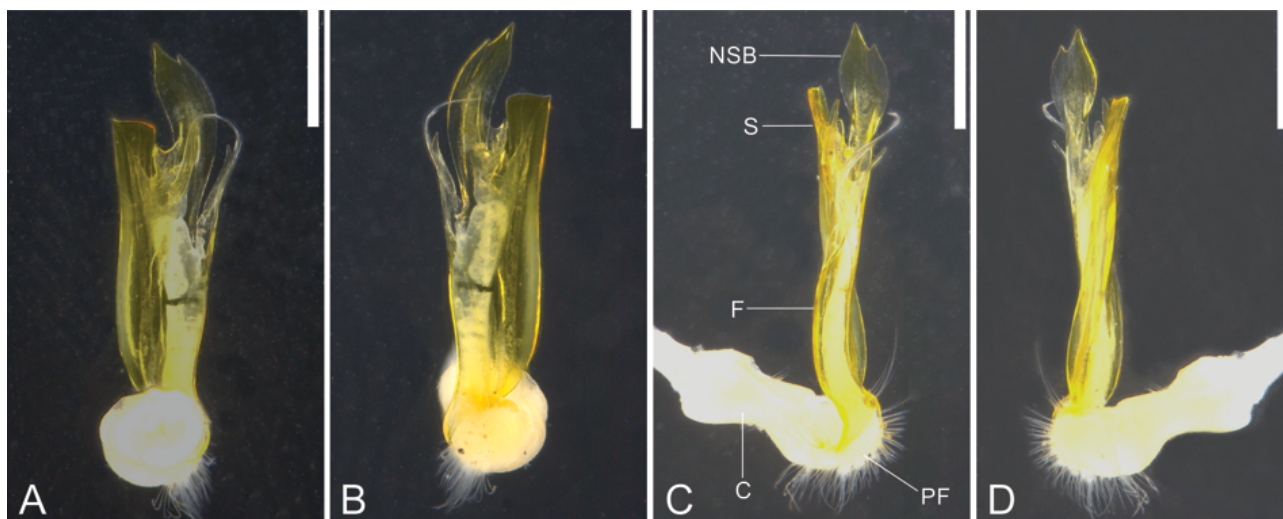


Figure 13. *Engyodesmus cracens* sp. nov., holotype male (WAM T75156), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.5 mm.

Type species

Boreohesperus furcosus Car & Harvey, 2013.

Diagnosis

Among the Australiosomatinae, *Furcadesmus* most closely resembles the genera *Apodesmus* and *Dolodesmus* as the solenomere of all three terminates in a pair of large, hooked processes. *Furcadesmus* differs from *Dolodesmus* by the absence of a thin posterior process emanating from the base of the solenomere, and from *Apodesmus* by the presence of NSB which is lacking in *Apodesmus*.

Description

General (Figure 14A): colour in ethanol brown (Figures 14A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 14D); metazonites with barely imperceptible transverse line but without median sagittal line. Very slight paranota on all but first few body rings. Anterior spiracles at mid-body flat and circular. Sternal lamella quadrate, and not indented medially. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Legs: legs medium length (Figure 14A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 14F).

Head (Figure 14C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 14E): strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths (2 = 3 = 4 = 5 = 6; 6 thickest; 7 short).

Gonopod: coxa (C) robust; prefemur (PF) ovoid, ca. 1/2 femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 1/3–1/2 acropodite length, rather straight, cylindrical; posterior process (pp) absent; non-seminiferous branch (NSB) much shorter than solenomere (S), with a subdistal sclerite (nsbp) that is longer than NSB; solenomere (S) flat, undulate, with a subdistal solenomere process (sp), and terminating in two large equal-sized hooked processes.

Remarks

The three known species of the genus *Furcadesmus* occur in the western Pilbara region of Western Australia (Figure 1D).

Etymology

The generic name refers to bifurcate tip of the solenomere (*furca*, Latin, pitchfork) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Furcadesmus curiosus (Car & Harvey, 2013), comb. nov.

urn:lsid:zoobank.org:act:E0E61D2E-4BE0-463B-91AB-E9F3DB5219A3

Boreohesperus curiosus Car & Harvey, 2013: 7–8, figures 1B, 3A–F, 9.

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, 14.5 km NNW. of Mt Elvire, Pilbara Biological Survey site OYE07, 21°42'39"S, 116°45'57"E, 2 October 2005–21 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124633).

Paratype: AUSTRALIA: *Western Australia*: 1 ♀, collected with holotype (WAM T126116).

Diagnosis

Furcadesmus curiosus differs from the other species of the genus by the shape of the solenomere which, when seen in medial or lateral view, curves in an arc (Car & Harvey, 2013, figures 3E, F).

Description

See Car & Harvey (2013).

Remarks

Furcadesmus curiosus has only been recorded from near Mt Elvire in the western Pilbara region of Western Australia (Figure 1D). The distribution map provided by Car & Harvey (2013, fig. 9) showed the collection site in the wrong location. The new map provided here corrects this error.

***Furcadesmus delicatus* (Car & Harvey, 2013),
comb. nov.**

urn:lsid:zoobank.org:act:69CC2421-755B-4EA1-B1C1-363DEB55E796

Boreohesperus delicatus Car & Harvey, 2013: 8–10, figures 1C, figures 4A–F, 9.

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, 6 km SE. of Marda Pool, Pilbara Biological Survey site DRW10, 21°04'11.8"S, 116°12'15.5"E, May 2004, CALM staff (Pilbara Biological Survey) (WAM T76070).

Paratypes: AUSTRALIA: *Western Australia*: 1 ♂, 11 km ESE. of Marda Pool, Pilbara Biological Survey site DRW07, 21°03'20.4"S, 116°15'06"E, May 2004, CALM staff (Pilbara Biological Survey) (WAM T76065); 1 ♂, 2 ♀, collected with holotype; 4 ♂, 1 ♀, Pilbara Biological Survey site DRW08, Mardie Station, Eramurra Creek, 21°03'48"S, 116°14'01"E, 28 November 2003–11 May 2004, wet pitfall traps, CALM staff (Pilbara Biological Survey) (WAM T76141).

Diagnosis

Furcadesmus delicatus differs from the other species of the genus by the shape of the solenomere which, when seen in medial or lateral view, is sinuate (Car & Harvey 2013, figures 4E, F).

Description

See Car & Harvey (2013).

Remarks

Furcadesmus delicatus has been recorded from three localities situated in the western Pilbara region of Western Australia (Figure 1D).

***Furcadesmus furcosus* (Car & Harvey, 2013),
comb. nov.**

Figure 14

urn:lsid:zoobank.org:act:7D64C1AD-1856-420D-BE41-D32E7074B38E

Boreohesperus furcosus Car & Harvey, 2013: 13–15, figures 1E, 7A–F, 9.

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Cane River Conservation Park, 9.5 km S. of Mt Minnie, Pilbara Biological Survey site WYW04, 22°11'19.1"S, 115°33'13.2"E, May 2004, CALM staff (Pilbara Biological Survey) (WAM T76078).

Paratypes: AUSTRALIA: *Western Australia*: 4 ♂, 4 ♀, collected with holotype (WAM T126118).

Diagnosis

Furcadesmus furcosus differs from the other species of the genus by the shape of the solenomere which, when seen in medial or lateral view, is only slightly curved (Car & Harvey, 2013, figures 7E, F).

Description

See Car & Harvey (2013).

Remarks

Furcadesmus furcosus has only been recorded from Cane River Conservation Park, in the western Pilbara region of Western Australia (Figure 1D).

Genus *Helicopodosomella* Verhoeff, 1924

urn:lsid:zoobank.org:act:A5981B62-B7B6-4633-9081-B116B96E12A7

Helicopodosomella Verhoeff, 1924: 30.

Type species

Helicopodosomella melas Verhoeff, 1924, by monotypy.

Diagnosis

Helicopodosomella most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 16A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Coelodesmus*, *Helicopodosoma*, *Heligmodesmus*, *Otoplacosoma*, *Pictodesmus*, *Serratidesmus*, *Stygirochirus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 15D). *Helicopodosomella* differs from all these genera by the unique shape of the gonopods which are simple, lacking any processes and a curved solenomere with a flared distal process (Figures 16A–D).

Description

General (Figure 15A): colour in ethanol pale yellow brown; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; mid-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 15D); metazonites with distinct transverse line and but without median sagittal line. Paranota present. Anterior spiracles at mid-body small, flat and circular. Sternal lamella wider than long, subquadrate and not medially indented. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring;

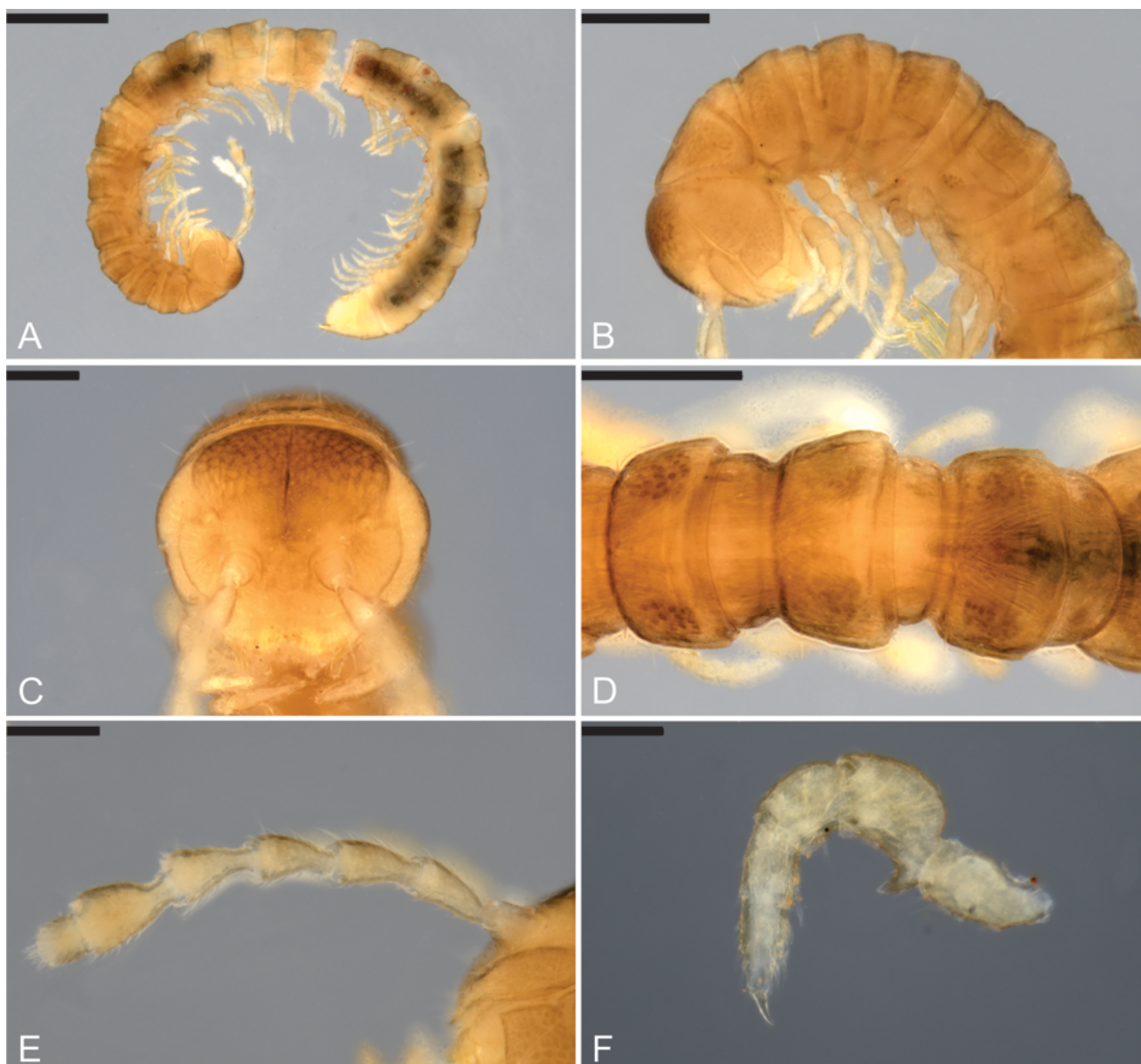


Figure 14. *Furcadesmus furcosus* (Car & Harvey), holotype male (WAM T76078): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 1 mm (A), 0.5 mm (B, D), 0.2 mm (C, E), 0.1 mm (F).

hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 15C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 15E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 = 4 = 5 = 6$); 6 thickest; 7 short.

Legs: legs medium length (Figure 15A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 15F).

Gonopod (Figures 16A–D): coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base;

femorite (F) ca. $1/2$ acropodite length, fairly straight, circular in lateral view; non-seminiferous branch (NSB) absent; solenomere (S) curved, flat, terminally truncate, without processes and with a flared distal process.

Remarks

As stated earlier, *Helicopodosomella* is removed from the synonymy of *Helicopodosoma* and treated as a distinct genus. The holotype of the type species *H. melas* has not been available for study, but the discovery of a putative new species of *Helicopodosomella* from near Kununurra allows further details concerning the morphology of the genus. The gonopod of the new species closely resembles that of *H. melas* (Verhoeff 1924, figure 18) but fresh examination of the holotype of *H. melas* will be needed to confirm this generic association.

The precise collection site of the type species, *H. melas*, is unknown (Verhoeff 1924), so the genus *Helicopodosomella* is only known the new species collected from near Kununurra in the eastern Kimberley (Figure 1B).

Helicopodosomella fanda sp. nov.

Figures 15, 16

urn:lsid:zoobank.org:act:24905EB4-87FC-46C8-8128-06CB522F264C

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Kununurra, 15°46'S, 128°44'E, 19 April 1983, clay under seedling rockmelons, M. Heap (WAM T71496).

Paratypes: AUSTRALIA: *Western Australia*: 5 ♂, 4 ♀, collected with holotype (WAM T71498); 1 ♂, near Kununurra, 15°46'S, 128°44'E, 29 November 1978, rice paddies, D. Roberts, J. Stoddart (WAM T71497).

Diagnosis

Helicopodosomella fanda differs from *H. melas* by the shape of the solenomere tip, which has a small pointed distal projection (Figures 16A–D), in contrast to the large blunt projection found in *H. melas* (Verhoeff 1924, figure 18).

Description

Male

General (Figure 15A): colour in ethanol uniformly deep brown (Figures 15A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 21 mm long; mid-body ring approximately 1.0 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 15D); paranota present. Anterior spiracles at mid-body flat and elliptical.

Head (Figure 15C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by 1.3 × socket diameter. Antennal segments (Figure 15E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths (2 = 3 = 4 = 5) > 6; 6 thickest; 7 very short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 15F).

Gonopod (Figures 16A–D): coxa (C) robust; prefemur (PF) ovoid, ca. 1/3 femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 1/2 acropodite length, fairly straight, circular in lateral view; non-semiferous branch (NSB) absent; solenomere (S) flat, terminally truncate, without processes and with a flared distal process.

Female

Similar to male, except for genitalic features.

Remarks

Helicopodosomella fanda has only been collected from Kununurra in the eastern Kimberley region of Western Australia (Figure 1D).

Etymology

The specific epithet is an adjective that refers to the resurrection of the genus *Helicopodosomella* from the synonymy of *Helicopodosoma* (*fandus*, Latin, right, correct, lawful) (Brown 1956).

Helicopodosomella melas Verhoeff, 1924

urn:lsid:zoobank.org:act:17FB3734-EF2A-42B2-80FB-AF9217C5899F

Helicopodosomella melas Verhoeff, 1924: 30, figure 18.

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Kimberley District, January, E. Mjöberg (NHRS) (not examined).

Diagnosis

Helicopodosomella melas differs from *H. fanda* by the shape of the solenomere tip, which has a large blunt projection (Verhoeff 1924, figure 18), compared with the small pointed distal projection in *H. fanda* (Figures 16A–D).

Description

Male

See Verhoeff (1924).

Female

Unknown.

Remarks

The type locality for *H. melas* was only stated to be “Kimberley Distrikt N. W. Australiens” (Verhoeff 1924) and no further specimens could be located in museum collections. However, the presence of *H. fanda* in the Kununurra region (Figure 1B) suggests that *H. melas* might also be from the east Kimberley based on the observation that most tropical Western Australian genera have highly restricted distributions (Figures 1A–D).

Genus *Heligmodesmus* gen. nov.

urn:lsid:zoobank.org:act:A872B01A-F013-4D11-8B33-D046AE570D81

Type species

Heligmodesmus pampinus sp. nov.

Diagnosis

Heligmodesmus most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 18A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Coelodesmus*, *Helicopodosoma*, *Helicopodosomella*, *Otoplacosoma*, *Pic-*

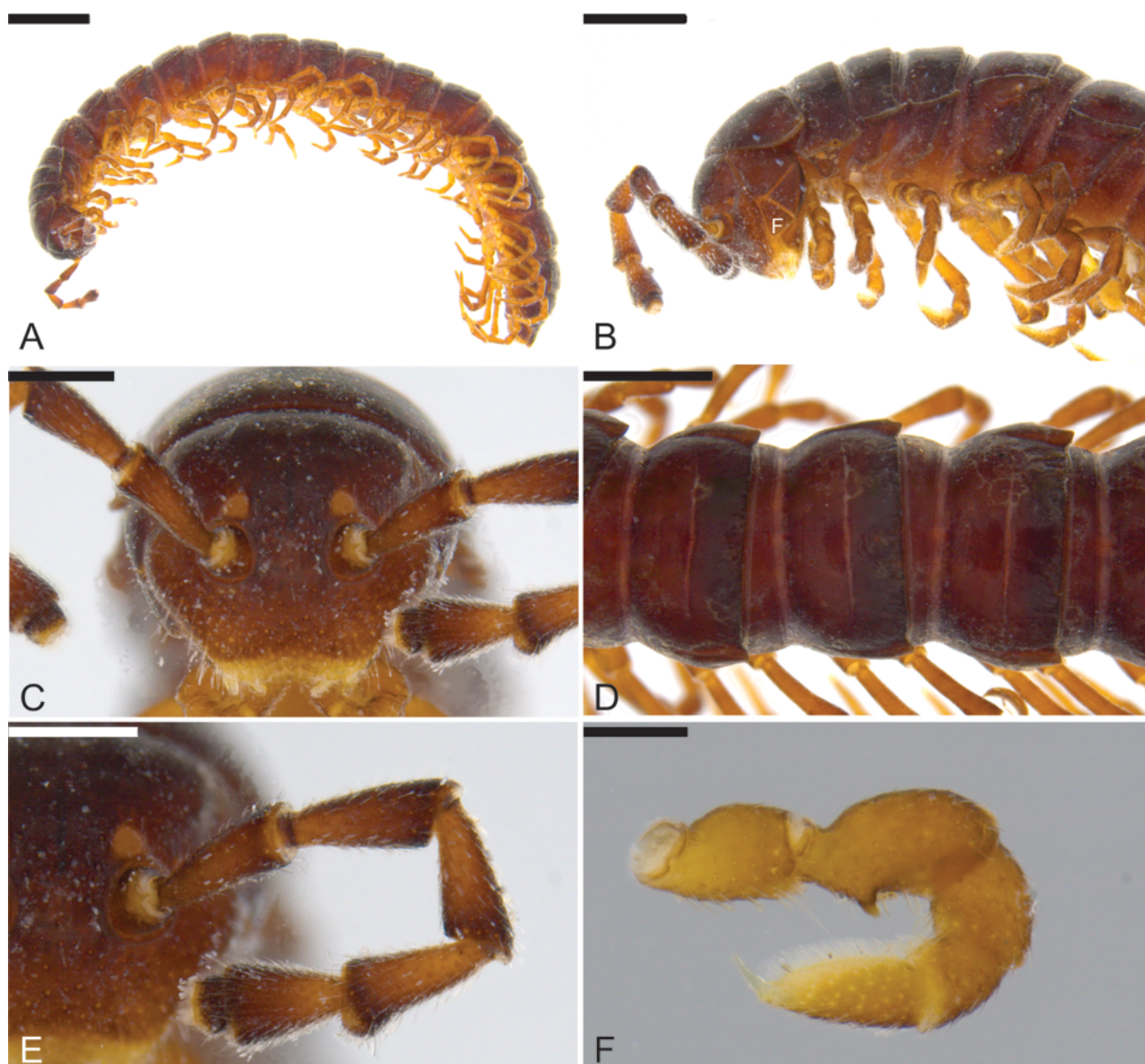


Figure 15. *Helicopodosomella fanda* sp. nov., holotype male (WAM T71496): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B, D), 0.5 mm (C, E), 0.2 mm (F).

todesmus, *Serratidesmus*, *Stygiochiropus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 17D). *Heligmodesmus* differs from all these genera by the unique shape of the gonopods which are simple, lacking any processes and have a twisted solenomere with a coiled tip (Figures 18A–D).

Description

General (Figure 17A): colour in ethanol brown with distinct paired pale spots on metazonites; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 17D); metazonites with distinct transverse line but without median sagittal line. Paranota present, with distinct rounded edges. Anterior spiracles at mid-body flat and ovoid.

Sternal lamella wider than long, anterior margin straight, lateral margins angled. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 17C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 17E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 = 4$) $> 5 > 6$; 6 thickest; 7 short.

Legs: legs medium length (Figure 17A); leg I of males incrassate, with blunt ventral femoral tubercle (Figure 17F).



Figure 16. *Helicopodosomella fanda* sp. nov., holotype male (WAM T71496), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Gonopod (Figures 18A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) rounded in cross-section, and straight; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) undulate, with tip coiled and folding back on itself.

Remarks

Heligmodesmus is only known from a single species that has been collected from the northern Kimberley region of Western Australia (Figure 1D).

Etymology

The generic name refers to coiled gonopod (*heligma*, Greek, curl) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Heligmodesmus pampinus sp. nov.

Figures 17, 18

urn:lsid:zoobank.org:act:873356B0-8EE7-4BDB-8550-6A886F20B3CA

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Mt Hart Station, 16°49'S, 124°55'E, 1–12 February 1965, A. Douglas (WAM T162935).

Paratype: AUSTRALIA: *Western Australia*: 1 ♀, collected with holotype (WAM T162936).

Diagnosis

As for the genus *Heligmodesmus*.

Description

General (Figure 17A): colour in ethanol most deep brown with pale patches dorsally, mostly paired but with only a single patch an anterior body rings (Figures 17A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 34.5 mm long; mid-body ring

approximately 3.0 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 17D); paranota present, large. Anterior spiracles at mid-body flat and ovoid.

Head (Figure 17C): without eyes; vertex and frons almost bare, clypeus setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.1 \times$ socket diameter. Antennal segments (Figure 17E): strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 = 4$) $> 5 > 6$; 7 thickest; 7 short.

Legs: leg I of males incrassate, with blunt ventral femoral tubercle (Figure 17F).

Gonopod (Figures 18A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) rounded in cross-section, and straight; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) undulate, with tip coiled and folding back on itself.

Female

Similar to male, except for genitalic features.

Remarks

Heligmodesmus pampinus is known from a single collection in the southwestern portion of the Kimberley region of Western Australia (Figure 1D). The label accompanying the specimens simply states “Mt Hart Station” which most likely refers to the general vicinity of the Mt Hart Homestead, which is now a wilderness lodge.

Etymology

The specific epithet refers to the coiled gonopod (*pampinus*, Latin, tendril) (Brown 1956).

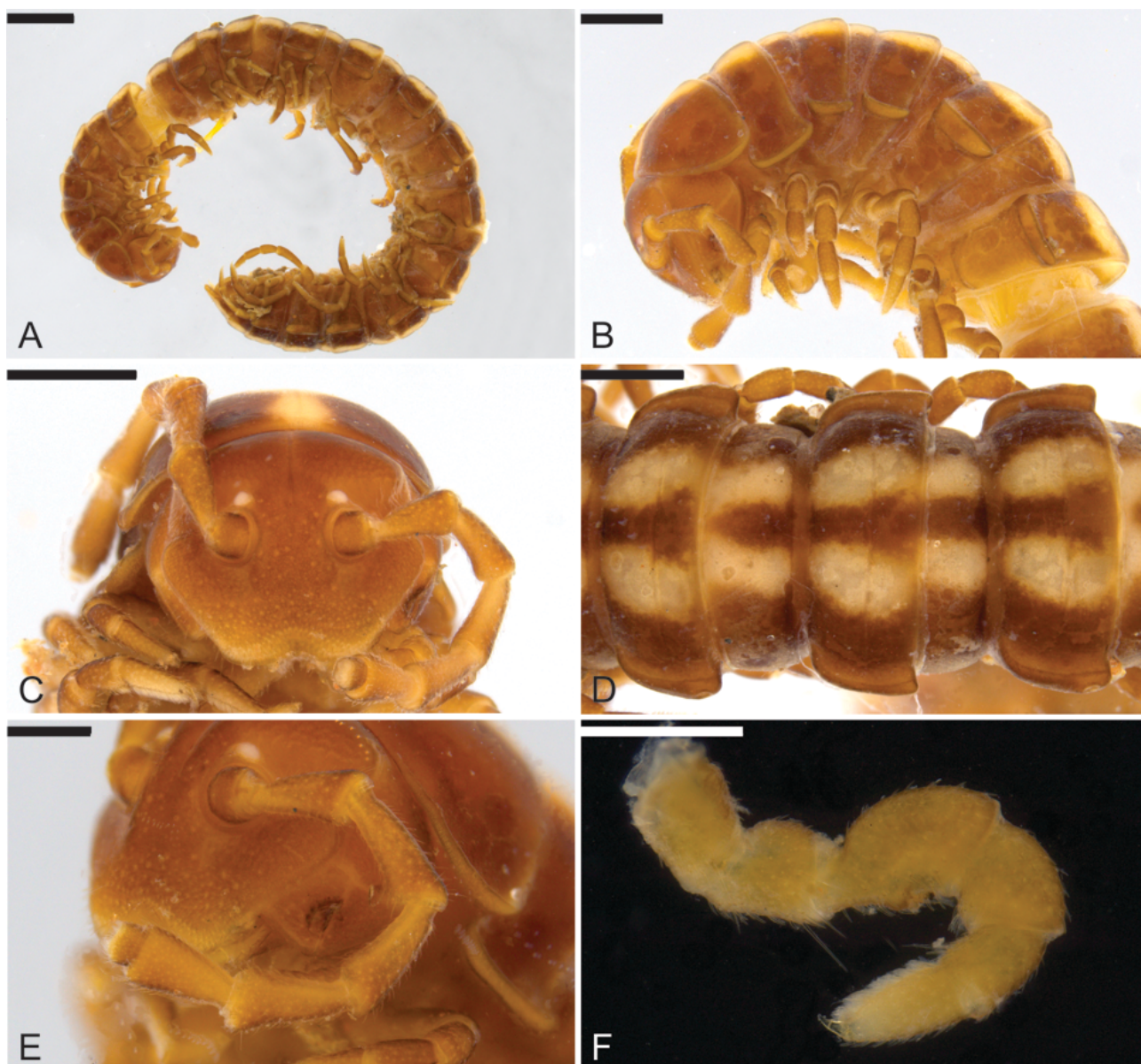


Figure 17. *Heligmodesmus pampinus* sp. nov., holotype male (WAM T162935): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B–D), 0.2 mm (E, F).

Genus *Juxtadesmus* gen. nov.

urn:lsid:zoobank.org:act:D843AC95-75D7-4FED-81CA-63635D7A680A

Type species

Juxtadesmus hospitalis sp. nov.

Diagnosis

Juxtadesmus is one of only a few australiosomatine genera that lack paranota or where they are highly reduced (*Aethalosoma*, *Antichiropus*, *Aulacoporus*, *Boreoheperus*, *Cirridesmus*, *Dicranogonus*, *Engyodesmus*, *Howeosoma*, *Metadesmus*, *Notodesmus*, *Pogonosternum*, *Pseudostromgylosoma*, *Solaenodolichopus*, *Taxidiotisoma* and *Walesoma*). It differs from these genera by the rather short solenomere that is curved into a semicircle (Figure 20C).

Description

General (Figure 19A): colour in ethanol pale yellow brown; with unknown number of segments, but presumably 20; segments 5, 7, 9, and 10 with ozopores, remainder unknown; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 19D); metazonites transverse or median sagittal lines. Paranota absent. Anterior spiracles at mid-body small, flat and circular. Sternal lamella wider than long, subquadrate. Anal region unknown.

Head (Figure 19C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 19E): unknown.

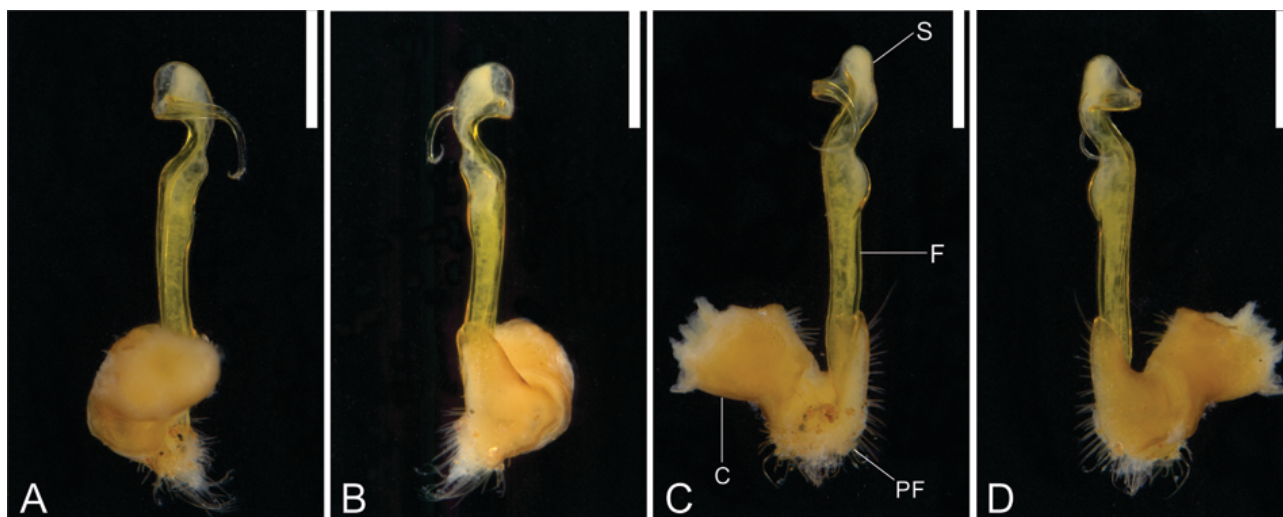


Figure 18. *Heligmodesmus pampinus* sp. nov., holotype male (WAM T162935), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Legs: legs medium length (Figure 19A); leg I of males incrassate, with strong ventral femoral tubercle.

Gonopod (Figures 20A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) flattened and curved in lateral view; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) curved into a semi-circle, but not twisted, with tubular solenomere process (sp).

Remarks

Juxtadesmus is only known from a single species that has been collected from the northern Pilbara region of Western Australia (Figure 1D).

Etymology

The generic name refers to the similarity of this species to other paradoxosomatids (*juxta*, Latin, near, close, next to, nigh) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Juxtadesmus hospitalis sp. nov.

Figures 19, 20

urn:lsid:zoobank.org:act:63066587-02E4-4639-A002-3D4AA2FAC899

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, 5 km E. of Whim Creek Hotel, Pilbara Biological Survey site DRE08, 20°50'54.6"S, 117°51'16.2"E, May 2004, wet pitfall trap, CALM staff (Pilbara Biological Survey) (WAM T76053).

Diagnosis

As for the genus *Juxtadesmus*.

Description

Male

General (Figure 19A): colour in ethanol uniformly yellow brown (Figures 19A–D); with unknown number of segments, but presumably 20; segments 5, 7, 9, and 10 with ozopores, remainder unknown; total length unknown, but rather small; mid-body ring approximately 0.55 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 19D); paranota absent. Anterior spiracles at mid-body flat and circular.

Head (Figure 19C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.1 \times$ socket diameter. Antennae absent.

Legs: leg I of males incrassate, with strong ventral femoral tubercle.

Gonopod (Figures 20A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) flattened and curved in lateral view; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) curved into a semi-circle, but not twisted, with tubular solenomere process (sp).

Female

Unknown.

Remarks

Juxtadesmus hospitalis has been collected from a single locality near Whim Creek in the northern Pilbara region of Western Australia (Figure 1D).

Etymology

The specific epithet is an adjective that refers to the occurrence of this species near the Whim Creek Hotel (*hospitalis*, Latin, of a guest or host) (Brown 1956).



Figure 19. *Juxtadesmus hospitalis* sp. nov., holotype male (WAM T76053): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal. Scale lines = 0.5 mm (A), 0.2 mm (B–D).



Figure 20. *Juxtadesmus hospitalis* sp. nov., holotype male (WAM T76053), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.1 mm.

Genus *Metadesmus* gen. nov.

urn:lsid:zoobank.org:act:79CBEBB3-1605-4CED-893D-E72B751FC1BB

Type species

Metadesmus seductus sp. nov.

Diagnosis

Metadesmus is one of only a few australiosomatine genera that have highly reduced or no paranota, along with

Aethalosoma, *Antichiropus*, *Aulacoporus*, *Boreoheesperus*, *Cirridesmus*, *Dicranogonus*, *Engyodesmus*, *Howeosoma*, *Juxtadesmus*, *Notodesmus*, *Pogonosternum*, *Pseudostrongylosoma*, *Solaenodolichopus*, *Taxidiotisoma* and *Walesoma*. It differs from these genera, and all other australiosomatines, by the unique shape of the gonopod where the femorite is strongly flattened (Figures 22A–D, 24A–D).

Description

General (Figures 21A, 23A): colour in ethanol pale red brown; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figures 21D, 23D); metazonites with transverse line but without median sagittal line. Paranota absent. Anterior spiracles at mid-body small, flat and ovoid. Sternal lamella wider than long, subquadrate and not medially indented. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 21C, 23C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove not prominent. Antennal segments (Figure 21E, 23C): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$); 6 thickest; 7 short.

Legs: legs medium length (Figure 21A, 23A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 21F, 23F).

Gonopod (Figures 22A–D, 24A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) distinctly flattened and straight in lateral view; posterior process (pp) absent; non-seminiferous branch (NSB) absent, but junction of femorite and solenomere with rounded process terminating in conical projection; solenomere (S) strongly curved ventrally with distal solenomere processes (sp).

Remarks

Metadesmus is known from two species that have been collected from Browns Range and in the eastern Pilbara region of Western Australia (Figure 1D).

Etymology

The generic name refers to the similarity of this species to other paradoxosomatids (*meta*, Greek, among, near, after, over, change) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Metadesmus secundus sp. nov.

Figures 21, 22

urn:lsid:zoobank.org:act:CF7AE676-8179-462B-BE34-D2D9BE43772C

Holotype: AUSTRALIA: *Western Australia*: ♂, 13.5 km E. of Warrawagine Homestead, Pilbara Biological Survey site PHYE06, 20°51'38"S, 120°49'14"E, 2 June 2005–19 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124630).

Paratypes: AUSTRALIA: *Western Australia*: 10 ♂, 2 ♀, collected with holotype (WAM T163162, T163163).

Diagnosis

Metadesmus secundus differs from *M. seductus* by the shape of the prolongation of the femorite (prof) which is distally constricted in *M. secundus* (Figures 22A–D) but uniformly conical in *M. seductus* (Figures 24A–D), and the lack of a kink in the solenomere (Figures 22A–D).

Description

General (Figure 21A): colour in ethanol uniformly red-brown (Figures 21A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 15.5 mm long; mid-body ring approximately 1.28 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 21D); paranota absent. Anterior spiracles at mid-body small, flat and elliptical.

Head (Figure 21C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.4 \times$ socket diameter. Antennal segments (Figure 21E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$); 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 21F).

Gonopod (Figures 22A–D): of medium length, extending to sixth body ring; coxa (C) robust; prefemur (PF) ovoid, ca. 1/3 femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 3/4 acropodite length, straight, flattened in lateral view; non-seminiferous branch (NSB) absent; femorite with conical, acute distally constricted process (prof); solenomere (S) strongly recurved, with thickened medial section, terminating in two long processes.

Female

Similar to male, except for genitalic features.

Other material examined

AUSTRALIA: *Western Australia*: 1 ♂, 2 ♀, 22 km ENE. of Warrawagine Homestead, Pilbara Biological Survey site PHYE03, 20°44'53"S, 120°55'53"E, 1 June 2005–22 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124643); 2 ♀, 1 juvenile, 24 km NE. of Warrawagine Homestead, Pilbara Biological Survey site PHYE04, 20°44'21"S, 120°53'38"E, 2 June 2005–22 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T146759); 1 ♂, 24 km NE. of Warrawagine Homestead, Pilbara Biological Survey site PHYE04, 20°44'21"S, 120°53'38"E, 2 June 2005–22 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124601); 4 ♂, 4 ♀, 41 km ESE. of Goldsworthy, Pilbara Biological Survey site PHYC02, 20°23'27"S, 119°54'31"E, 28 June 2005–15 May 2006, ethylene glycol



Figure 21. *Metadesmus secundus* sp. nov., holotype male (WAM T124630): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 0.5 mm (B–E), 0.2 mm (F).

pits, CALM staff (Pilbara Biological Survey) (WAM T124626, T163160, T163161); 1 ♂, 40.5 km W. of Goldsworthy, Pilbara Biological Survey site PHYW09, 20°20'09"S, 119°08'15"E, 26 June 2005–28 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124638); 1 ♂, 5.5 km S. of Yarrie Homestead, Pilbara Biological Survey site PHYE13, 20°43'25"S, 120°12'08"E, 5 June 2005–20 May 2006, ethylene glycol pits, CALM staff (Pilbara Biological Survey) (WAM T124603).

Remarks

Metadesmus secundus has been collected at three sites near the northern edge of the Pilbara IBRA bioregion (Figure 1D).

Etymology

The specific epithet is an adjective referring to this being the second species of the genus *Metadesmus* (*secunda*, Latin, second) (Brown 1956).

Metadesmus seductus sp. nov.

Figures 23, 24

urn:lsid:zoobank.org:act:EF359D42-0EDA-46D6-BB78-C5D6414F41AF

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Browns Range, 18°53'19.8"S, 128°56'13.8"E, 15 January–16 March 2012, wet pitfall trap, A. Slabber (WAM T162967).

Paratypes: AUSTRALIA: *Western Australia*: 3 ♂, collected with holotype (WAM T123127, T162966, 162968); 1 ♂, same data

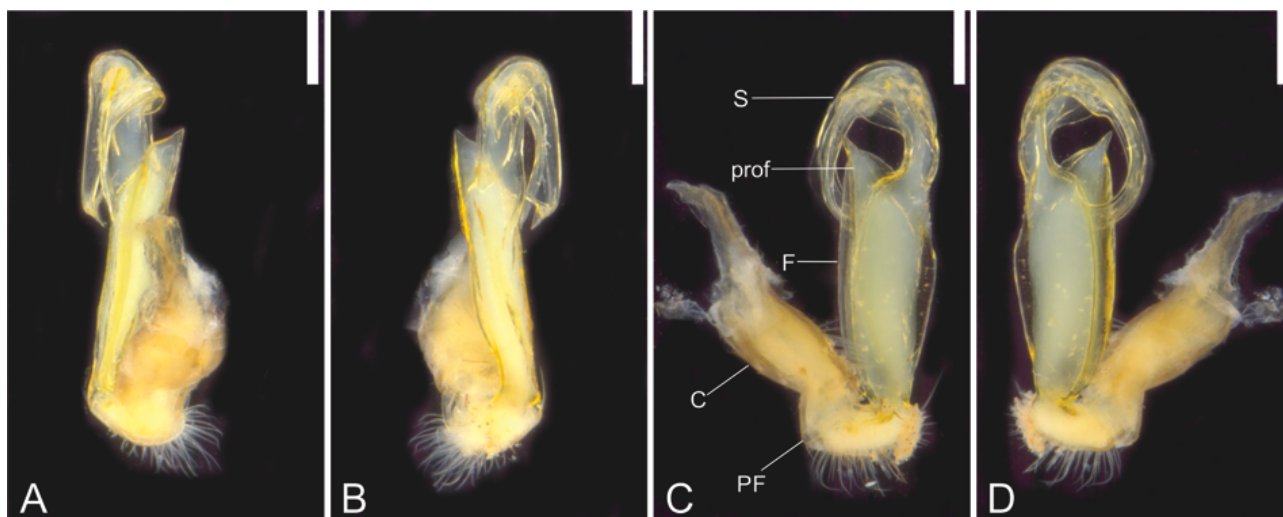


Figure 22. *Metadesmus secundus* sp. nov., holotype male (WAM T162967), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

as holotype except 18°51'14.5"S, 128°56'29"E (WAM T123124).

Diagnosis

Metadesmus seductus differs from *Metadesmus secundus* by the shape of the prolongation of the femorite (prof) which is distally constricted in *M. seductus* (Figures 24A–D) but uniformly conical in *M. secundus* (Figures 22A–D), and the presence of a kink in the solenomere (Figures 24A–D).

Description

Male

General (Figure 23A): colour in ethanol uniformly brown (Figures 23A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 20.9 mm long; mid-body ring approximately 2.0 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 23D); paranota absent. Anterior spiracles at mid-body small, flat and ovoid.

Head (Figure 23C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.4 \times$ socket diameter. Antennal segments (Figure 23E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths ($2 = 3 > 4 = 5 = 6$); 6 thickest; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 23F).

Gonopod (Figures 24A–D): of medium length, extending to sixth body ring; coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. $3/4$ acropodite length, straight, flattened in lateral view; non-seminiferous branch (NSB) absent; femorite with conical, acute distal process (prof); solenomere (S)

strongly recurved, with thickened medial section, terminating in two long processes.

Female

Similar to male, except for genitalic features.

Other material examined

AUSTRALIA: *Western Australia*: 1 ♂, 3 juveniles, collected with holotype (WAM T123118, T162964); 2 juveniles, same data as holotype except 18°51'14.5"S, 128°56'29.0"E (WAM T123121, T146758); 1 ♂, 1 ♀, same data as holotype except 18°52'05.3"S, 128°56'30.1"E (WAM T123126[MH1], T123128); 2 juveniles, same data as holotype except 18°54'04.3"S, 128°55'31.7"E (WAM T123119); 1 ♀, 1 juvenile, same data as holotype except 18°58'05.9"S, 128°55'21.5"E (WAM T123117, T123123); 1 ♂, same data as holotype except 18°58'18.6"S, 128°56'15.2"E (WAM T123122).

Remarks

Metadesmus seductus has only been found at Browns Range, Western Australia (Figure 1D).

Etymology

The specific epithet is an adjective that refers to the presence of this species in a remote region of Western Australia (*seductus*, Latin, remote, apart) (Brown 1956).

Genus *Otoplacosoma* Verhoeff, 1924

urn:lsid:zoobank.org:act:AB8C2027-6823-4DB2-90FA-B92D162ACB46

Otoplacosoma Verhoeff, 1924: 31.

Type species

Otoplacosoma bivittatum Verhoeff, 1924 by monotypy.

Diagnosis

Otoplacosoma most closely resembles genera attributed to the Antichiropodini due to the presence of an elon-



Figure 23. *Metadesmus seductus* sp. nov., holotype male (WAM T162967): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 0.5 mm (B–E), 0.2 mm (F).

gated femorite and a long solenomere (Figures 26A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Coelodesmus*, *Helicopodosoma*, *Helicopodosomella*, *Heligmodesmus*, *Pictodesmus*, *Serratidesmus*, *Stygiochiropus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 25D). *Otoplacosoma* differs from all of these genera by the unique shape of the gonopods which are extremely simple, lacking any processes and with a curved solenomere with a small terminal process (Figures 26A–D).

Description

General (Figure 25A): colour in ethanol uniformly brown; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure

25D); metazonites with distinct transverse and median sagittal lines. Paranota present, large; paranota of segment 2 flared and extending anteriorly and posteriorly. Anterior spiracles at mid-body flat and ovoid. Sternal lamella wider than long, subquadrate and not indented medially.

Head (Figure 25C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 25E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > (4 = 5 = 6)$; 6 thickest; 7 short).

Legs: legs medium length (Figure 25A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 25F).

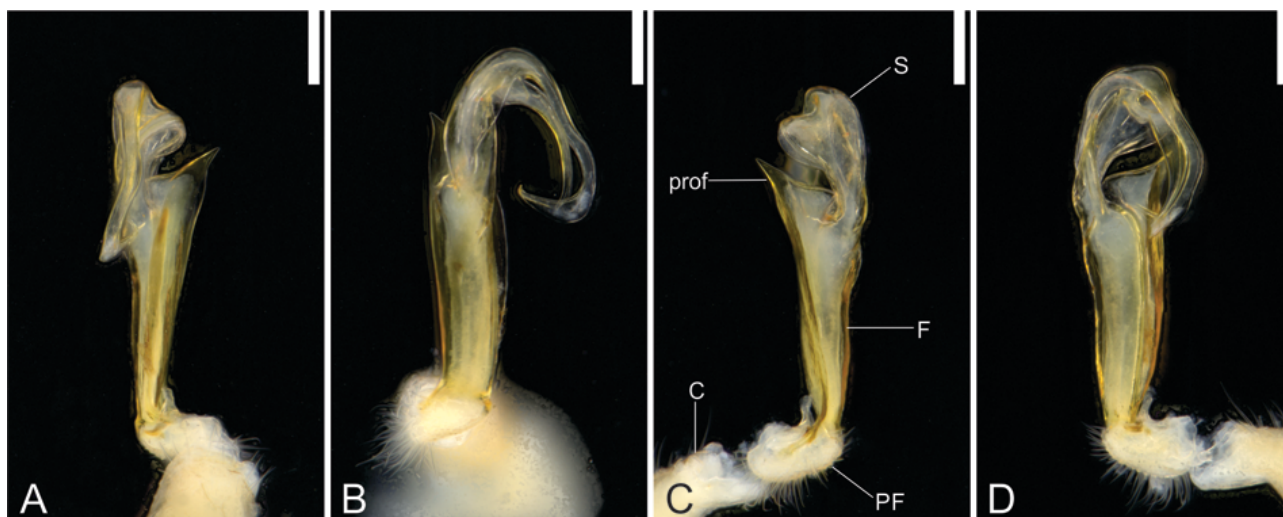


Figure 24. *Metadesmus seductus* sp. nov., holotype male (WAM T162967), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Gonopod (Figures 26A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) rounded in cross-section and straight in lateral view; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) curved, with small terminal process.

Remarks

As stated earlier, *Otoplacosoma* is removed from the synonymy of *Helicopodosoma* and treated as a distinct genus. The holotype of the type species *O. bivittatum* has not been available for study, but the discovery of a putative new species of *Otoplacosoma* from Mt Hart Station allows further details concerning the morphology of the genus. The gonopod of the new species closely resembles that of *O. bivittatum* (Verhoeff 1924, figure 19) but fresh examination of the holotype of *O. bivittatum* will be needed to confirm this generic association.

The precise collection site of the type species, *O. bivittatum*, is unknown (Verhoeff 1924), so the genus *Otoplacosoma* is only known from Mt Hart Station in the western Kimberley (Figure 1C).

Otoplacosoma bivittatum Verhoeff, 1924

urn:lsid:zoobank.org:act:41A09B4C-FF03-4820-B140-3B1E417597DE

Otoplacosoma bivittatum Verhoeff, 1924: 31, figure 19.

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Kimberley District, E. Mjöberg (NHRS) (not examined).

Diagnosis

Otoplacosoma bivittatum differs from *O. damula* by the shape of the solenomere which is coiled in *O. bivittatum* and not coiled in *O. damula* (Figures 26A–D).

Description

Male

See Verhoeff (1924).

Female

Unknown.

Remarks

The male holotype of *Otoplacosoma bivittatum* was collected from an unspecified locality in the Kimberley region of Western Australia (Verhoeff 1924).

Otoplacosoma damula sp. nov.

Figures 25, 26

urn:lsid:zoobank.org:act:16773DCC-CD87-44CF-AE93-94F93F5AC0E6

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Mt Hart Station, 16°49'S, 124°55'E, 1–12 February 1965, A. Douglas (WAM T71495).

Diagnosis

Otoplacosoma damula differs from *O. bivittatum* by the shape of the solenomere which is coiled in *O. bivittatum* and not coiled in *O. damula* (Figure 26A–D).

Description

Male

General (Figure 25A): colour in ethanol deep chestnut brown; unknown number of segments, but likely 20 (posterior half of specimen missing; segments 5, 7 and 9 with ozopores; length unknown; mid-body ring approximately 2.8 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 25D); antennae and legs long and slender. Paranota on all body



Figure 25. *Otoplacosoma damula* sp. nov., holotype male (WAM T71495): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (D), 0.5 mm (B, C, E), 0.2 mm (F).

rings large, that of body ring 2 wider than others. Anterior spiracles at mid-body flat and ovoid.

Head (Figure 25C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove deep; antennal sockets separated by $0.76 \times$ socket diameter. Antennal segments (Figure 25E): strongly clavate, especially antennomeres 4 and 5; antennomeres with relative lengths $(2 = 3) > (4 = 5 = 6)$; 6 thickest but 5 and 6 subequal in apical width; 7 short.

Legs: leg I of males incrassate, with strong ventral femoral tubercle (Figure 25F).

Gonopod (Figures 26A–D): long; coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base;

femorite (F) ca. $2 \times$ acropodite length, nearly straight, cylindrical; without non-seminiferous branch (NSB); solenomere (S) curved, of uniform thickness, with very small terminal processes.

Female

Similar to male, except for genitalic features.

Remarks

The label accompanying the specimen simply states “Mt Hart Station” which most likely refers to the general vicinity of the Mt Hart Homestead, which is now a wilderness lodge.



Figure 26. *Otoplacosoma damula* sp. nov., holotype male (WAM T71495), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Etymology

The specific epithet is a noun denoting the presence of this species at Mount Hart Station (*damula*, Latin, diminutive word for deer) (Brown 1956).

Genus *Pictodesmus* gen. nov.

urn:lsid:zoobank.org:act:1FABE4E9-576D-403B-8E28-021A84880D3D

Type species

Pictodesmus concinnus sp. nov.

Diagnosis

Pictodesmus most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 28A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Coelodesmus*, *Helicopodosoma*, *Helicopodosomella*, *Heligmodesmus*, *Otoplacosoma*, *Serratidesmus*, *Stygiochiropus*, *Tridactylogonus* and *Vexatodesmus* due to the presence of well-developed paranota on the body rings (Figure 27D). *Pictodesmus* differs from all of these genera by the unique shape of the gonopods which are simple, lacking any processes and a curved solenomere with an acute tip (Figures 28A–D).

Description

General (Figure 27A): colour in ethanol red brown, but with paired spots on prozonites and metazonites, and with pale paranota; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 27D); metazonites with transverse line but without median sagittal line. Paranota present. Anterior spiracles at mid-body small, flat and elliptical. Sternal lamella wider than long, subquadrate and medially indented. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and

truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 27C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove deep. Antennal segments (Figure 27E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths (3) > (2 = 4 = 5 = 6); 6 thickest; 7 short.

Legs: legs medium length (Figure 27A); leg I of males incrassate, with ventral femoral tubercle (Figure 27F).

Gonopod (Figures 28A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) rounded in cross-section and rather straight in lateral view; posterior process (pp) absent; non-seminiferous branch (NSB) absent, and junction of femorite and solenomere without rounded process; solenomere (S) strongly curved and with an acute tip.

Remarks

Pictodesmus is known from a single species collected from Browns Range in Western Australia (Figure 1C).

Etymology

The generic name refers to the similarity of this species to other paradoxosomatids (*pictus*, Latin, paint) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Pictodesmus concinnus sp. nov.

Figures 27, 28

urn:lsid:zoobank.org:act:141FFD54-E61F-44B6-9F52-F5DF3FDD23EA



Figure 27. *Pictodesmus concinnus* sp. nov., holotype male (WAM T125976): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A, B), 0.5 mm (B–E), 0.2 mm (F).

Material examined

Holotype: AUSTRALIA: *Western Australia*: ♂, Browns Range, ca. 280 km S. of Lake Argyle, 18°53'19.8"S, 128°56'13.8"E, 15 January–16 March 2012, wet pitfall trap, stony rise, A. Slabber (WAM T125976).

Diagnosis

As for the genus *Pictodesmus*.

Description

General (Figure 27A): colour in ethanol uniformly yellow brown (Figures 27A–D); with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; total length ca. 22 mm; mid-body ring approximately 2.76 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 27D); paranota present, large and distinct. Anterior spiracles at mid-body flat and elliptical.

Head (Figure 27C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.5 \times$ socket diameter. Antennal segments (Figure 27E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths $(3) > (2 = 4 = 5 = 6)$; 6 thickest; 7 short.

Legs: leg I of males incrassate, with ventral femoral tubercle (Figure 27F).

Gonopod (Figures 28A–D): long, extending to sixth body ring; coxa (C) robust; prefemur (PF) ovoid, ca. $1/3$ femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. $3/4$ acropodite length, straight, circular in cross-section;



Figure 28. *Pictodesmus concinnus* sp. nov., holotype male (WAM T125976), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

non-seminiferous branch (NSB) absent; solenomere (S) evenly curved, with small, acute distal processes.

Female

Unknown.

Remarks

Pictodesmus concinnus has only been collected from a single location in Browns Range, Western Australia (Figure 1C).

Etymology

The specific epithet refers to the beautiful colour pattern (*concinnus*, Latin, skilfully put together, beautiful, appropriate) (Brown 1956).

Genus *Serratidesmus* gen. nov.

urn:lsid:zoobank.org:act:FE0E757D-D6AD-41B8-B98D-65FBFB089370

Type species

Serratidesmus prionotes sp. nov.

Diagnosis

Serratidesmus differs from other genera of Australiosomatinae by the presence of eight rounded tubercles on the posterior edge of the metazonites (Figure 29D) and the lack of a ventral tubercle on the male femur I (Figure 29F).

Description

General (Figure 29A): colour in ethanol generally dark brown with white paranota; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; medium-sized australiosomatines, with distinct waist between prozonite and metazonite (Figure 29D); metazonites with distinct transverse and median sagittal lines. Paranota present, large; posterior margin of metazonites with 8 prominent tubercles. Anterior spiracles

at mid-body flat and ovoid. Sternal lamella wide, sub-quadrate and medially indented. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 29C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep. Antennal segments (Figure 29E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > 4 = 5 > 6$); 6 thickest; 7 short.

Legs: legs long (Figure 29A); leg I of males without ventral femoral tubercle (Figure 29F).

Gonopod (Figures 30A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) slightly curved in lateral view; rounded process present at junction of femorite and solenomere; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) gently twisted, terminating in simple tip.

Remarks

Serratidesmus is only known from a single species that has been collected from the northern Kimberley region of Western Australia (Figure 1D).

Etymology

The generic name refers to serrate posterior margin of the metazonites (*serratus*, Latin, toothed like a saw) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Serratidesmus prionotes sp. nov.

Figures 29, 30

urn:lsid:zoobank.org:act:9E34F0A2-F4EA-4B33-BBE3-0EDB6FCBDCB3

Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, South Maret Island, behind South Beach, 14°26'58.9"S, 124°58'58.3"E, 20 March 2007, sifted litter, vine thicket, J.M. Waldock, K.L. Edward (WAM T146744).

Paratypes: AUSTRALIA: *Western Australia*: 1 ♂, collected with holotype (WAM T82556); 1 ♀, collected with holotype (WAM T163321).

Diagnosis

As for the genus *Serratidesmus*.

Other material examined

AUSTRALIA: *Western Australia*: 1 juvenile, South Maret Island, 14°26'09.7"S, 124°59'27.6"E, 17 March 2007, sifting litter, vine thicket near track above North-east beach, J.M. Waldock, K.L. Edward (WAM T135932); 1 juvenile, South Maret Island, 14°26'11.7"S, 124°59'22.0"E, 19 March 2007, sifting litter, *Corymbia* woodland on plateau above North-east Beach, J.M. Waldock, K.L. Edward (WAM T135933); 11 juveniles, South Maret Island, 14°26'09.7"S, 124°59'27.6"E, 17 March 2007, sifting litter, vine thicket near track above North-east beach, J.M. Waldock, K.L. Edward (WAM T135934); 3 juveniles, South Maret Island, 14°26'12.3"S, 124°59'26.5"E, 18 March 2007, sifting litter, under fig on plateau above North-east Beach, J.M. Waldock, K.L. Edward (WAM T135935); 13 juveniles, South Maret

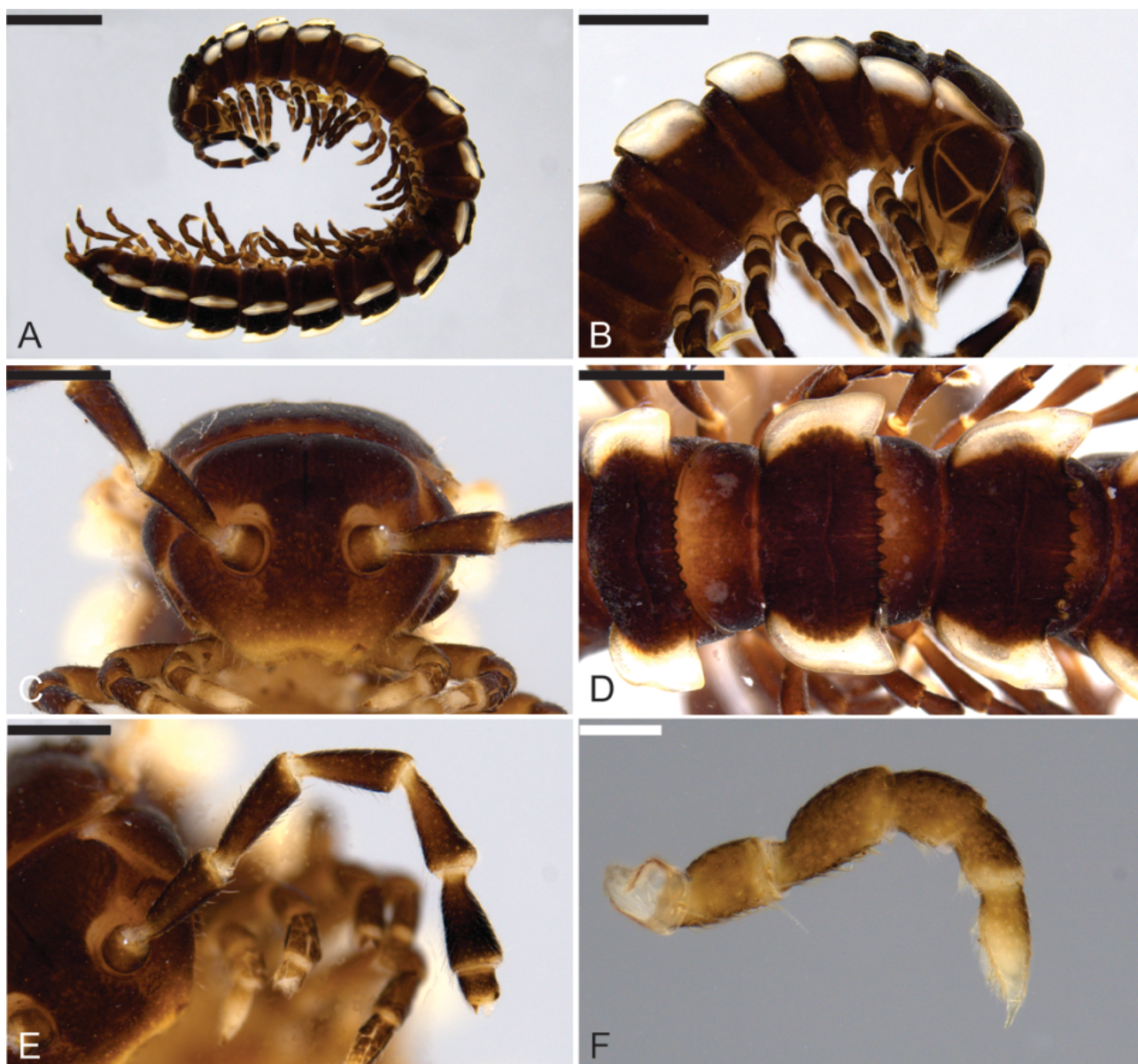


Figure 29. *Serratidesmus prionotes* sp. nov., holotype male (WAM T146744): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, left antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B, D), 0.5 mm (C, E), 0.2 mm (F).



Figure 30. *Serratidesmus prionotes* sp. nov., holotype male (WAM T146744), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

Island, 14°26'10.7"S, 124°59'27.3"E, 17 March 2007, sifting litter, next to boulder, vine thicket above North-east beach, J.M. Waldock, K.L. Edward (WAM T135936); 9 juveniles, collected with holotype (WAM T135937); 1 juvenile, South Maret Island, 14°26'11.6"S, 124°59'20.7"E, 19 March 2007, sifting litter, *Corymbia clavigera*, J.M. Waldock, K.L. Edward (WAM T135938); 5 juveniles, South Maret Island, 14°26'09.4"S, 124°59'27.7"E, 17 March 2007, sifting litter, vine thicket near track above North-east beach, J.M. Waldock, K.L. Edward (WAM T135939); 11 juveniles, South Maret Island, 14°26'11.6"S, 124°59'20.7"E, 19 March 2007, sifting litter, *Corymbia clavigera*, J.M. Waldock, K.L. Edward (WAM T135940); 4 juveniles, South Maret Island, 14°26'11.7"S, 124°59'22.0"E, 19 March 2007, sifting litter, *Corymbia* woodland on plateau above North-east Beach, J.M. Waldock, K.L. Edward (WAM T135941); South Maret Island, 14°26'12.3"S, 124°59'26.5"E, 18 March 2007, sifting litter, under fig on plateau above North-east Beach, J.M. Waldock, K.L. Edward, 3 juveniles (WAM T135942); 1 juvenile, South Maret Island, 14°26'57.4"S, 124°58'58.8"E, 20 March 2007, sifting litter, vine thicket off South Beach, J.M. Waldock, K.L. Edward (WAM T135943); 1 juvenile, South Maret Island, 14°26'57.4"S, 124°58'58.6"E, 20 March 2007, sifting litter, vine thicket off South Beach, J.M. Waldock, K.L. Edward (WAM T135944); 1 juvenile, South Maret Island, 14°26'09"S, 124°59'31"E, 18 March 2007, sifting litter, fig litter behind dunes North-east beach, J.M. Waldock, K.L. Edward (WAM T135945); 1 juvenile, South Maret Island, 14°26'27"S, 124°59'23"E, 17 March 2007, A. Bamford (WAM T135946).

Description

General (Figure 29A): colour in ethanol uniformly pale brown (Figures 29A–D); 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; approximately 22 mm long; mid-body ring approximately 1.94 mm wide

dorsally; with distinct waist between prozonite and metazonite (Figure 29D); paranota absent. Anterior spiracles at mid-body flat and ovoid.

Head (Figure 29C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.4 \times$ socket diameter. Antennal segments (Figure 29E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 > 4 = 5 > 6$); 6 thickest; 7 short.

Legs: leg I of males without ventral femoral tubercle (Figure 29F).

Gonopod (Figures 30A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) slightly curved in lateral view; rounded process present at junction of femorite and solenomere; posterior process (pp) and non-seminiferous branch (NSB) absent; solenomere (S) gently twisted, terminating in simple tip.

Female

Similar to male, except for genitalic features.

Remarks

Serratidesmus prionotes is a very distinctive species that has been found in vine thickets on South Maret Island in the northern Kimberley region of Western Australia (Figure 1D). Juvenile specimens of the same genus have been found on nearby North Maret Island and Berthier Island but have not been assigned to *S. prionotes* due to the lack of adult males.

Etymology

The specific epithet is an adjective that refers to the serrate posterior margin of the metazonites (*prionotos*, Greek, jagged, serrate) (Brown 1956).

Genus *Stygiochiropus* Humphreys and Shear, 1993

urn:lsid:zoobank.org:act:77FE28FC-618A-4CAD-BED2-04C89F846484

Stygiochiropus Humphreys and Shear, 1993: 181.

Type species

Stygiochiropus communis Humphreys and Shear, 1993 by original designation.

Diagnosis

Stygiochiropus differs from all other genera of Australiosomatinae by the presence of triangular paranota (Figure 31D).

Description

General (Figure 31A): colour in ethanol pale yellow brown (Figures 31A–D); with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 31D); metazonites without transverse or median sagittal lines. Paranota present, prominent and triangular. Anterior spiracles at mid-body small, flat and ovoid. Sternal lamella wider than long, subquadrate. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 31C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus not visible;



Figure 31. *Stygiochiropus communis* Humphreys and Shear: holotype male (WAM T23652): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; paratype male (T19390): D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 2 mm (A), 1 mm (B), 0.5 mm (C), 0.1 mm (D–F).

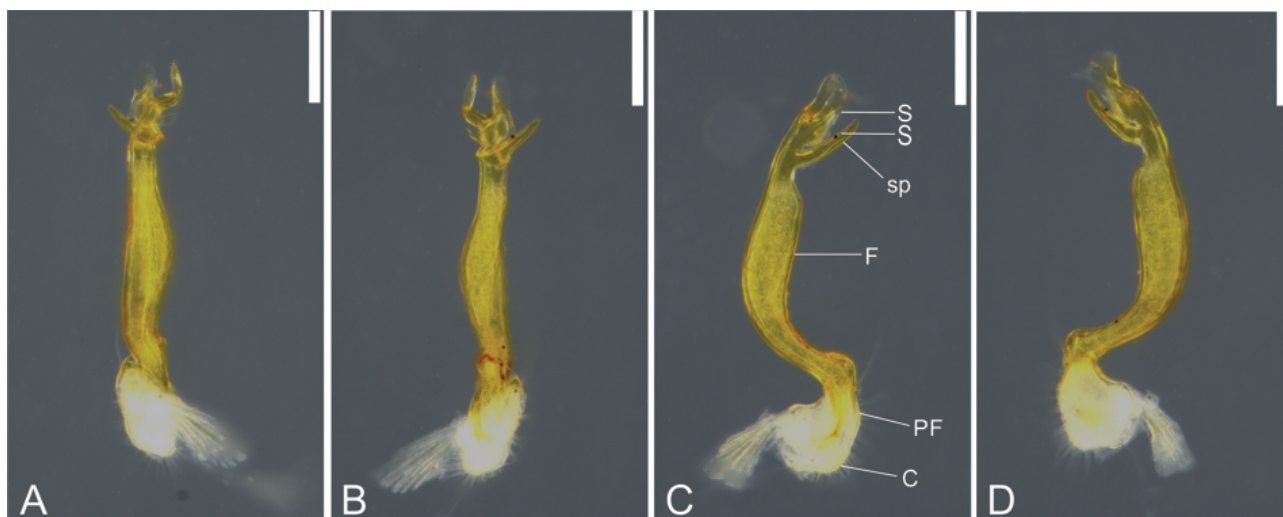


Figure 32. *Stygiochiropus communis* Humphreys and Shear, holotype male (WAM T23652), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

post-antennal groove visible. Antennal segments (Figure 31E): mostly long and slender, clavate, especially antennomeres 5 and 6; antennomeres with relative lengths ($2 = 3 = 4$) > ($5 = 6$); 6 thickest; 7 very short.

Legs: legs extremely long (Figure 31A); leg I of males incrassate, with strong ventral femoral tubercle (Figure 31F).

Gonopod (Figures 32A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) flattened and strongly curved in lateral view; posterior process (pp) absent; non-seminiferous branch (NSB) absent, and without medial sclerite (nsbp); solenomere (S) with various terminal sclerites, including a conical subdistal solenomere process (sp).

Remarks

Species of the genus *Stygiochiropus* are restricted to hypogean ecosystems from Cape Range in Western Australia (Figure 1C). Four species have been described: *S. communis* Humphreys and Shear, 1993, *S. isolatus* Humphreys and Shear, 1993, *S. peculiaris* Shear and Humphreys, 1996, and *S. sympatricus* Humphreys and Shear, 1993 (Humphreys & Shear 1993; Shear & Humphreys 1996). The type species *S. communis* was the topic of an allozyme study that detected the presence of three genetic provinces that loosely correspond with the geological elements of Cape Range such as gorges and surface drainage basins (Humphreys & Adams 2001).

Although species of *Stygiochiropus* have been amply illustrated with line drawings and scanning electron microscope images, we provide the first digital images of the type species *S. communis* to enable comparisons with other tropical genera from Western Australia (Figures 31, 32).

Genus *Vexatodesmus* gen. nov.

urn:lsid:zoobank.org:act:DADBA53E-477F-4102-B43D-DD91AF851753

Type species

Vexatodesmus pisinnus sp. nov.

Diagnosis

Vexatodesmus most closely resembles genera attributed to the Antichiropodini due to the presence of an elongated femorite and a long solenomere (Figures 34A–D). Among the Antichiropodini it resembles *Apodesmus*, *Australodesmus*, *Brochopeltis*, *Coelodesmus*, *Helicopodosoma*, *Helicopodosomella*, *Heligmodesmus*, *Otoplacosoma*, *Pictodesmus*, *Serratidesmus*, *Stygiochiropus* and *Tridactylogonus* due to the presence of well-developed paranota on the body rings (Figure 33D). *Vexatodesmus* differs from all these genera in the shape of the gonopods in which the solenomere terminate in a pair of blade-like distal processes (Figures 34A–D).

Description

General (Figure 33A): colour in ethanol mostly red brown; with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; small australiosomatines, with distinct waist between prozonite and metazonite (Figure 33D); metazonites without transverse or median sagittal lines. Paranota present. Anterior spiracles at mid-body small, flat and elliptical. Sternal lamella wider than long, subquadrate and medially indented. Pre-anal ring sparsely setose; epiproct extending past anal valves, in dorsal view tapering and truncate, tip ca. 1/5 width of pre-anal ring; hypoproct rounded-trapezoidal; spinnerets in rectangular array, wider than long.

Head (Figure 33C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove deep. Antennal segments (Figure 33E): mostly

strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths $6 > (3 = 4 = 5) > 2$; 6 thickest; 7 short.

Legs: legs very short (Figure 33A); leg I of males incrassate, with prominent ventral femoral tubercle (Figure 33F).

Gonopod (Figures 34A–D): coxa (C) robust; prefemur (PF) ovoid, leading directly into femorite with no noticeable process at femorite base; femorite (F) longer than acropodite, flattened in cross-section and curved in lateral view; posterior process (pp) absent; non-seminiferous branch (NSB) absent, and junction of femorite and solenomere without rounded process; solenomere (S) curved and with 2 acute, blade-like distal processes.

Remarks

Vexatodesmus is known from a single species collected from the Pilbara region of Western Australia (Figure 1B).

Etymology

The generic name refers to the discovery of this new species at the very end of this project (*vexatus*, Latin, agitate, harass, annoy) (Brown 1956) and is combined with the stem *-desmus*, commonly used in Polydesmida. It is masculine in gender.

Vexatodesmus pisinnus sp. nov.

Figures 33, 34

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Type material

Holotype: AUSTRALIA: *Western Australia*: ♂, Nullagine River, edge of Miaree Pool, 20°51'15.0"S 116°36'45.2"E, 18 February 2022, in litter, M. Curran, N. Gunawardene (WAM T165681).

As for the genus *Vexatodesmus*.

Description

General (Figure 33A): colour in ethanol mostly red brown (Figures 33A–D); with 20 segments; segments 5, 7, 9, 10, 12, 13 and 15–19 with ozopores; total length ca. 10.7 mm; mid-body ring approximately 0.47 mm wide dorsally; with distinct waist between prozonite and metazonite (Figure 33D); paranota present, large and distinct. Anterior spiracles at mid-body flat and elliptical.

Head (Figure 33C): without eyes; vertex and frons almost bare, clypeus sparsely setose; vertigial sulcus distinct, ending above level of antennal sockets; post-antennal groove moderately deep; antennal sockets separated by $1.3 \times$ socket diameter. Antennal segments (Figure 33E): mostly strongly clavate, especially antennomeres 5 and 6; antennomeres with relative lengths $6 > (3 = 4 = 5) > 2$; 6 thickest; 7 short.

Legs: leg I of males incrassate, with ventral femoral tubercle (Figure 33F).

Gonopod (Figures 34A–D): medium length, extending to sixth body ring; coxa (C) robust; prefemur (PF) ovoid, ca. $1/4$ femorite length, leading directly into femorite with no noticeable process at femorite base; femorite (F) ca. 2 times acropodite length, curved, irregularly flattened in cross-section; non-seminiferous branch (NSB) absent; solenomere (S) evenly curved, with 2 acute, blade-like distal processes.

Female

Unknown.

Other material examined

AUSTRALIA: *Western Australia*: 1 juvenile, collected with holotype (WAM T165682).

Remarks

Vexatodesmus pisinnus has only been collected from a single location on the Nullagine River in the Pilbara region of Western Australia (Figure 1B).

Etymology

The specific epithet refers to the small size of adults (*pisinnus*, Latin, small, little) (Brown 1956).

Disclosures

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References

- Attems C (1937) Myriapoda 3. Polydesmoidea I, Fa. Strongylosomidae. *Das Tierreich* 68: 1–300.
- Attems CG (1911) Myriopoda exkl. Scolopendridae. Pp. 147–204, *In Die Fauna Südwest-Australiens*. (Michaelsen W & Hartmeyer R eds). Vol. 3. Gustav Fischer, Jena. <https://www.biodiversitylibrary.org/item/16709#page/3/mode/1up>
- Brölemann HW (1916) Essai de classification des Polydesmiens (Myriapodes). *Annales de la Société Entomologique de France* 84: 523–608.
- Brown RW (1956) Composition of scientific words. Revised edition. Smithsonian Institution Press, Washington, D.C.
- Car CA & Harvey MS (2013) A review of the Western Australian keeled millipede genus *Boreoheesperus* (Diplopoda: Polydesmida: Paradoxosomatidae). *ZooKeys* 290: 1–19. <https://doi.org/10.3897/zookeys.290.5114>
- Car CA & Harvey MS (2014) The millipede genus *Antichiropus* (Diplopoda: Polydesmida: Paradoxosomatidae),



Figure 33. *Vexatodesmus pisinnus* sp. nov., holotype male (WAM T165681): A, body, lateral; B, head and anterior segments, lateral; C, head, anterior; D, mid-body rings, dorsal; E, right antenna, lateral; F, left leg I, lateral. Scale lines = 1 mm (A), 0.25 mm (B–D).

part 2: species of the Great Western Woodlands region of Western Australia. *Records of the Western Australian Museum* 29: 20–77. [https://doi.org/10.18195/issn.0312-3162.29\(1\).2014.020-077](https://doi.org/10.18195/issn.0312-3162.29(1).2014.020-077)

Car CA & Harvey MS (2017) New species of *Boreohepesrus* (Diplopoda, Polydesmida, Paradoxosomatidae) from north-western Australia. *European Journal of Taxonomy* 320: 1–11. <https://doi.org/10.5852/ejt.2017.320>

Car CA, Harvey MS & Huey JA (2019) The millipede genus *Antichiropus* (Diplopoda: Polydesmida: Paradoxosomatidae), part 3: species of the Pilbara bioregion of Western Australia. *Zootaxa* 4617: 1–71. <http://dx.doi.org/10.11646/zootaxa.4617.1.1>

Car CA, Wojcieszek JM & Harvey MS (2013) The millipede genus *Antichiropus* (Diplopoda: Polydesmida: Paradox-

osomatidae), part 1: redefinition of the genus and redescrptions of existing species. *Records of the Western Australian Museum* 28: 83–118. [https://doi.org/10.18195/issn.0312-3162.28\(2\).2013.083-118](https://doi.org/10.18195/issn.0312-3162.28(2).2013.083-118)

Humphreys WF & Adams M (2001) Allozyme variation in the troglobitic millipede *Stygiochiropus communis* (Diplopoda: Paradoxosomatidae) from arid tropical Cape Range, northwestern Australia: population structure and implications for the management of the region. *Records of the Western Australian Museum, Supplement* 54: 15–36.

Humphreys WF & Shear WA (1993) Troglobitic millipedes (Diplopoda: Paradoxosomatidae) from semi-arid Cape Range, Western Australia: systematics and biology. *Invertebrate Taxonomy* 7: 173–195. <https://doi.org/10.1071/IT9930173>

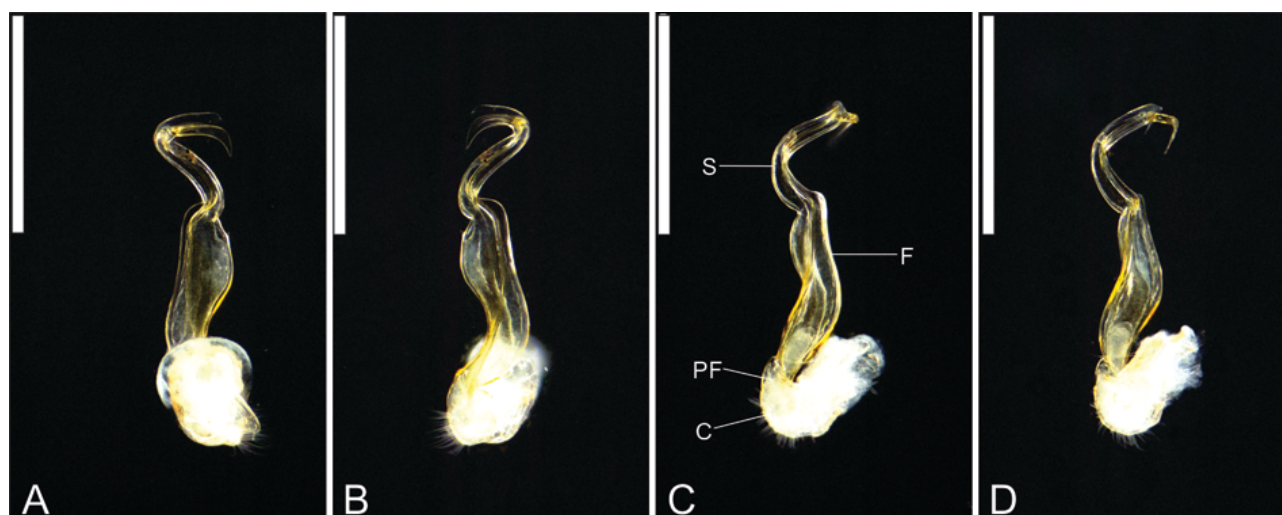


Figure 34. *Vexatodesmus pisinnus* sp. nov., holotype male (WAM T165681), left gonopod: A, posterior; B, anterior; C, medial; D, lateral. Scale lines = 0.2 mm.

McKenzie NL, Johnston RB & Kendrick PG, eds (1991) Kimberley rainforests. Surrey Beatty & Sons, Chipping Norton.

Mesibov R (2006) Dirt-encrusted and dragon millipedes (Diplopoda: Polydesmida: Paradoxosomatidae) from Queensland, Australia. *Zootaxa* 1354: 31–44. <https://doi.org/10.11646/zootaxa.1354.1.2>

Mesibov R & Car CA (2015) A new genus and species of native exotic millipede in Australia (Diplopoda, Polydesmida, Paradoxosomatidae). *ZooKeys* 498: 7–16. <https://doi.org/10.3897/zookeys.498.9716>

Rowe M & Sierwald P (2006) Morphological and systematic study of the tribe Australiosomatini (Diplopoda: Polydesmida: Paradoxosomatidae: Paradoxosomatidae) with the description of new species and a revision of the genus *Australiosoma*. *Invertebrate Systematics* 20: 527–556. <https://doi.org/10.1071/IS05034>

Shear WA (1992) A new genus and two new species of millipedes from the Cape Range, Western Australia

(Diplopoda, Polydesmida, Paradoxosomatidae). *Records of the Western Australian Museum* 15: 777–784. <https://www.biodiversitylibrary.org/item/230472#page/839/mode/1up>

Shear WA & Humphreys WF (1996) A new *Stygiochiropus* from a North West Cape (Western Australia) coastal plain cave (Diplopoda: Polydesmida: Paradoxosomatidae). *Records of the Western Australian Museum* 17: 447–449. <https://www.biodiversitylibrary.org/item/240512#page/473/mode/1up>

Silvestri F (1897) Neue Diplopoden. *Abhandlungen und Berichte aus dem Staatlichen Museum für Tierkunde in Dresden* 6: 1–23. <https://www.biodiversitylibrary.org/item/104470#page/181/mode/1up>

Verhoeff KW (1924) Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia 1910–1913. 34. Myriapoda: Diplopoda. *Arkiv för Zoologi* 16(5): 1–142.



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