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RESULTS OF THE DIVA-1 EXPEDITION OF RV “METEOR” (CRUISE M48/1)

***Chauliodoniscus coronatus* sp. nov., a new deep-sea species from the Angola Basin (Crustacea, Isopoda, Asellota, Janiroidea, Haploniscidae)**

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A new isopod species of the family Haploniscidae is described. The new species was discovered in samples collected from the Angola abyssal plain (south-east Atlantic). Differences to related species of the genus are discussed. A row of several small tooth-like processes at the anterior margin of the cephalon is a conspicuous character of *Chauliodoniscus coronatus* sp. nov., which distinguishes it from all other members of the genus *Chauliodoniscus*.

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**Keywords:** *Chauliodoniscus coronatus*; Peracarida; Isopoda; Haploniscidae; Taxonomy; Angola Basin; Deep sea**Introduction**

Deep-sea invertebrates were collected during the DIVA 1 expedition with the RV “Meteor” (M48/1) in July 2000. The goal of this expedition was to study the biodiversity in oceanic abyssal plains.

The family Haploniscidae Hansen, 1916 is a well-known and important asellote family due to its richness in species, which at some sites amounts to almost 20% (Harrison 1988) of the specimens collected. The vertical distribution ranges from 680 to 9000 m with most species occurring around 5000 m depth (Kussakin 1973; Lincoln 1985). At present, the family Haploniscidae consists of seven genera with more than 90 species described.

*Abbreviations:* l, left; r, right; A1, first antenna, antennula; A2, second antenna, antenna; Lm, lacinia mobilis; Md, mandible; Mx1, first maxilla, maxillula; Mx2, second maxilla, maxilla; Mxp, maxilliped; P1–7, pereopods 1–7; Pi, pars incisiva; Plt, pleotelson; Plp1–5, pleopods 1–5; Pm, pars molaris; Urp, uropods

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During the DIVA 1 expedition, 282 specimens (16.1% of all isopod specimens) belonging to the family Haploniscidae were collected that can be allocated to 15 species; six known species, seven that still have to be compared with type material, and two new species. Three species are being redescribed (Brökeland and Wägele in preparation). In this contribution, we describe a new species belonging to the genus *Chauliodoniscus* Lincoln, 1985.

The genus *Chauliodoniscus* was proposed by Lincoln (1985). Type species: *Chauliodoniscus tasmanicus* Lincoln, 1985.

**Material and methods**

During the expedition M48/1 of RV “Meteor”, samples were taken at twelve stations along a transect of about 700 km in the Angola Basin with a minimum depth of 5125 m and a maximum depth of 5452 m.

Isopods were collected with an epibenthic sledge (Rothlisberg and Percy 1977; Brandt and Barthel 1995; modified by Brenke). Samples were washed with sea

water on board through a 0.3 mm sieve and fixed in cold 70% ethanol.

Animals were drawn, measured and dissected under a stereo-microscope (Olympus SHZ10). Body length was measured from the anterior margin of cephalon to the apex of pleotelson without the posterolateral tips of the pleotelson (according to Wilson and Hessler 1980). For the drawings a camera lucida (Olympus) was used. Appendages were transferred onto slides and fixed with MERCK glycerine–gelatine stained with “light green”. Photographs were made with a digital camera system (Olympus DP50, Microscope BX40). The picture of the total animal (Fig. 8) is an Extended Focal Imaging (EVI) overlay picture. The EVI picture is calculated from 37 single layers each of 10 µm thickness. The nomenclature of setae follows Fish (1972) and Schultz (1969).

### Diagnosis of *Chauliodoniscus coronatus* sp. nov.

Body dorsoventrally slightly flattened. Cephalon without rostrum but with row of 16–20 small, tooth-like processes. Third peduncular article of antenna with apically bilobed, strong dorsal tooth. Pereomers II and IV with prominent anterolateral process in ♂ and ♀, pereomer III with anterolateral point less protruding and more rounded, pereomers VI and VII dorsally fused with pleotelson. Pleotelson tapering caudally, telsonic apex rounded, shorter than lateral tips. Pleotelson with two inconspicuous dorsal humps anterior to longitudinal keels that end on posterolateral tips. Posterolateral tips short and robust.

### Material

A total of 32 specimens of *C. coronatus* sp. nov. were found at four stations during the DIVA 1 expedition.

*Holotype*: 1 ♀, 2.1 mm, collected at Station 348, 16°18.1'S 005°27.2'E to 16°19.3'S 005°27.2'E, depth 5387 m, trawling distance 4475 m.

*Allotype*: 1 ♂, same data as holotype.

*Paratype*: 1 ♀, Station 338, 18°19.4'S 004°39.7'E to 18° 20.8' S 004°38.6' E, depth 5395 m, trawling distance 4321 m.

*Paratypes*: 1 ♀, 6 ♂, Station 340 18°18.3'S 004°41.3'E to 18°19.4'S 004°41.9'E, depth 5395 m, trawling distance 4321 m; 1 ♀, Station 348, 16°18.1'S 005°27.2'E to 16°19.3'S 005°27.2' E, depth 5387 m, trawling distance 4475 m, 1 ♀, Station 350, 16°14.3'S 005°26.8'E to 16°14.9'S 005°26.7'E, depth 5389 m, trawl-distance 3179 m.

The female holotype (K-40554, 23 slides), the allotype (K-40556, 11 slides), one female paratype (K-40555, 30

slides) and nine additional paratypes (K-40557, K-40558, K-40559) were deposited in the Zoological Museum Hamburg.

In total, 20 specimens were kept in the collection of the Department of Animal Morphology and Systematics, University of Bochum.

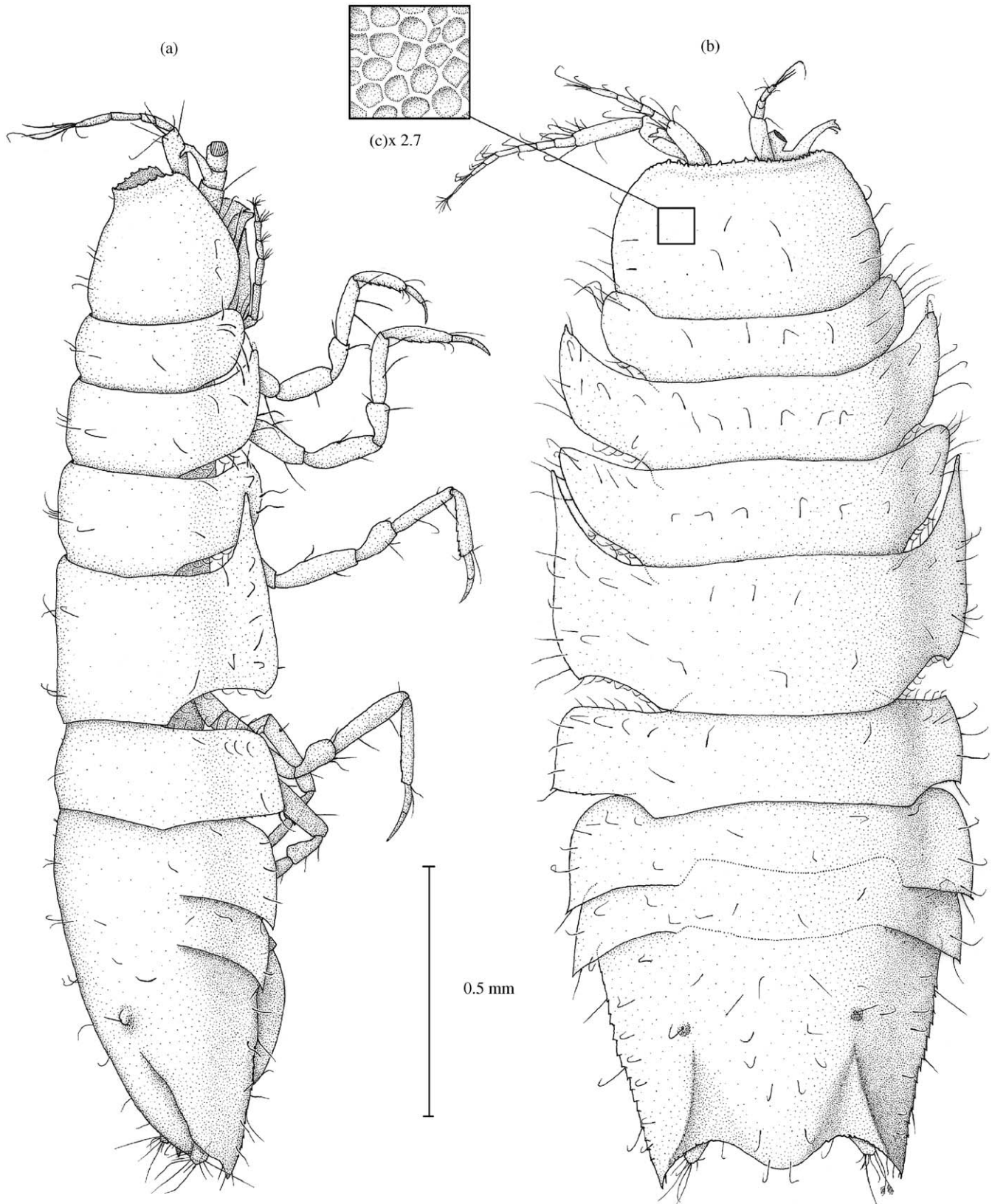
### Description of *C. coronatus* ♀

*Body* (Figs. 1–8): unpigmented, opaque white, dorsal surface with small, irregularly rounded cuticular depressions. Approximately, 2.5 times longer than wide, widest in middle (pereomer IV). Many very thin and inconspicuous simple setae on cephalon, pereomers and pleotelson. Eyes lacking. Cephalon smooth and oval, 1.7 times broader than long, without rostrum but with about 16–20 small tooth-like processes on convex anterior margin, becoming less prominent laterally (Figs. 1 and 8). Pereon dorsally somewhat vaulted, flattening laterally. Pereomers I and III with rounded anterolateral corners produced anteriorly, pereomers II and IV with prominent anterolateral process, in pereomer IV slender. Deep incision between pereomers IV and V. Pereomers VI and VII dorsally fused with pleotelson. Relative lengths of pereomers: IV > III = V > II = VI > I = VII. Pleotelson about 1/4 length of body, in posterior half with longitudinal keels ending on posterolateral tips. Lateral margin slightly convex and serrated. Posterolateral tips longer than uropods and caudally surpassing the apex of pleotelson. Dorsal, directly anterior of the keels, two inconspicuous humps with one simple seta at top.

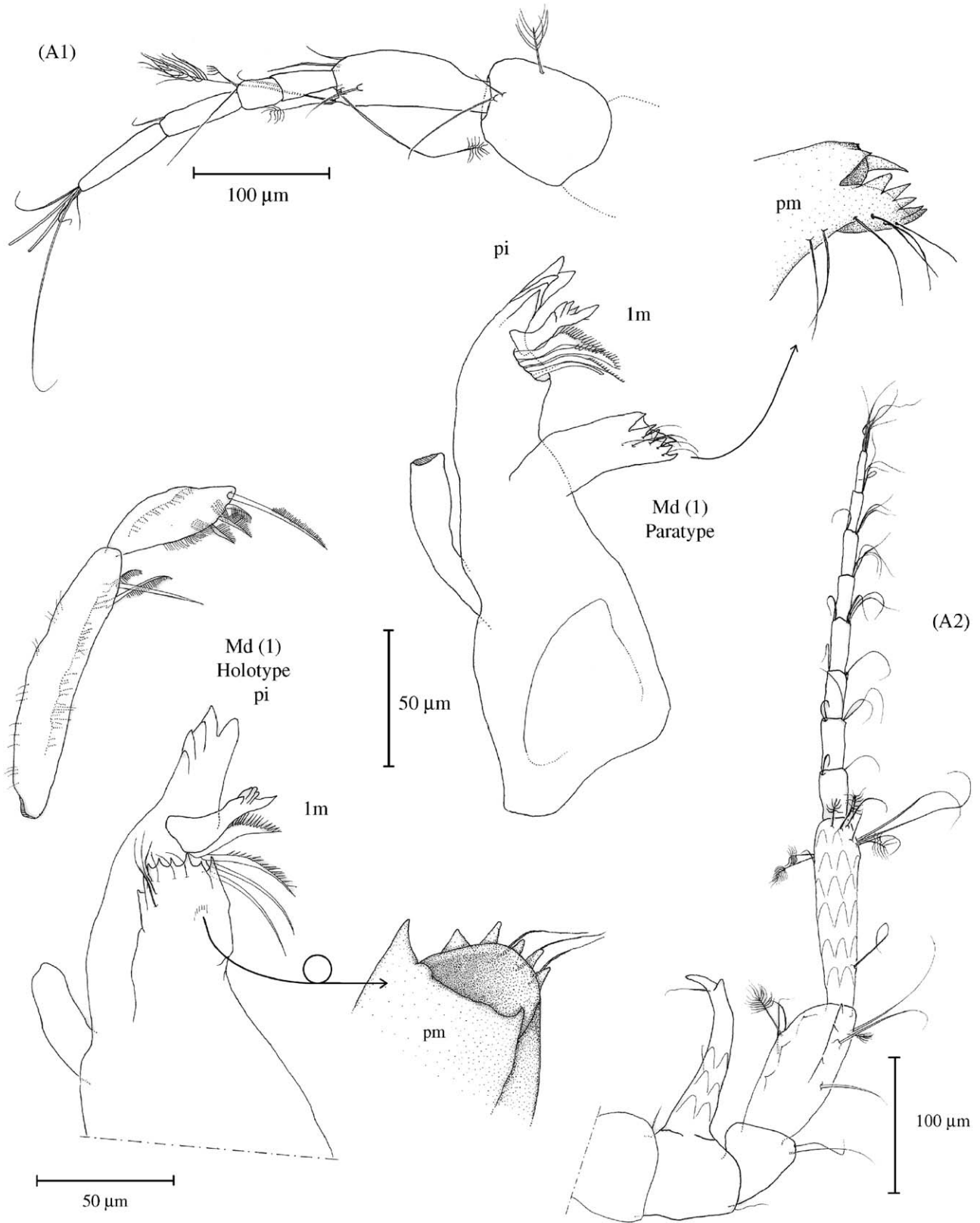
*Antenna 1* (Fig. 2): short, about 1/6 of body length. Article one broken off during dissection, second article as long as wide with three setae, one brush seta and two simple setae. Third article longer and slim, with three long brush setae and three simple setae.

Flagellum composed of four articles. First article bearing one simple seta distally, second article distally with one brush and one simple seta, third article with one distal simple seta, fourth article terminally with a group of four simple setae and two aesthetascs. Relative lengths of flagellar articles: 2 < 1 < 3 < 4.

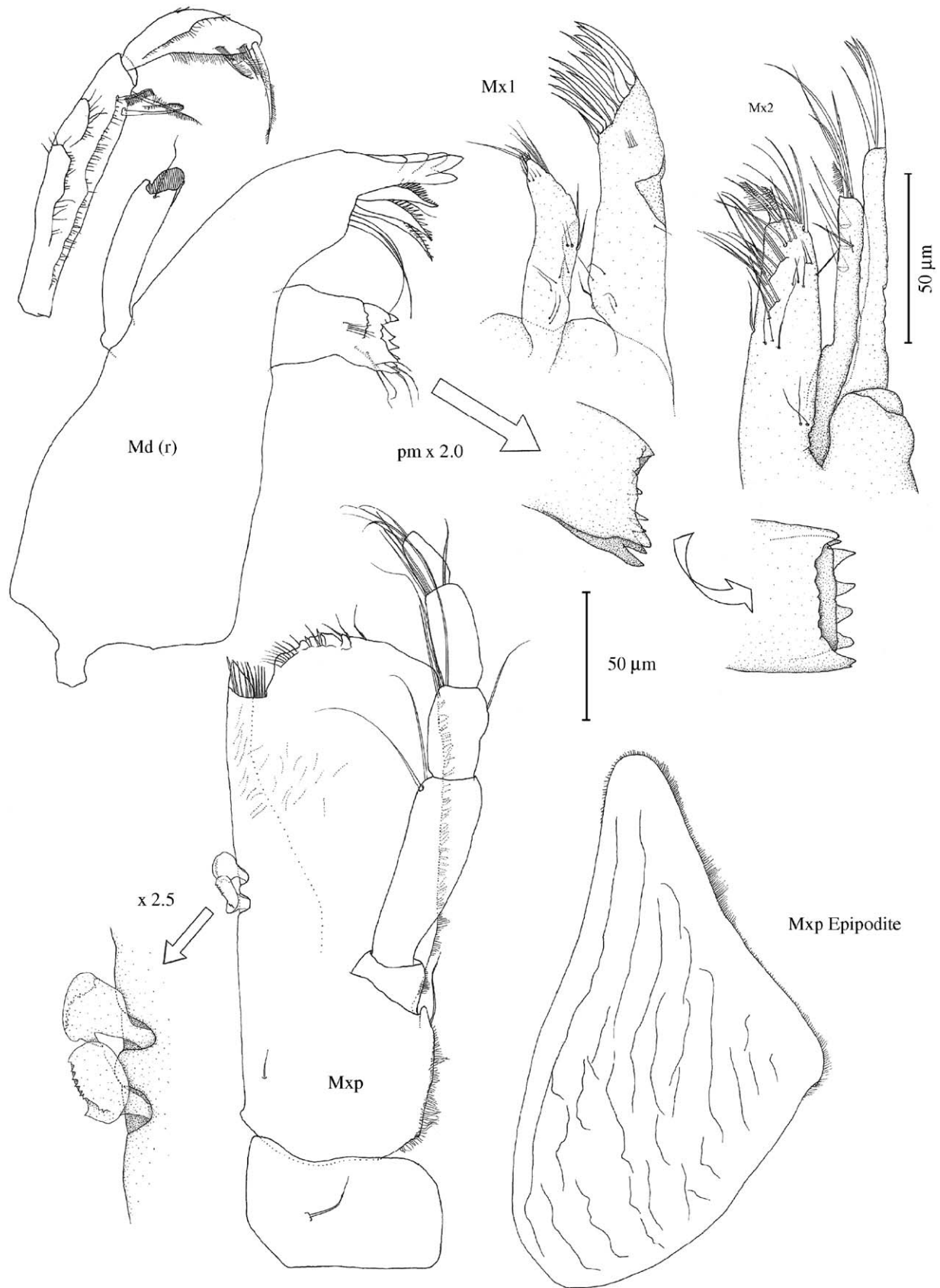
*Antenna 2* (Fig. 2): about twice as long as antennula. Article one broken off during dissection, second article as long as wide with one simple seta at dorsal side, third article with prominent dorsal bilobed tooth with long and short tip. Shaft of tooth with cuticular scales and one simple seta in middle and one in distal part. Article four with two simple setae, article five with two rows of pointed cuticular scales, two brush setae and five simple setae. Article six with cuticular scales, proximally with one simple seta, distally with at least five brush and five simple setae. Flagellum consisting of eight articles of



**Fig. 1.** *C. coronatus* sp. nov.; holotype, female, 2.1 mm length: (a) lateral view; (b) dorsal view; (c) detail of body surface.



**Fig. 2.** *C. coronatus* sp. nov.; holotype, female: antennula, antenna with dorsal tooth, left mandible with palpus and detail of *P. molaris*; paratype, female: left mandible of with detail of *P. molaris*.



**Fig. 3.** *C. coronatus* sp. nov.; holotype, female: right mandible, detailed views of *P. molaris*; maxillula; maxilla; maxilliped with epipodite and with detailed view of retinacula.

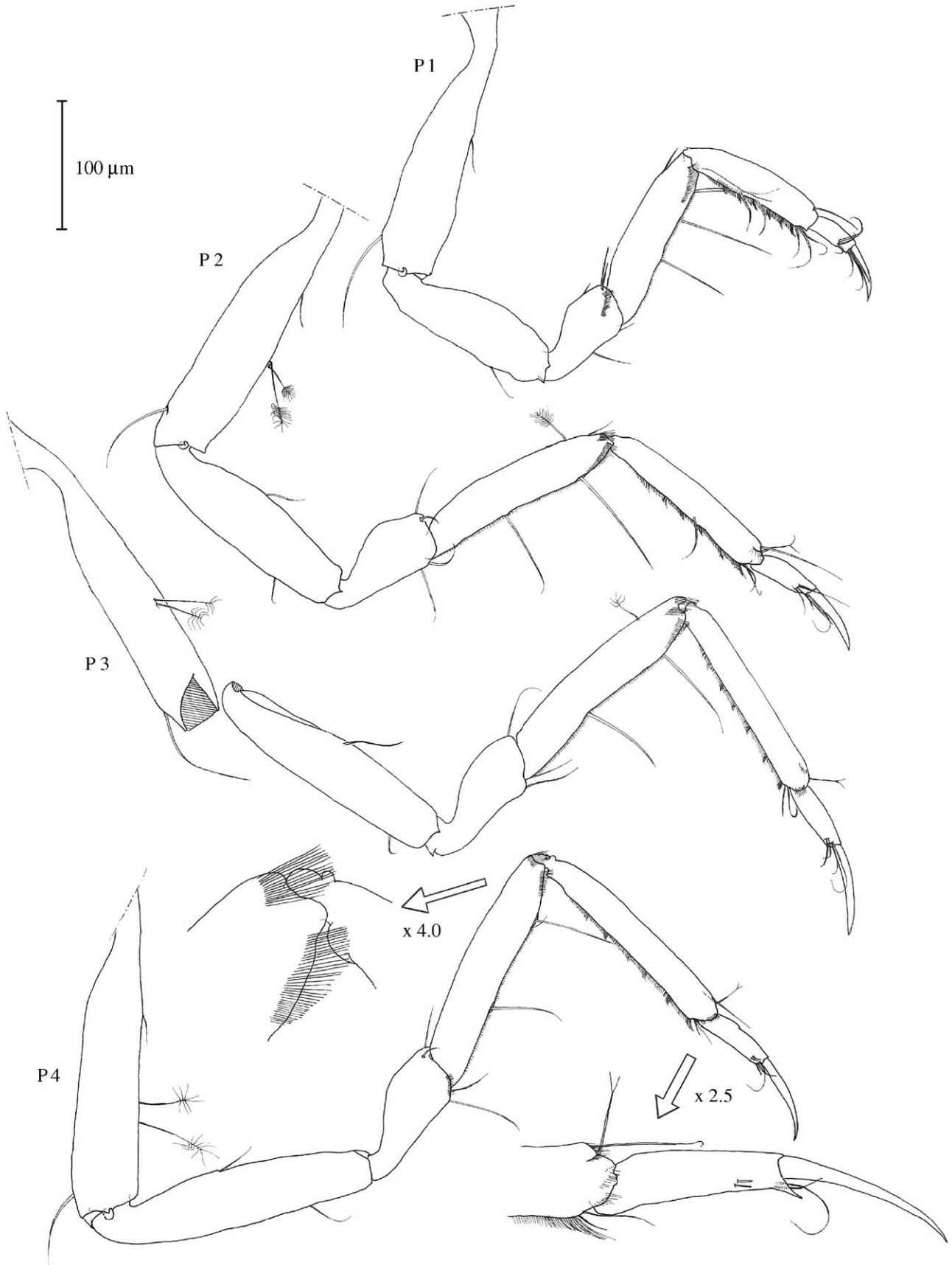
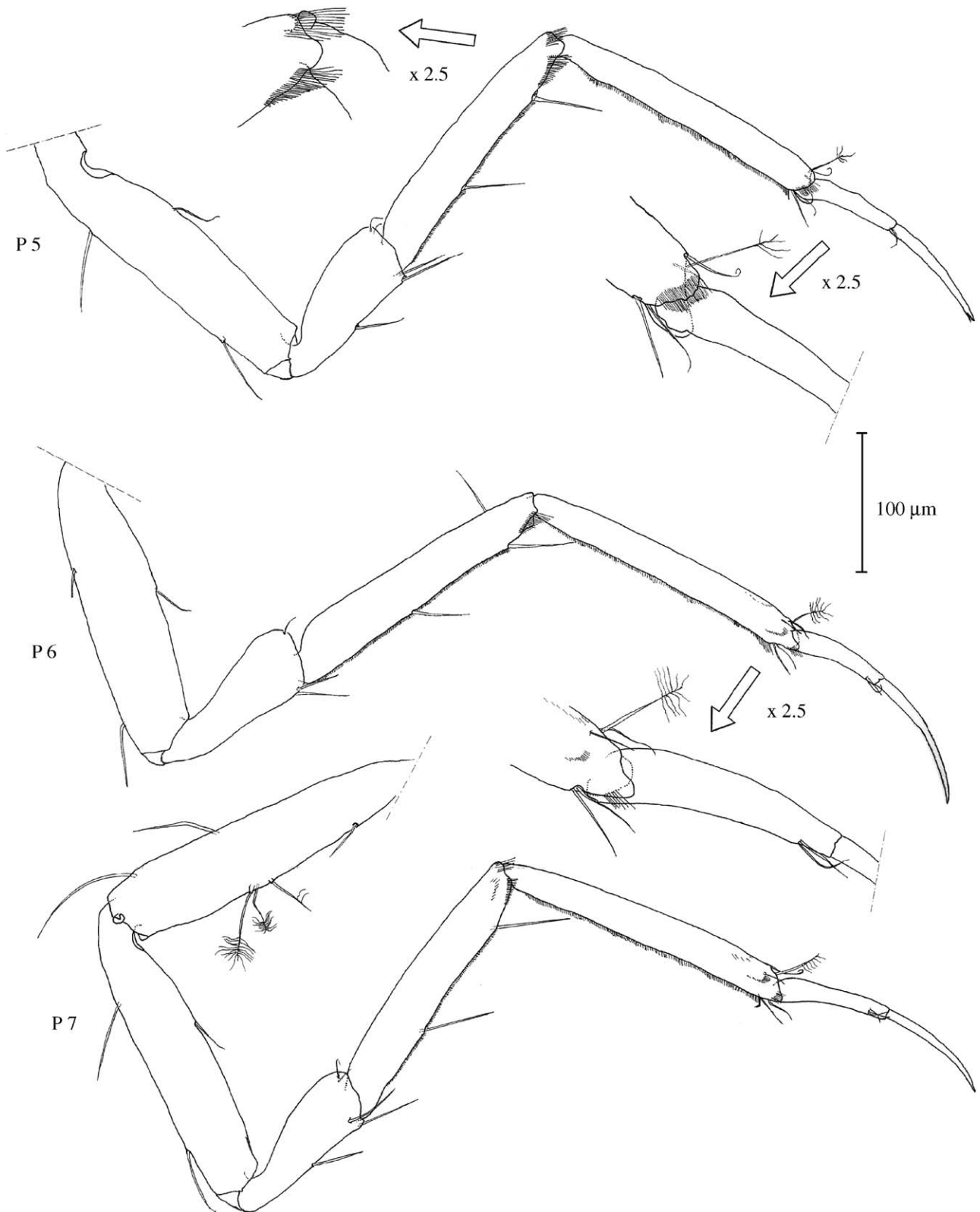
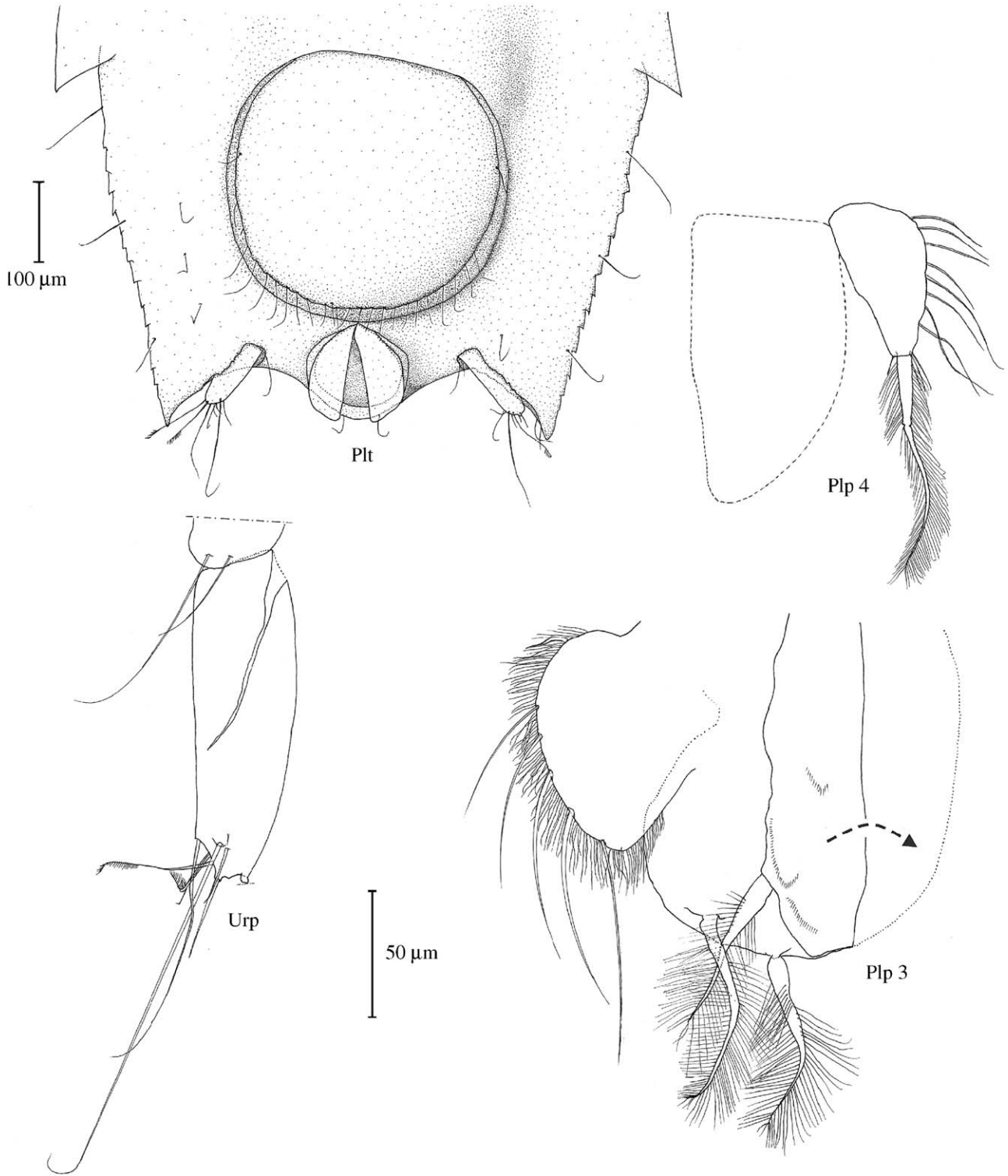


Fig. 4. *C. coronatus* sp. nov.; holotype, female: pereopods 1–4, pereopod 4 with detailed views of distal end of carpus and dactylus.



**Fig. 5.** *C. coronatus* sp. nov.; holotype, female: pereopods 5–7; basis absent in pereopods 5 and 6, detailed views of distal end of propodus of pereopods 5 and 6.

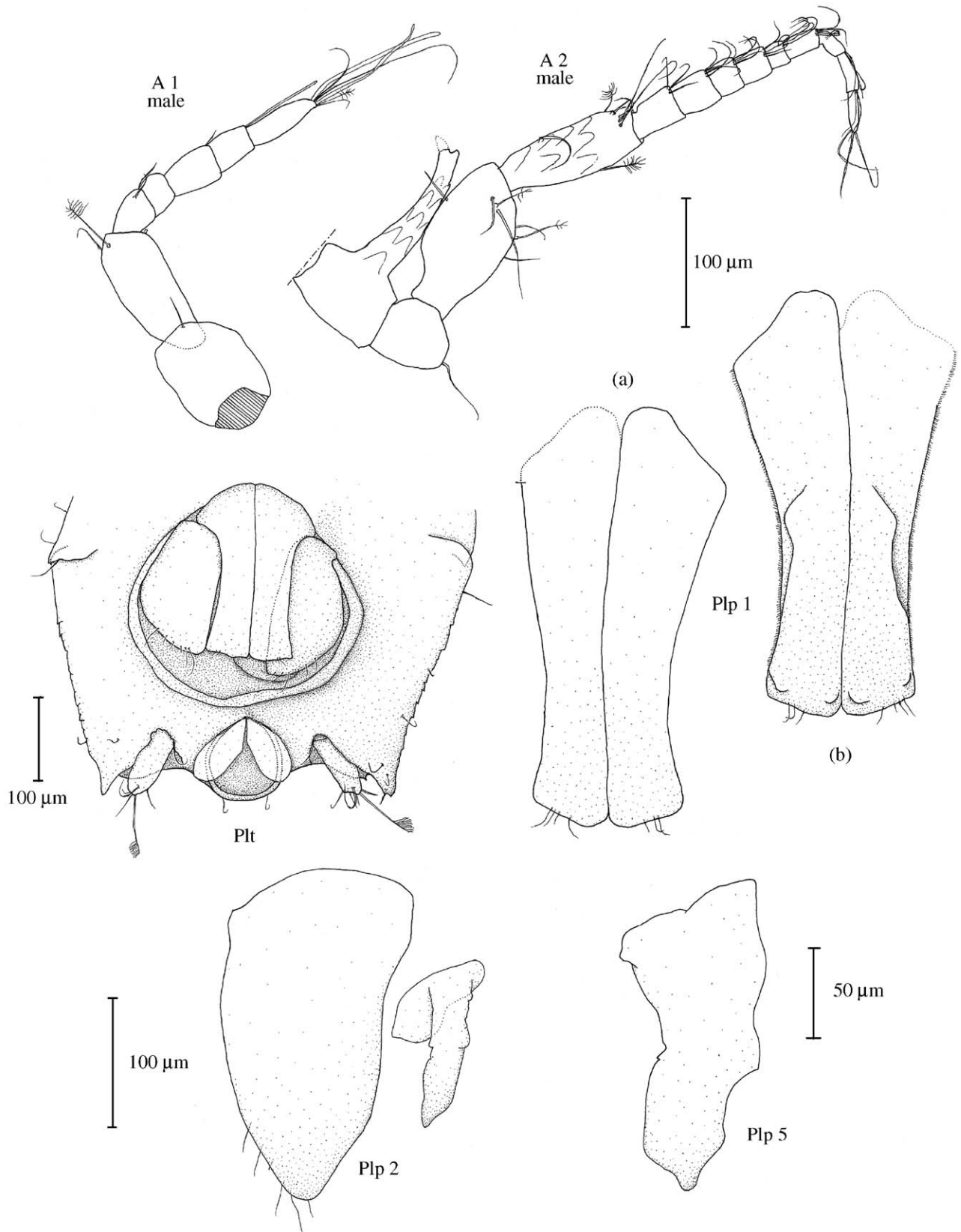


**Fig. 6.** *C. coronatus* sp. nov.; holotype, female: ventral view of pleotelson; pleopod 3: arrow indicates that the endopod should be unfolded (dotted line); pleopod 4: dotted line the reconstructed shape of the exopod; uropod.

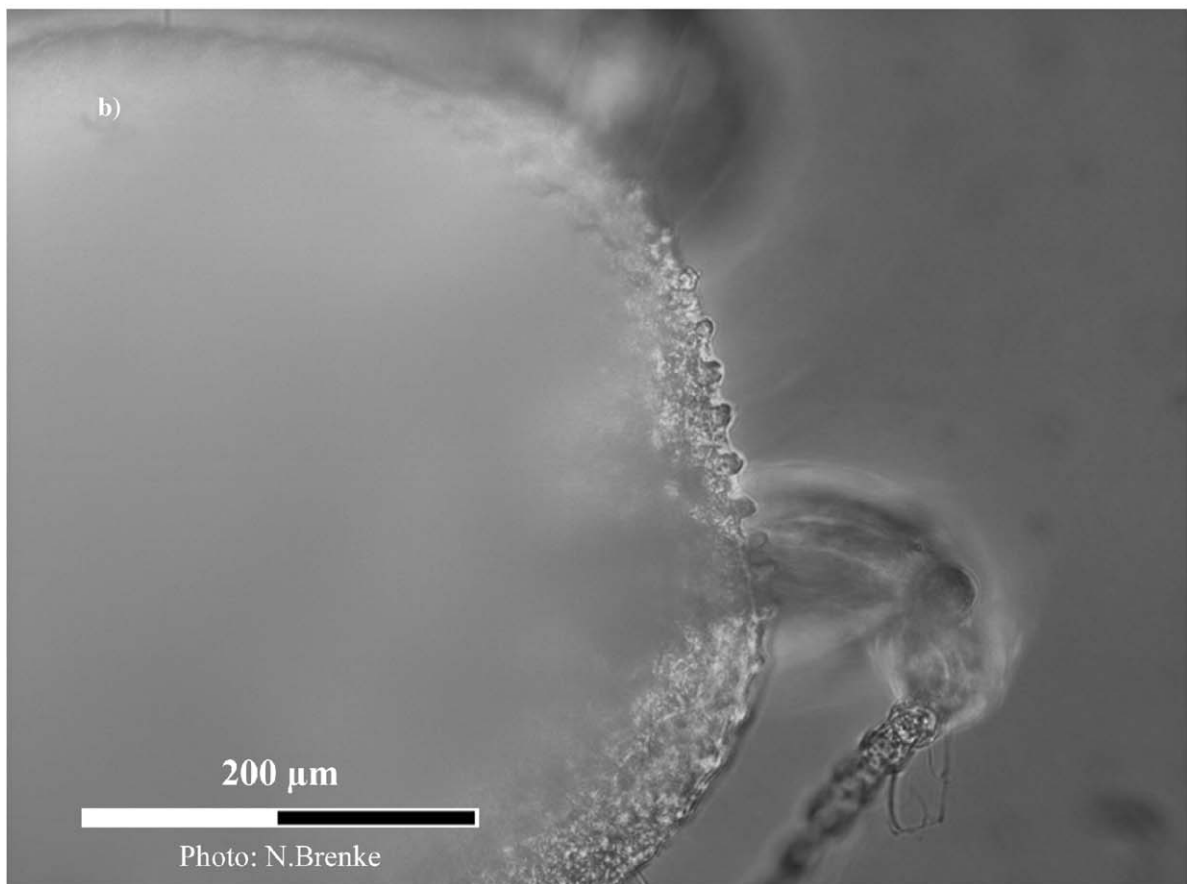
subequal length, tapering distally. Articles with up to five simple setae at distal margin, last article with terminal group of five long simple setae.

Mandibles (Figs. 2 and 3): proximally broad, tapering distally, with three-articulated palp overreaching mandibles in length.





**Fig. 7.** *C. coronatus* sp. nov.; allotype, juvenile male: antennula, antenna, ventral view of pleotelson: (a) ventral view of pleopod 1; (b) dorsal view of pleopod 1; pleopod 2, pleopod 5.



*Pars incisiva* of left and right mandible with five blunt teeth. *Lacinia mobilis* of left mandible elongated, distally with four short teeth and one long, robust tooth. Proximally, two long simple setae and at least two setulose setae. Right mandible without *l. mobilis*, distomedially three setulose setae and three simple setae. *Pars molaris* of left and right mandible with grinding surface, medially five prominent teeth and two prominent teeth at opposite corners on other side. Between these two prominent teeth a faintly developed row of approximately five to seven knolls. *P. molaris* with six long simple accessory setae. On proximal side in distal third, a comb of five fine setae.

Article one of mandibular palp long and slender, article two 1.5 times as long as article one, distally with no (right mandible) or one (left mandible) simple spine and two (left mandible) or three (right mandible) setulose spines. Article three smallest, curved, distally with three short setae and one long setulose seta. Several rows of fine setae on articles two and three.

*Maxilla 1* (Fig. 3): with two endites. Inner endite shorter and more slender than outer one, terminally with about five long and ten shorter simple setae. Shaft of inner endite with about ten simple setae, lateral margin with a slight depression (artefact). Outer endite broad, bearing 13 strong setae. Comb of four short simple setae in distal third. Basal third with seven simple setae.

*Maxilla 2* (Fig. 3): inner endite broader than middle and outer endites, with two hemiplumose setae (*sensu* Wilson, 1989) at apex and more than 25 long simple setae. Median endite with one hemiplumose seta and four simple setae apically. Three long parallel flattened setae in upper half of medial margin. Outer endite apically with five stiff, smooth bristles.

*Maxilliped* (Fig. 3): epipodite triangular with cuticular wrinkles and row of fine hairs on lateral and apical margins that may be fused to a membrane at the anterolateral margin. Coxa with one long simple seta. Basis (protopodite) with one short simple seta basally near mediad margin.

Palpus slender with five articles. Relative lengths of articles:  $1 \ll 2 \gg 3 < 4 > 5$ . Articles apically with long simple setae: 0–2–4–4–3.

Distal margin of endopodite irregularly rounded, with several thin simple setae. Medial margin shovel-like, bent dorsally, bearing many fine setae. Outer margin with row of fine hairs. Endites connected by two retinacula. Retinacula with one prominent tooth and row of approximately ten fine teeth on dorsal lobe.

Pereopods (Figs. 4 and 5): all sub-similar walking legs, slender, becoming progressively longer posteriorly. Pereopod 1: 0.7 mm, pereopod 7: 1.15 mm.

Basis elongated, with one to three long simple setae and (except pereopod 1) two to three brush setae standing close together.

Ischium elongated, faintly shorter than basis, all similar in shape, with 1–3 long simple setae.

Merus half as long as ischium, thickening distally. Three to four simple setae in distal third, pereopods 1, 5 and 7 each with one simple seta in middle of ventral side. Pereopods 1 and 4 with comb of fine setae in distal third on lateral side.

Carpus long and slender, faintly shorter than ischium. Pereopod 1 with three long simple setae, pereopods 2–7 each with two simple long setae ventrally. Entire carpus with row of short and very fine setae on ventral margin. Distal end with one to two rows of simple setae overlapping the articulation with propodus. Pereopods 2 and 3 each with one dorsal brush seta in distal third, pereopods 1 and 6 each with one simple dorsal seta.

Propodus about as long as carpus. Ventral margin with row of setae, getting less prominent from pereopod 1–7. Pereopod 1 ventrally with two long setae in middle, pereopod 2 with one long seta, all other pereopods without setae in middle of propodus. Propodus with 2–3 long simple setae at distal ventral end and one simple seta (pereopod 1), one simple and one forked seta (pereopod 2 and 4), one forked seta (pereopod 3) or two simple setae and one brush seta (pereopods 5–7) at distal end. Pereopods 2–7 with row of setae and several microtrichs at distal end.

Dactylus slender, as long as or faintly longer than propodus, with one long pointed claw. Dactylus, including claw, distinctly shorter than propodus. Claw faintly longer than dactylus, pereopod 5 with two tips. Dactylus distally with 1–6 simple setae. Smaller ventral claw absent.

Pleopods (Fig. 6): pleopod 2 (operculum) hemispherical, on lateral margin with one simple seta and row of 24 simple setae at posterior margin. Irregular rounded cuticular depressions (as in detail in Fig. 1). Pleopod 3 with large, distally rounded endopodite, bearing three strong setulose setae, possibly respiratory chamber ventilators, and several rows of microtrichs. Exopodite about half as long as endopodite, triangular, margin bearing row of shorter, simple setae and five very long simple setae. Pleopod 4 with approximately triangular endopodite. Exopodite smaller than endopodite, apically with long setulose setae (possibly respiratory chamber ventilators) surpassing endopodite. Lateral margin of exopodite with eight simple setae.

*Uropods* (Figs. 1 and 6): uniramous, cylindrical, shorter than terminal pleotelsonic tips. First article quite small, concealed in ventral view of the total

◀  
**Fig. 8.** *C. coronatus* sp. nov.; holotype, female: (a) EVI-photograph of whole specimen; (b) detailed view of anterior margin of cephalon.

animal, about 1/5 of total lengths of uropods. Article two long and slender, distally bearing two hemiplumose setae, three short and two long simple setae. Protopodite with two long simple setae.

### Description of ♂ allotype

Body and appendages of male allotype smaller than those of female holotype. Pleopods 1 and 2 not fully developed, allotype therefore juvenile according to Wolff (1962) (Fig. 7).

Body surface structure similar to that of the ♀ holotype. Male differs from female in following characters:

*Antennula*: flagellum with five articles. Relative lengths:  $5 > 4 = 3 > 1 > 2$ .

*Antenna*: flagellum with nine articles.

*Pleopods*: pleopod 1 sympodites, broadest at the proximal end. Row of three simple setae at tip. Pleopod 2 with big oval protopodite, tapering apically. Apical margin with approximately six long simple setae. Exopodite small, rounded, inserting at medio-lateral margin of protopodite. Endopodite shorter than protopodite. Pleopod 5 uniramous, tapering apically.

### Remarks

Pleopod 4 of the holotype was partially damaged during dissection. These parts are indicated by a dotted outline (Fig. 6). Pleopod 5 could not be dissected from the female and is consequently only drawn from the male allotype.

### Discussion

Up to now the genus *Chauliodoniscus* Lincoln, 1985 included nine species. Drawings from all nine species were compared with the new species. Four of these nine species, described by Menzies (1962) from the Atlantic, show similarities with the new species: *C. quadrifrons* Menzies, 1962, *C. elevatus* Menzies, 1962, *C. parallelus* Menzies, 1962 and *C. ovalis* Menzies, 1962. In cooperation with W. Brökeland (Zoological Institute and Museum, University of Hamburg), type specimens of these species were loaned from the American Museum of Natural History, New York (AMNH), and compared with *C. coronatus* sp. nov.

*C. quadrifrons* (AMNH cat. no. 11993; found at 5°53.5'S 9°51.5'E, depth 3015 m) shows many similar characters like the bilobed dorsal process of antenna and the two humps on the pleotelson, but differs from *C. coronatus* sp. nov. in the following characters:

pereomer III with long anterolateral process and anterior margin of cephalon without tooth-like processes.

*C. elevatus* (AMNH cat. no. 11988; found at 41°3'S 7°49'E, depth 4961 m) differs in size and shape of peduncular article five of the antenna, which is very broad in *C. elevatus*, and in shape of the anterolateral process of pereomer III and II. In *C. coronatus* sp. nov. the anterolateral parts of pereomers II and IV are prolonged, in *C. elevatus* pereomers III and IV are prolonged. No dorsal humps are present on the pleotelson.

Antenna, pleopod 1, and pereopod 1 of *C. parallelus*, (AMNH cat. no. 11981; found at 38°58.5'S 41°45'W, depth 5041 m) are similar to *C. coronatus* sp. nov., though *C. parallelus* differs in having no tooth-like processes on the anterior margin of the cephalon and no dorsal humps on the pleotelson. In addition, anterolateral parts of pereomers II and IV are less prolonged than in *C. coronatus* sp. nov.

*C. ovalis* (AMNH cat. no. 11989; was found at 38°58.5'S 41°45'W, depth 5041 m) is similar to *C. coronatus* sp. nov. concerning shape of pleopod 1, pereopod 3, the bilobed tooth on antenna, and the dorsal humps on the pleotelson. Nevertheless, *C. ovalis* differs from the former by the lack of prominent anterolateral processes on pereomers II and IV. Furthermore, no tooth-like processes are found at the anterior margin of the cephalon.

Comparing *C. coronatus* sp. nov. with drawings and type specimens of members of the genus *Chauliodoniscus* Lincoln, 1985 we come to the conclusion that the unique characteristic features, like the tooth-like processes on the anterior margin of the cephalon and the distinct shape of the pereomers, justify the recognition of a new species.

### Distribution

Known only from the Angola Basin, Atlantic Ocean, 850 km west of Namibia.

### Etymology

The shape of the cephalon bearing 16–20 small tooth-like processes reminded the authors of a crown, from the Latin “corona”.

### Acknowledgements

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