New genus and new species of Metapseudidae (Crustacea, Tanaidacea) from southeastern Australian coast (#45854)

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New genus and new species of Metapseudidae (Crustacea, Tanaidacea) from southeastern Australian coast

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Abstract

Based on materials collected on the shelf of SE Australia (off Portland) a new genus and new species – *Muvi schmallenbergi* gen. nov., sp. nov., of tanaidacean family Metapseudidae is described. *Muvi* is distinguishable from other genera within subfamily Chondropodinae by having equally long flagella of antennule. Moreover it differs from the other chondropodins in combination of numerous characters as: eyelobes with visual elements, rostrum with smooth lateral edges, pereonites with lateral processes and pleotelson lacking lateral process, antennule article-1 with single apophysis, maxillule inner lobe well-developed, labial palp bearing three distal setae, cheliped exopod well developed and setose, pereopod-1 coxa with distinct apophysis, pleopods in five pairs and uropod basis without apophysis.

The identification key for genera within Chondropodinae is given and distribution of chondropodins is discussed.

Introduction

Tanaidacea, the small benthic peracarid crustaceans, is poorly recognized element of marine ecosystem, till the late 1990's for the Australian waters being known only from few taxonomical papers (e.g. *Boesch, 1973*; *Băcescu, 1981*; *Sieg, 1993*; *Edgar, 1997*). The turning point comes with the beginning of this millennium when a series of surveys were dedicated to tanaidacean fauna (*Larsen, 2000*; *Larsen, 2001*; *Larsen & Heard, 2001*; *Larsen & Hansknecht, 2002*; *Guţu & Heard, 2002*; *Guţu, 2006*; *Błażewicz-Paszkowycz & Bamber, 2007a*; *Błażewicz-Paszkowycz & Bamber, 2007b*; *Edgar, 2008; Błażewicz-Paszkowycz & Bamber, 2009*; *Błażewicz-Paszkowycz &*

Bamber, 2012; *Bamber & Błażewicz-Paszkowycz, 2013*). As the outcome *Guţu (2006)* described 13 new species from tropical Australian region, *Edgar (2008)* found 12 new species off Tasmania and finally *Błażewicz-Paszkowycz & Bamber (2012)* added 44 new species to the list from Bass Strait. The results from those few papers demonstrate that coast of Australia is characterised by inordinate diversity (*Bamber & Błażewicz-Paszkowycz, 2013*), but also high level of endemism (*Błażewicz-Paszkowycz & Bamber, 2012*; *Błażewicz-Paszkowycz, Bamber & Anderson, 2012*). A total number of Tanaidacea living in the Australian coast is still far from complete (*Stępień, Pabis & Błażewicz, 2018*). *Poore et al. (2015)* has summarized the total number of known tanaidaceans from Australian waters is close to 200. However this number is probably only a fraction of tanaidacean fauna. The studies on the lower shelf and upper bathyal depths of the western and southwestern Australia demonstrated that Tanaidacea is the most abundant taxon in terms of individuals and species (*Poore et al., 2015*).

Chondropodinae is currently represented by 29 species classified to 9 genera (*WoRMS, 2019*) distributed in tropical to temperate waters. So far the Chondropodinae were recorded from e.g. Adriatic Sea, Brazilian coast, Gulf of Guinea, Mauritania, Gulf of Mexico, Caribbean Sea or Coast of Malaysia (*Guţu, 1984*; *Guţu, 1996*; *Guţu, 2002*; *Bamber & Sheader, 2005*; *Guţu, 2006a*; *Guţu, 2014*; *Jakiel et al., 2015*). In Australian waters the subfamily is known so far from two species – *Julmarichardia gutui* Ritger & Heard, 2007 found in NW Australian coast (*Ritger & Heard, 2007*), and *Bamberus jinigudirus* Stępień & Błażewicz-Paszkowycz, 2013 collected from Ningaloo coral reefs (*Stępień & Błażewicz-Paszkowycz, 2013*). Described herein *Muvi schmallenbergi* sp. nov. is the third Chondropodinae species recorded from Australia.

Materials and methods

The analysed sample was taken during the SLOPE campaign off Portland, Victoria, Australia at the depth of 49.5 m using Smith-McIntyre grab. The sample was preserved in formaldehyde, and after identification was fixed in 70% ethanol. Images of body habitus were taken with Leica M125 stereomicroscope combined with DFC295 camera and LAS V4.5 software. Appendages were dissected in a glycerine solution using chemically-sharpened tungsten needles, mounted in glycerine on slides, and sealed with nail varnish. Drawings were made using a Nikon Eclipse 50i microscope combined with a camera lucida; redrawn with china ink and finally combined and cleared with Corel PHOTO-PAINT X7. The body length to width ratio was calculated using measurements from the tip of the carapace to the end of the pleotelson, and of the widest part of carapace, while the length and width of articles were measured along their central axes. The general morphological terminology follows that proposed by *Błażewicz-Paszkowycz, Bamber & Jóźwiak (2013)*. To simplify species descriptions, the expression '*N*x' replaces '*N* times as long as' and '*N* L:W' replaces '*N* times longer than wide'. The type material is deposited in Melbourne Museum (NMV, Australia).

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Results

Systematics

Order Tanaidacea Dana, 1849

Suborder Apseudomorpha Sieg, 1980

Superfamily Apseudoidea Leach, 1814

Family Metapseudidae Lang, 1970

Subfamily Chondropodinae Guţu, 2008

Genus *Muvi* gen. nov.

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Diagnosis. Rostrum triangular pointed, lateral margin smooth. Eyelobes with visual elements. Pereonites wider than long. Antennule peduncle of four articles, article-1 with only single apophysis on outerodistal corner; flagella equal in length, each with twelve segments. Maxillule inner lobe well developed. Labial palp with three distal setae. Exopod on cheliped and pereopod-1 well developed, with nine and eleven plumose setae, respectively. Pereopod-1 coxa with distinct apophysis. Pereopods bases without apophyses. Pereopod-1 propodus 1.5 times as long as wide. Pleopods in five pairs. Uropod basal article without hyposphaenium; endopod of seven segments, exopod of three segments.

Etymology. The name is an acronym for Museum Victoria, where the studied material is deposited.

Remarks

Muvi gen. nov. was classified to subfamily Chondropodinae based on a combination of following characters: pleon of five free pleonites, antennule peduncle article-1 with apophysis, antenna peduncle article-2 elongated, mandibular palp of three articles and pereopod-1 basis with row of plumose setae dorsally. New genus can be immediately distinguished from other members of the subfamily by having elongated, multiarticled inner flagellum of antennule, that is equal in size and in number of the articles to outer flagellum. Moreover *Muvi* gen. nov. differs from:

- *Bamberus* Stępień & Błażewicz-Paszkowycz, 2013 by pleotelson without lateral process, antennule article-1 with single apophysis, well developed inner lobe of maxillule, labial palp with three setae distally and uropod basal article without apophysis. In *Bamberus* pleotelson has single process on lateral sides, antennule article-1 lacks apophyses, inner lobe of maxillule is reduced and bears only two distal setae, labial palp has two seta while uropod basis has distinct apophysis (*Stępień & Błażewicz-Paszkowycz, 2013*)
- *Calozodion* Gardiner, 1973 by having three strong setae distally on labial palp; there is only one distal spine in *Calozodion* (*Guţu, 2002*);
- *Chondropodus* Guţu, 2006 by having eyelobes with visual elements, pereonites with lateral processes, pleotelson without lateral process, labium with three distal setae, pereopod-1 coxa with distinct apophysis, propodus only 1.5 L:W, pleopod exopod with single article. In *Chondropodus* eyelobes lacking visual elements, pereonites do not have lateral processes, labial palp has single distal spine, pereopod-1 lacking coxal apophysis

and propodus is at least twice as long as wide and pleopod exopod is biarticled (*Guţu, 2006a*);

- *Hoplopolemius* Sganga & Roccatagliata, 2016 in antennule peduncle article-1 with only single apophysis (*Richardson, 1902*; *Guţu, 2002*; *Larsen & Shimomura, 2006*);
- *Julmarichardia* Guţu, 1989 in rostrum with smooth lateral edges, antennule peduncle article-1 with single apophysis. The lateral edges of *Julmarichardia* rostrum are distinctly serrated and antennule peduncle article-1 in members of this genus has more than one apophysis (*Barnard, 1914*; *Guţu, 1989a*; *Guţu, 1989b*; *Bamber & Sheader, 2005*; *Ritger & Heard, 2007*);
- *Trichapseudes* Barnard, 1920 by having five pairs of pleopods – in *Trichapseudes* only three pairs of pleopods are present (*Barnard, 1920*);
- *Vestigiramus* Guţu, 2009 in well-developed and setose cheliped exopod. *Vestigiramus* has reduced uniarticled and naked cheliped exopod (*Guţu, 2009*);
- *Zaraza* Guţu, 2006 by three setae distally on labial palp and five pairs of pleopods. *Zaraza* has labial palp with single terminal seta (spine) and three pairs of pleopods (*Guţu, 2006b*).

Key to the genera of the subfamily Chondropodinae (modified after *Guţu 2008*)

1 - Rostrum very large with strong denticles around ... *Julmarichardia* Guţu, 1989

- Rostrum normal without strong denticles around ... 2

2 - Pereopod-1 propodus cylindrical, much longer than its thickness or the length of carpus...3

- Pereopod-1 propodus wide, not much longer than its thickness or the length of carpus ... 4

3- Uropod peduncle with strong apophysis dorsally … *Bamberus* Stępień & Błażewicz, 2013

Uropod peduncle without strong apophysis dorsally … *Chondropodus* Guţu, 2006

4 - Antennule inner flagellum twoarticulated ... 5

- Antennule inner flagellum multiarticulated ... 6

5 - Cheliped exopod triarticulated, with terminal setae … *Calozodion* Gardiner, 1973 Cheliped exopod uniarticulated, without terminal setae … *Vestigiramus* Guţu, 2009

6 - Antennule inner flagellum equal in length to outer flagellum … *Muvi* gen. nov.

Antennule inner flagellum shorter than outer flagellum … 7

7 - Pereopod-1 exopod with last article round (and large), having more of 20 plumose setae around….. … *Trichapseudes* Barnard, 1920

- Pereopod-1 exopod with last article normal (elongated), having some plumose setae around... 8

9 - Five pairs of pleopods ... *Hoplopolemius* Sganga & Roccatagliata, 2016

- Three pairs of pleopods ... *Zaraza* Guţu, 2006

Muvi schmallenbergi sp. nov.

urn:lsid:zoobank.org:act:14743564-C6F2-42CE-A181-CE30F5C5A2C2

(Figs 1 – 3)

Material examined. Holotype female (MNV J74649), SLOPE 99, Victoria, Off Portland, 38° 31´ 34´´ S, 141° 58´ 46´´ E, depth 49.6 m, 11 May 1994, Smith-McIntyre grab, coll. G.C.B. Poore. Paratype, female (MNV J74648), 5.9 mm, the same locality, dissected on slides.

Diagnosis. As for the genus.

Etymology. The new species is dedicated to Barbara Schmallenberg.

Description of female

Body (Fig. 1A, B) 5.95 mm long. Cephalothorax 21% of total body length; rostrum triangular and pointed (Fig. 2C); eyelobes pointed with visual elements. Pereonites length-width ratio: 0.3, 0.4, 0.5, 0.5, 0.5 and 0.3; pereonites 2–5 with dorsoproximal apophyses on lateral margin. Pleon 32% of total body length; pleonites equal in length about 0.2 L:W, with pointed lateral margins; pleotelson just longer than last three pleonites combined.

Antennule (Fig. 2A) peduncle article-1 2.1 L:W and 1.9x article-2, with four simple and two penicillate setae on inner margin and one simple, one plumose and four penicillate setae on outer margin; single apophysis present in distoouter corner; article-2 1.2 L:W and 1.9x article-3, with five simple and two penicillate setae subdistally; article-3 as long as wide, with two simple setae distally; common article short and naked; flagella subequal, each with 12 segments, setation as figured.

Antenna (Fig. 2B) peduncle article-2 1.7 L:W and 3x article-3, with three minute distal and subdistal setae; squama narrow, 4.5 L:W, with simple subdistal seta and three distal setae; peduncle article-3 0.8 L:W and 0.7x article-4, with two long simple setae distally; article-4 1.2 L:W and 0.9x article-5, with three penicillate distal setae; article-5 1.4 L:W, with two short simple, two long simple and two penicillate setae distally and one midlength simple seta; flagellum of six segments, setation as figured.

Mouthparts. Labrum (Fig. 2D) rectangular with numerous minute setae on distal and lateral margins. Right mandible (Fig. 2E) incisor with four well calcified triangular teeth; outer margin with tubercles and with minute setae distally. Left mandible (Fig. 2F) outer margin with distally setulose tubercles; incisor with four distal teeth; *lacinia mobilis* as long as incisor, with four teeth, setiferous lobe with four complex-tip setae; molar broad, distally serrated; palp (Fig. 2G) article-1 1.1 L:W, with five inner setae; article-2 2.1 L:W with outer margin serrated, two simple distal setae and row of inner setae started from middle of article, setae decreasing in length towards distal end of article; article-3 3.7 L:W, with five outer setae and row of setae along inner margin. Maxillule (Fig. 2H) inner endite with five setae distally (at least three of them setulated), inner and outer margins with serration, outer margin with tuft of setae; outer endite with eleven spines (apparently one serrated), outer margin setulated. Maxilla (Fig. 2I) outer lobe of moveable endite with two subdistal simple and five distal serrated setae, outer margin with microtrichiae; inner lobe of moveable endite with ten serrated setae distally; outer lobe of fixed endite distally with three trifurcated and three serrated setae; inner lobe of fixed endite with 22 setae (at least five of them serrated). Labium (Fig. 2J) outer and inner margins with setation distally; palp (Fig. 2K) lateral margins setulated, distally, with three simple spines.

Maxilliped (Fig. 2L) basis 1.1 L:W, with outerodistal spine and three innerodistal long setae, additionally outer margin with teeth and inner margin with proximal microtrichiae. Palp article-1 0.4 L:W, with long simple seta on inner margin and one simple and two plumose setae on outer margin; article-2 1.2 L:W, with two rows of setae on inner margin and two long outerodistal setae; article-3 about as long as wide, with row of setae along inner margin (at least one plumose); article-4 1.3 L:W, with row of distal setae (at least five of them serrated) and one outer seta. Endite (Fig. 2M) outer margin setulated; inner margin with three coupling hooks and five short plumose setae; distal margin with nine short plumose setae/spines (some with complex tip) and one long plumose seta, subdistal seta simple.

Cheliped (Fig. 3A) basis 1.1 L:W, with plumose dorsodistal seta, simple seta ventroproximally, spine ventrally at midlength and four long setae ventrodistally; exopod of three articles, article-3 with nine plumose setae; merus 1.2 L:W and 0.7x basis, with one simple and one plumose setae, four spines and apophysis ventrally, carpus 0.9 L:W and 1.2x merus, with row of setae along dorsal margin, one apophysis and three setae ventrally and distal apophysis; propodus 0.9 L:W and 1.8x carpus, with three short dorsal and three outer setae and one serrated inner spine near dactylus insertion; fixed finger about 0.8x propodus, with two proximal outer setae, four setae ventrally, cutting margin with two long setae near dactylus insertion, four setae distally and small teeth accompanied with minute setae in proximal half; dactylus just longer than fixed finger with two subdistal setae and row of teeth and spinules along cutting edge.

Pereopod-1 (Fig. 3B) coxa with two setae; basis 2.2 L:W and 2.0x merus, with two ventral setae and four ventrodistal setae, row of plumose and simple setae along dorsal margin; exopod of three articles, article-3 with eleven plumose setae; ischium with three setae, merus 1.3 L:W and 1.1x carpus, with dorsodistal spine, other setation as figured; carpus 1.1 L:W and 1.1x propodus, with two ventrodistal spines, other setation as figured; propodus 1.5 L:W and 1.5x dactylus, with three spines and three setae ventrally and two spines and two setae dorsally; dactylus 2.9 L:W and 2x unguis, with dorsal seta and ventral apophysis; dactylus and unguis combined as long as propodus.

Pereopod-3 (Fig. 3C) coxa with seta; basis 2.1 L:W and 1.8x merus, with tuft of setae ventrodistally, other setation as figured; ischium with two setae, merus 1.7 L:W and 1.3x carpus, with one small and one bigger spines ventrodistally, other setation as figured; carpus 1.2 L:W and 0.65x propodus, with ventral spine in proximal part, two ventrodistal spines, two long setae and three spines dorsodistally; propodus 2.5 L:W and 1.5x dactylus, with two ventral spines in proximal part, one ventrodistal spine, one dorsal subdistal spine and one dorsodistal spine, other setation as figured; dactylus 3.2 L:W, with ventral tooth, ventrodistal seta and two dorsal setae; unguis about 0.5x dactylus; together about as long as propodus.

Pereopod-4 (Fig. 3D) coxa with two penicillate setae; basis 2.1 L:W and 2.0x merus, with one ventroproximal seta, two simple, three penicillate setae dorsally and two short and one long setae ventrodistally; ischium with three setae, merus 1.5 L:W and 0.9x carpus, with two short ventrodistal spines, other setation as figured, carpus 1.8 L:W and as long as propodus, with two short and one longer dorsal spines and two ventrodistal spines, other setation as figured; propodus 3.3 L:W and 2.0x dactylus, with eight serrated setae distally; dactylus damaged, 2.0x unguis, with two short setae ventrally.

Pereopod-5 (Fig. 3E) coxa with one simple and one plumose setae; basis 2.3 L:W and 2.2x merus, with simple ventroproximal seta, midlength ventral seta , one plumose and three simple setae ventrodistally, dorsal margin with one simple, five plumose and three penicillate setae; ischium with one plumose and one short simple setae, merus 1.7 L:W and as long as carpus, with short ventrodistal spine, other setation as figured; carpus 1.5 L:W and 0.8x propodus, with four increasing in size spines along ventral margin and one dorsodistal spine, other setation as figured; propodus 2.0 L:W and 1.7x dactylus, with two spines ventrally, serrated dorsodistal spine and three ventrodistal serrated minute spines, other setation as figured; dactylus with midlength minute ventral spine, short dorsal seta and one short ventrodistal seta, dactylus combined with unguis 0.9x propodus.

Pereopod-6 (Fig. 3F) basis 3.1 L:W and 3.4x merus, with two plumose dorsal setae and four plumose ventral setae; ischium with plumose seta, merus 1.3 L:W and 0.6x carpus, with one dorsodistal plumose seta and two ventrodistal plumose setae; carpus 1.9 L:W and 0.9x propodus, with two ventrodistal spines and one dorsodistal spine, other setation as figured; propodus 2.2 L:W and 1.2x dactylus, with one midlength spine ventrally and some minute serrated ventrodistal and dorsodistal spines, and dorsal midlength penicillate seta; dactylus with ventrodistal seta and three setae dorsally and with ventral serration; dactylus combined with unguis 1.1x propodus.

Pleopods (Fig. 3G) basal article 1.7 L:W, with plumose distal seta; endopod just longer than exopod, with nine plumose setae distally and one dorsal and one ventral midlength setae; exopod with eleven plumose setae along distal end and plumose ventroproximal seta.

Uropod (Fig. 3H) basal article 1.8 L:W, with seven simple setae distally; exopod of three segments, article-2 with two distal setae, article-3 with three distal setae; exopod of seven segments 3.7x endopod, some of them with midlength setae apparently indicated fusion of segments, other setation as figured.

Distribution. Species is known only from the type locality **-** off Portland, Australia from depth 49.6 m.

Discussion

Distribution of Chondropodinae

Depth and type of sediment

Bathymetrically Chondropodinae are mostly shallow water tanaidaceans and their vertical distribution usually not exceeds shelf depths (Table 1). So far only few species were recorded from deeper areas, namely: *Julmarichardia thomassini* Guţu, 1989 found at 250 m, *Calozodion pabisi* Jakiel & Jóźwiak, 2015 found at 386 m and *Julmarichardia alinati* Guţu, 1989 with maximum depth at 450 m. Intriguingly the shallowest record of the last species is from only 6 m. Family Metapsedidae to which chondropodins are classified are often considered as being associated with coral reefs or hydroid colonies (*Sieg, 1986*; *Stępień & Błażewicz-Paszkowycz, 2013*). However closer look only on the Chondropodinae, reveals that members of this subfamily can be found in fact on various sediments, e.g. sand, silt clay, rubble, algea or dead corals (Table 1). The limited data do not allow to point– substrate preferences at the species level.

Horizontal distribution

Chondropodinae are widespreaded worldwide (Figs 4, 5). The highest number of species belonging to this subfamily were so far recorded from waters around Central America – six species, from East African coasts – with five species, and West Africa – with four species. At the genus level, chondropodins are in most cases not restricted to one marine basin for example *Julmarichardia* was found in Mozambique Channel as well as on Maleysian coast and North-west Australia, and *Calozodion* was found on Brasilian coast, off Angola and from Malaysia (Figs 4 and 5). Some others genera are monotypic – *Bamberus*, *Trichapseudes* and *Zaraza*, making impossible to comment any zoogeographical patterns. So far only two non-monotypic genera of Chondropodinae show restricted distribution, namely *Vestigiramus* with three species recorded along east coast of South America, and *Chondropodus* with two species described from coast of Mauretania.

The most striking aspect of Chondropodinae distribution is fact that they are limited to tropics and to some extend to temperate area, and completely absent in higher latitudes (Figs 4 and 5). The most northward record of this subfamily is for *Julmarichardia dollfusi* (Guţu, 1989) described from Jersey Island (North-east Atlantic, apparently without precise location of sampling site) (*Guţu, 1989a*). The most southward records of Chondropodinae are for species described by Barnard - *Julmarichardia deltoides* (Barnard, 1914) found off Gt. Fish Point Lighthouse and *Trichapseudes tridens* Barnard, 1920 taken off East London, South Africa, both locations about 33°S (coordinates not specified in original descriptions) (*Barnard, 1914; Barnard, 1920*). It is worth to mention that absence of this subfamily in polar regions is not biased by a low sampling effort. In fact, at least Atlantic sector of Arctica and Antarctica are among the best studied areas of World Ocean regarding to tanaidaceans fauna (*Bird, 2010*; *Błażewicz-Paszkowycz, 2014*; *Jakiel et al., 2018*).

The longitudinal gradient in diversity from the peak in the tropics and decrease towards the poles is observed in many marine groups of invertebrates e.g., decapods, gastropods and bivalves (*Clarke & Crame, 2010*) or vertebrates e.g., fishes (*Rabosky et al., 2018*).

One of the possible explanation of this phenomenon is that the tropical climates are older and larger and the tropical regions diversify faster due higher rates of speciation and lower extinction rates (*Mittelbach et al., 2007*; *Brown, 2014*).

At the same time the main factor assumed to be responsible for extinctions of shallow-water taxa in the polar regions are glaciations periods, especially when the shelf may have been completely covered by ice (*Clarke & Crame, 2010*; *Thatje, 2012*). Then the potential recolonization of shelf in polar areas might be limited for some tropic or even temperate taxa because of theirs physiology (*Thatje, 2012*; *Brown, 2014*). As was pointed by Brown (2014) tropical species and lineages that have long evolutionary history in relatively equable environments, may not tolerate the abiotic stresses at higher latitudes with emphasis on cold temperature and extreme seasonality.

Within Tanaidacea the pantropical and pantemperate distribution with no representatives on high latitudes is often described phenomenon. It was so far assigned for most of shallow-water families of Apseudomorpha (*Błażewicz-Paszkowycz, 2014*) and some Tanaidomorpha families considered as plesiomorphic: Tanaididae, Pseudozeuxidae, Paratanaidae and Leptocheliidae (*Błażewicz et al., 2012*).

For Antarctic, Sieg (1992) suggested the extinction of shallow-water tropical or temperate tanaidacean taxa during glaciations, and then in postglacial periods the colonisation of the vacant habitats by deep-sea forms. At the same time, he pointed out that according to fossil records all recent tanaidacean families had evolved before the Eocene and thus theirs representatives were theoretically able to colonize the antarctic shelf. To support his extinction hypothesis Sieg stated that Antarctic tanaidacean fauna is characterised by the high ratio between deep-sea and shallow-water taxa, presence of relatively phylogenetically young taxa and lack of species with functional eyes on the shelf (*Sieg, 1992*).

Over two decades later, Błażewicz-Paszkowycz (2014) developed Sieg's hypotesis pointing out that some tanaidaceans might survived the glaciations in shelf or slope refugia or colonized the Antarctic via the Scotia Arc. This idea is strongly supported by presence in Antarctica representatives of typically tropical families - *Paratanais oculatus* (Paratanaidae) and *Allotanais hirsutus* (Tanaididae).

The Arctic tanaidacean fauna share some species with temperate Atlantic and to a lesser extent with temperate Pacific and is thus characterised by lower level of endemism (*Sieg, 1986*). Still this area is underrepresent by some taxa like e.g. shallow-water Apseudomorpha and similarly to the Antarctic area it may be a result of glaciation events.

In particular, majority of Apseudomorpha including Chondropodinae appeared to have radiated in Indo-West Pacific and at the same time theirs physiology adapted to tropics making them unable to recolonise polar regions (*Błażewicz-Paszkowycz, 2014*).

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Table title and legend

Table 1. Depth and sediment type for known Chondropodinae species. Hyphen was used when the collection details were not specified in paper with description of species.

Figure captions

Figure 1. *Muvi schmallenbergi* sp. nov. holotype female (XXX), length 4.5 mm. Habitus illustration.

(A) Body dorsal view. (B) Body lateral view. Scale bar = 1 mm. Photographs: Magdalena Błażewicz.

Figure 2. *Muvi schmallenbergi* sp. nov. holotype female (cat. no. J61578). Antennule, antenna, and mouth parts illustrations.

(A) Antennule. (B) Antenna. (C) Rostrum. (D) Labrum. (E) Right mandible. (F) Left mandible. (G) Mandibular palp. (H) Maxillule. (I) Maxilla. (J) Labium. (K) Labial palp. (L) Maxilliped. (M) Maxillipedal endite. Scale bars = 0.1 mm.

Figure 3. *Muvi schmallenbergi* sp. nov. holotype female (cat. no. J61578). Cheliped and pereopods illustrations.

(A) Cheliped. (B) Pereopod-1. (C) Pereopod-3. (D) Pereopod-4. (E) Pereopod-5. (F) Pereopod-6. (G) Pleopod. (H) Uropod. Scale bars = 0.1 mm.

Figure 4. Distribution of Chondropodinae (1).

Circle – genus *Bamberus* represented only by *B. jinigudirus*. Triangle – genus ***Muvi*** represented only by *M. schmallenbergi*. **Diamond – genus *Calozodion*:** light green – *C. bacescui*; yellow – *C. bogoescui*; red – *C. dominiki*; purple – *C. heardi*; blue –*C. moyas*; orange – *C. multispinosum*; green – *C. pabisi*; pink – *C. simile*; light blue – *C. singularis*; brown – *C. suluk*; black – *C. tanzaniense*; grey – *C. wadei*. **Square – genus *Chondropodus*:** blue – *Ch. curvispinus*; green – *Ch. rectispinus*.

Figure 5. Distribution of Chondropodinae (2).

Circle – genus *Hoplopolemius*: yellow – *H. propinquus*; red – *H. toyoshious*; blue – *H. triangulatus*. **Triangle – genus *Julmarichardia*:** green – *J. alinati*; yellow – *J. bajau*; orange – *J. deltoides*; red – *J. dollfusi*; *J. gutui*; blue – *J. thomassini*. **Diamond – genus *Trichapseudes*** represented only by *T. tridens*. **Pentagon – genus *Vestigiramus*:** red – *V. antillensis*; green – *V. codreanui*; orange – *Vestigiramus* sp. Araujo-Silva & Larsen, 2012. **Square – genus *Zaraza*** represented only by *Z. linda*.

Figure 1

Muvi schmallenbergi sp. nov. holotype female (XXX), length 4.5 mm. Habitus illustration.

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A
B

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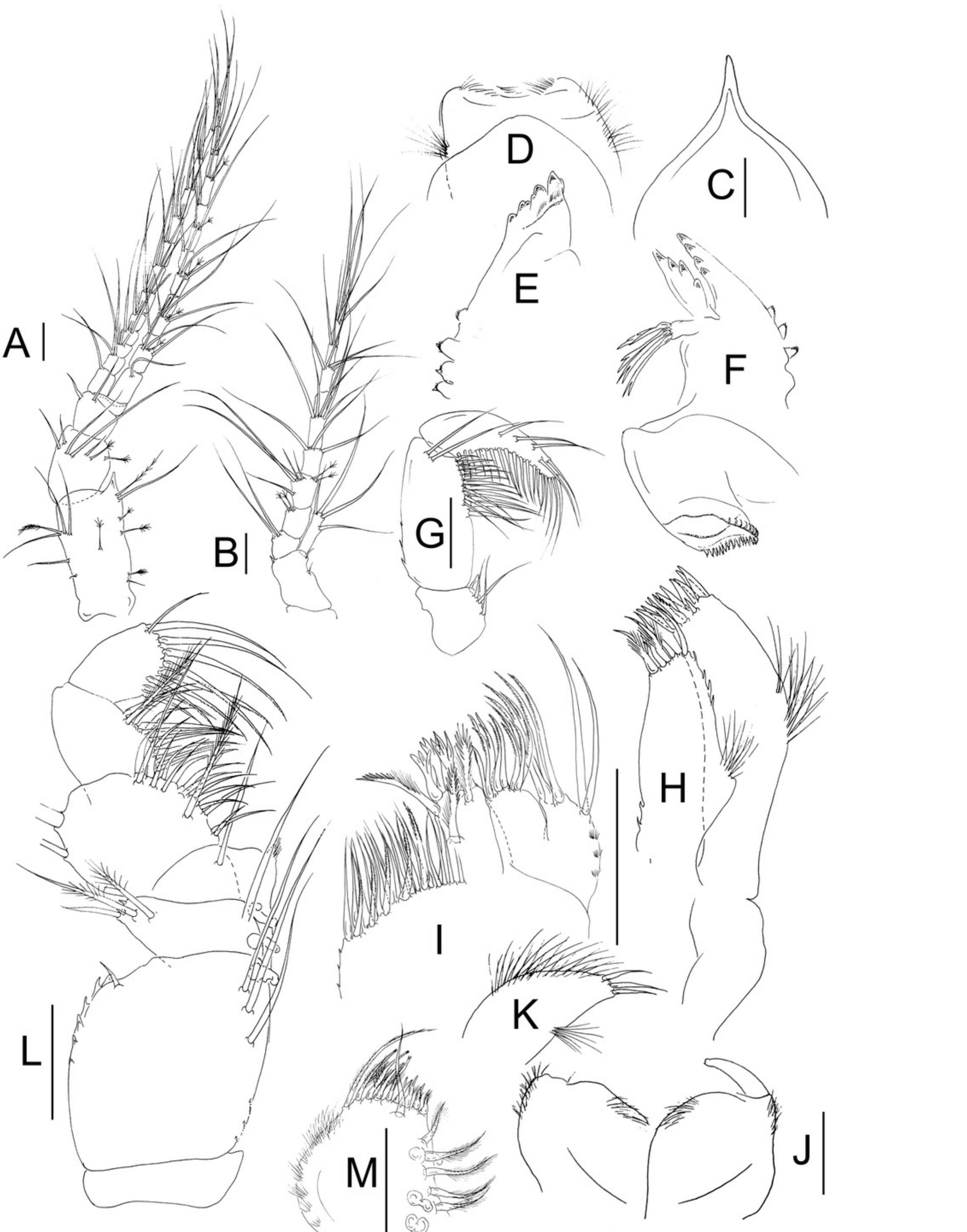
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Figure 3

Muvi schmallenbergi sp. nov. holotype female (cat. no. J61578). Cheliped and pereopods illustrations.

(A**)** Cheliped. (B) Pereopod-1. (C) Pereopod-3. (D) Pereopod-4. (E) Pereopod-5. (F) Pereopod-6. (G) Pleopod. (H) Uropod. Scale bars = 0.1 mm.

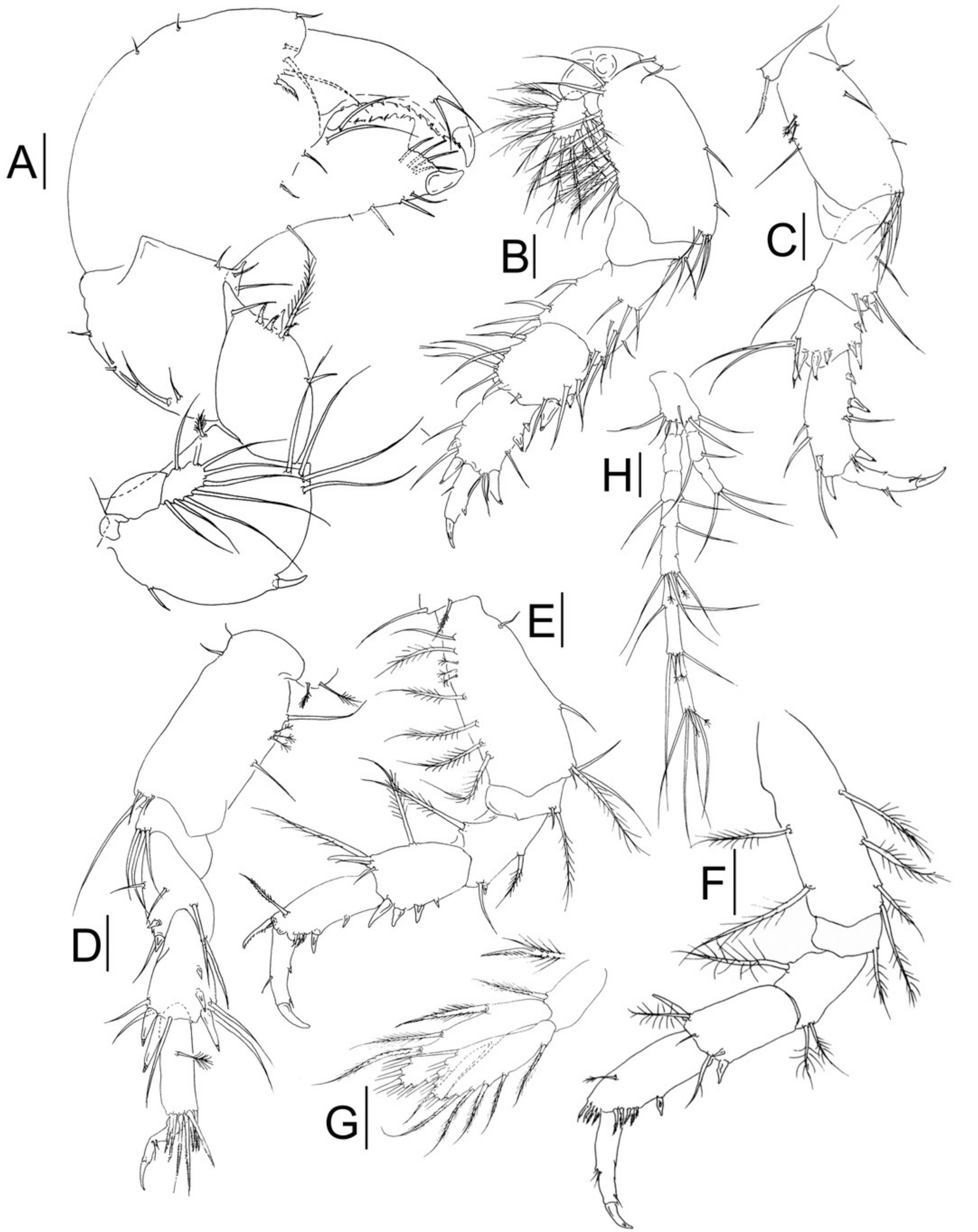
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Figure 4

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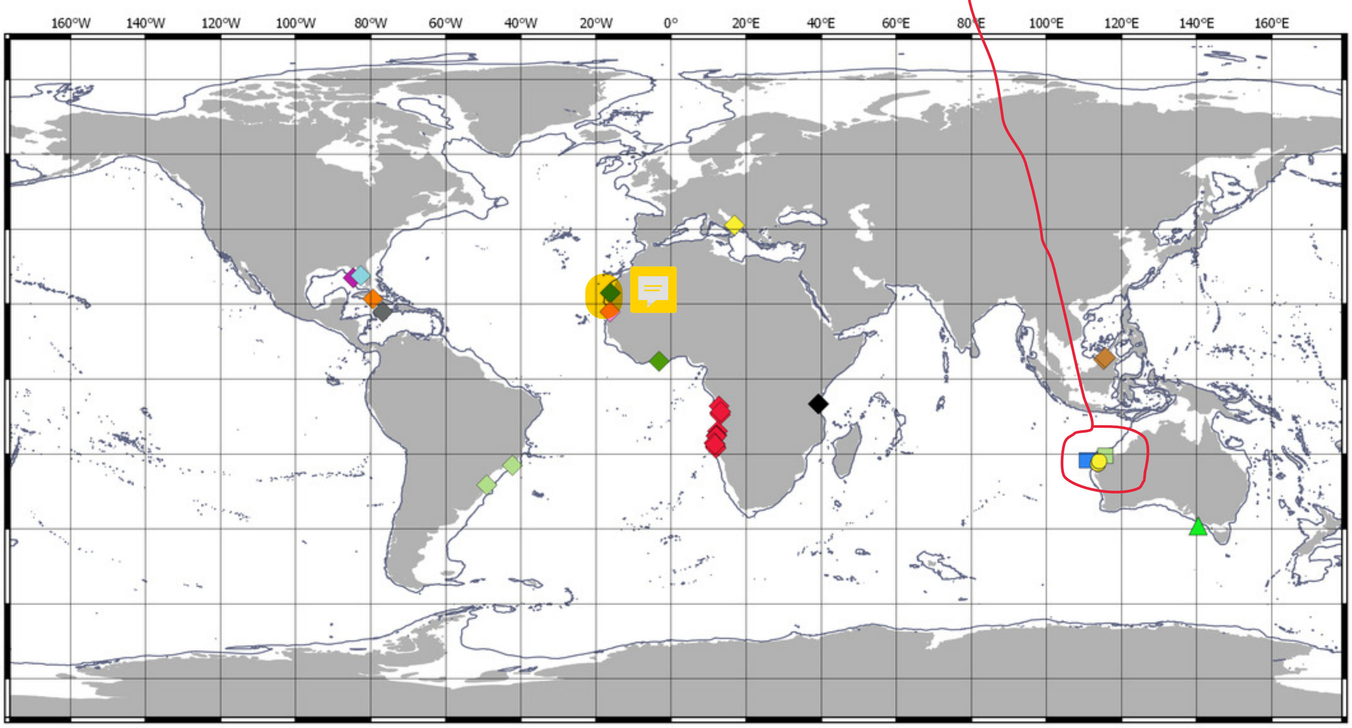

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Distribution of Chondropodinae (2).

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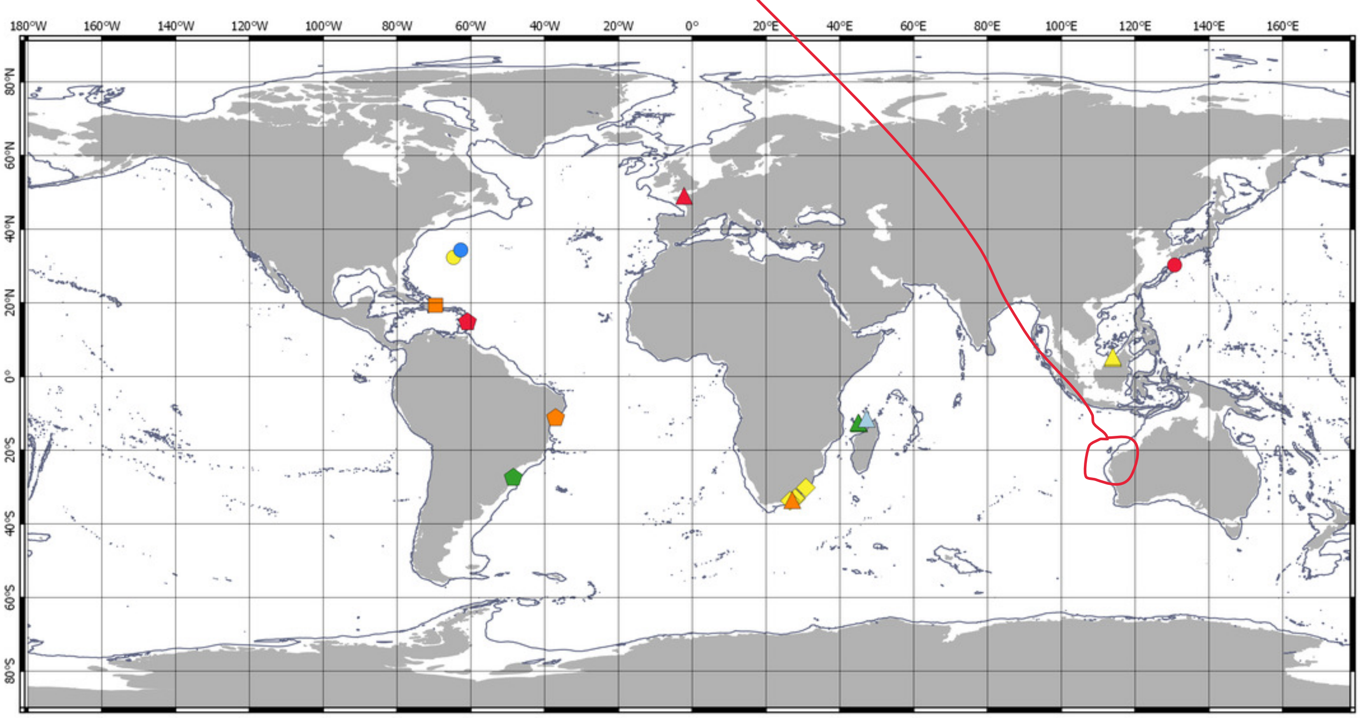

Table 1 (on next page)

Depth and sediment type for known Chondropodinae species.

Hyphen was used when the collection details were not specified in paper with description of species.

Species	Depth [m]	Sediment	References
Bamberus jinigudirus Stępień & Błażewicz-Paszkowycz, 2013	4–12	sand, fine rubble in groove, dead Acropora, finger rubble	*Stępień & Błażewicz-Paszkowycz, 2013*
Calozodion bacescui Gutu, 1996	29–50	sandy substratum with biogenic gravel, limestone concretions and algae	*Gutu, 1996*
Calozodion bogoescui Gutu, 2014	shallow waters	-	*Gutu, 2014*
Calozodion dominiki Bochert, 2012	26–117	-	*Bochert, 2012*
Calozodion heardi Gutu, 2002	-	-	*Gutu, 2002*
Calozodion moyas Menioui, 2013	6	-	*Menioui, 2013*
Calozodion multispinosum Gutu, 1984	22	dark grey mud	*Gutu, 1984*
Calozodion pabisi Jakiel & Jóźwiak, 2015	386	*Lophelia* reef	*Jakiel et al., 2015*
Calozodion simile Gutu, 2006	-	-	*Gutu, 2006a*
Calozodion singularis Gutu, 2002	-	-	*Gutu, 2002*
Calozodion suluk Bamber & Sheader, 2005	23–35	2% gravel, 75-78% sand, 9-12% silt, 10-11% clay	*Bamber & Sheader, 2005*
Calozodion tanzaniense Gutu, 2014	shallow waters	-	*Gutu, 2014*
Calozodion wadei Gardiner, 1973	6.1	fine sand, silt and clay	*Gardiner, 1973*
Chondropodus curvispinus Gutu, 2006	-	-	*Gutu, 2006a*
Chondropodus rectispinus Gutu,	-	-	*Gutu, 2006a*

2006			
Hoplopolemius propinquus (Richardson, 1902)	-	-	*Richardson, 1902*
Hoplopolemius toyoshious (Larsen & Shimomura, 2006)	73	shell sand	*Larsen & Shimomura, 2006*
Hoplopolemius triangulatus (Richardson, 1902)	-	-	*Richardson, 1902*
Julmarichardia alinati Gutu, 1989	6–450	-	*Gutu, 1989b*
Julmarichardia bajau Bamber & Sheader, 2005	23–35	2% gravel, 75-78% sand, 9-12% silt, 10-11% clay	*Bamber & Sheader, 2005*
Julmarichardia deltoides (Barnard, 1914)	90	-	*Barnard, 1914*
Julmarichardia dollfusi (Gutu, 1989)	-	-	*Gutu, 1989*
Julmarichardia gutui Ritger & Heard, 2007	78–83	-	*Ritger & Heard, 2007*
Julmarichardia thomassini Gutu, 1989	250	-	*Gutu, 1989b*
Muvi schmallenbergi sp. Nov.	49.6	-	
Trichapseudes tridens Barnard, 1920	31–155	-	*Barnard, 1920*
Vestigiramus antillensis Gutu, 2009	1–2	dead corals and seagrass beds	*Gutu, 2009*
Vestigiramus codreanui (Gutu, 1996)	29	limestone concretions and algae	*Gutu, 1996*
Vestigiramus sp. Araujo-Silva & Larsen, 2012	71.6	sandy bottom associated with sponge and algae	*Araujo-Silva & Larsen, 2012*

Zaraza linda Gutu, 2006	0.5–2	dead corals covered with algae	*Gutu, 2006b*