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

**Cumacea species (Crustacea: Peracarida) from the deep-sea expedition DIVA-1 with RV “MeteOR” to the Angola Basin in July 2000. Family Leuconidae**

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**Abstract**

Seven new deep-sea species from the Angola Basin are described from the family Leuconidae with the genus Leucon with five species, including the subgenera *Crymoleucon* Watling, 1991 and *Epileucon* (Atlantide Rep. 4 (1956) 183) with one species each, and *Macrauloleucon* Watling, 1991 with three species and the genera *Bytholeucon* Watling, 1991, and *Eudorella* Norman, 1867 with one species each. Only one species of the family Leuconidae in the present material—*Leucon (Leucon) homorhynchus* Bishop, 1981b—was already described.

**Keywords:** Angola Basin; Cumacea; Deep-sea; Taxonomy

**Introduction**

The present study is part of the DIVA project (DIVersity of the Abyssal Atlantic) which itself is part of the international DIVERSITAS program analysing the biological resources of the Atlantic. The focus of the project DIVA-1 was the Angola Basin.

The two major aims of the project are the analysis of

- Latitudinal gradient of species richness and the effect of agriculture and climatic changes in Africa.
- Latitudinal gradient of species richness of the deep Atlantic and the influence of natural (biotic and abiotic) factors on diversity.

The systematic analysis of the entire samples, of which the present study is a part, is basis for answering the questions given. As very little work has been done for the Cumacea in this particular part of the Atlantic, many new species were expected.

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Table 1. List of the epibenthic sledge stations of the DIVA-1 Deep-Sea Expedition to the Angola Basin in July 2000 with RV “Meteor” (Me 48-1)

<table>
<thead>
<tr>
<th>Date</th>
<th>Area</th>
<th>Station</th>
<th>Sample</th>
<th>Position start</th>
<th>Depth (m)</th>
<th>Position end</th>
<th>Depth (m)</th>
<th>Time (min)</th>
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<td>5389</td>
<td>103</td>
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</tbody>
</table>

(Brandt and Barthel 1995). Very few specimens were collected by box corer.

Sampling took place at 12 stations on a 700 km long transect across the eastern margin of the Angola Basin in depths of ca. 5500 m. (Table 1: station list, DIVA-1). The material was fixed and preserved in ethanol after a quick dip in freshwater. The type series of the new species are deposited in the Zoological Museum, Hamburg (ZMH) and Museum Senckenberg, Frankfurt (MSF).

Results

Bytholeucon angolensis sp. n.

Fig. 1 and 9

Material: 1 female dissected, 1 ovigerous female, 1 subadult female, station 340 (epibenthic sledge, epinet); 1 ovigerous female used for SEM, station 344 (epibenthic sledge, epinet); 1 ovigerous female broken, 1 ovigerous female holotype, station 348 (epibenthic sledge, epinet), ZMH: K 40658.

Holotype: ovigerous female, ZMH: K 40657.

Date: 28 July 2000

Leg.: Brandt and Wägele

Locus typicus: Angola Basin, station 348 (epibenthic sledge, epinet): 16°18.1'S 05°27.2'E (depth: 5390 m) to 16°19.3'S 05°27.2'E (depth: 5387 m)

Diagnosis: Antenna 1 peduncle geniculate between basal and second article, accessory flagellum shorter than basal article of main flagellum; carapace less than two times longer than the free thoracic segments; maxilliped 3 exopod with four spines at basis; pereiopod 1 exopod’s basis with five spines.

Etymology: the new species is named after the type locality the Angola Basin.

Description is based on holotype, ovigerous female, 3.1 mm long. Carapace anterior 1/3 dorsomedian line serrate. Pseudorostrum projecting anteriorly, short, little upturned, on ventral part with three shallow teeth; siphonal tube not longer than pseudorostrum; ocular lobe reduced; eyes missing; antennal notch distinct, wide open; anterolateral corner subacute; anteroventral margin of carapace serrate (Figs. 1–9); five thoracic segments visible; pleon little longer than carapace and free thoracic segments combined; pleonite 6 shorter than uropods’ peduncle, posterior tip of anal valves visible in dorsal view.

Description of appendages based on paratype female (station 340, epinet). Antenna 1 peduncle geniculate between basal and second article, accessory flagellum shorter than basal article of three segmented main flagellum, distal article very small; maxilliped 2 basis shorter than rest of appendage, merus and carpus subequal in length, carpus with five pairs of setae at inner margin, propodus little longer than dactylus, propodus with one strong plumose seta, dactylus with three strong terminal setae; maxilliped 3 basis longer than rest of appendage, distal little broadened, with two long and one shorter plumose setae and one tooth, ischiium little shorter than merus, merus with one long plumose seta and one tooth distally, carpus second longest article with one tooth and one long seta (broken in paratype), dactylus little longer than propodus with three strong terminal setae and three subterminal setae; exopod present, with four spines at basis; pereiopod 1 broken (in all specimens sampled), basis with ten long setae, exopod present, basis with five spines; pereiopod 2 basis shorter than rest of appendage, ischiium present, dactylus second longest article, tapering, with four setae terminally; exopod present; pereiopod 3 basis longer than rest of appendage, ischiium present, carpus second longest article with three long distal setae, dactylus small; exopod present; pereiopod 4 similar in shape to
Fig. 1. *Bytholeucon angolensis* sp. n. H: habitus ovigerous female (scale: 1 mm), A1: antenna 1 (scale: 0.1 mm), Mxp2: maxilliped 2 (same scale as in A1), Mxp3: maxilliped 3 (same scale as in A1), P1: pereiopod 1 (same scale as in P2), broken after basis, P2: pereiopod 2 (scale: 0.1 mm), P3: pereiopod 3 (same scale as in P2), P4: pereiopod 4 (scale: 0.1 mm), P5: pereiopod 5 (same scale as in P4), U: pleonite 6 and uropods (same scale as in P2).
pereiopod 3, no exopod; pereiopod 5 basis longer than rest of appendage, ischium little shorter than merus, carpus longer than ischi um and merus combined, propodus and dactylus small.

Uropods peduncle with three hair-like setae at inner margin, peduncle 1.3 times longer than pleonite 6, and longer than endopod’s basal article.

Exopod shorter than two segmented endopod, basal article of endopod 2.5 times longer than distal, the latter with one strong terminal and one strong subterminal seta and two spine-setae at distal inner margin.

Remarks
Watling (1991) erected the genus Bytholeucon for two species B. hiscens (Bishop, 1981b) and B. ultraabyssalis (Gamo 1987). The new species resembles in the length proportion of carapace to free thoracic segments B. hiscens as the carapace is less than two times longer than the free thoracic segments, but more than 2 in B. ultraabyssalis. On the other hand the number of spines at the basal article of exopods of pereiopod 1 are different: two in B. hiscens, four in B. ultraabyssalis and five in the new species; the number of spines at basal article of exopods of maxilliped 3 differs as well: three in B. hiscens, six in B. ultraabyssalis and four in the new species.

Eudorella divae sp. n.

Fig. 2

Material: 1 nonovigerous female, 3 juveniles, station 340 (epibenthic sledge, epinet); 1 male, damaged, station 344 (epibenthic sledge, epinet); 1 female, dissected, 1 ovigerous female (holotype), 1 subadult male used for SEM, station 350 (epibenthic sledge, epinet), ZMH: K 40660; 1 female, station 341 (box corer no. 1), SMF 30271.

Holotype: ovigerous female, ZMH: K 40659
Date: 29 July 2000
Leg.: Brandt and Wägele
Locus typicus: Angola Basin, station 350 (epibenthic sledge, supranet): 16°14.3’S 05°26.8’E (depth: 5389 m) to 16°14.9’S 05°26.7’E (depth: 5389 m)

Diagnosis: uropods’ peduncle 1.4 times longer than pleonite 6, but shorter than uropods’ endopod basal article; uropods’ exopod little shorter than basal article of endopod; uropods’ endopod terminal spine fused to distal article.

Etymology: the new species is named after the expedition “DIVA” (DIVERSity of the Atlantic).

Description is based on holotype, ovigerous female, 5.2 mm long. Carapace little shorter than free thoracic segments, with hair like setae at front, pseudorostrum directed dorsally, very short; ocular lobe reduced; eyes missing; antennal notch narrow and small, upper half of anterolateral carapace margin with three upward directed teeth; anterolateral corner rounded, with four teeth; anteroventral margin of carapace serrate; five thoracic segments visible; pleon longer than carapace and free thoracic segments combined; pleonite 6 0.7 times as long as peduncle in length, tips of anal valves visible in dorsal view.

Description of appendages based on ovigerous female paratype. Antenna 1 geniculate between peduncle articles 2 and 3, third article with five plumose setae at outer margin and one simple distal one; accessory flagellum half as long as basal article of main flagellum; main flagellum three segmented, with simple setae; basal article with four, second article with one, third article with three long and one hair like setae, and additional two aesthetascs; maxilliped 2 carpus second longest article after basis, with five plumose setae at inner margin and one long, strong plumose seta at outer distal margin, propodus with nine simple setae at inner margin and one at proximal margin, dactylus short with strong terminal seta and one subterminal simple seta; maxilliped 3 basis damaged, broadened distally, with four plumose setae, ischi um present, merus with one long plumose seta at distal outer margin, carpus second longest article after basis, with six setae at inner margin, propodus with one seta at distal part, dactylus with one stout terminal and four subterminal setae, exopod present; pereiopod 1 basis shorter than rest of appendage, margin with fine plumose setae, distal end with long plumose seta, ischi um present, merus 1.6 times as long as ischi um, carpus 1.8 times longer than merus, subequal in length to propodus, which is second longest article after basis; dactylus 0.6 times as long as propodus, with three terminal and three subterminal setae; exopod present; pereiopod 2 basis shorter than rest of appendage, ischi um present, merus wider than ischi um, with one spine-seta at distal margin, carpus slender, with one spine-seta at distal margin, propodus short, dactylus tapering; exopod present; pereiopod 3 and pereiopod 4 broken in paratype female; pereiopod 5 basis longer than rest of appendage, ischi um subequal in length to merus and propodus, which are of same length, carpus second longest article, dactylus short (1/4 times as long as ischi um) with long terminal seta.

Uropods’ peduncle 1.4 times longer than pleonite 6, but shorter than uropods’ endopod basal article. Exopod little shorter than basal article of endopod; two segmented endopod, basal article with six spine-setae at inner margin, basal article 3.9 times longer than distal. Distal article three spine-setae at inner margin, terminal spine fused to distal article, subterminal seta plumose.

Tooth formula according to Barnard and Given (1960) 1 up, 5 down.
Fig. 2. *Eudorella divae* sp. n. ovigerous female. H: habitus (scale: 1 mm), female and male anterolateral margin of carapace (scale: 0.1 mm), A1: antenna 1 (scale as in P2), Mxp2: maxilliped 2 (scale: 0.1 mm), Mxp3: maxilliped 3 (scale as in P2), P1: pereiopod 1 (scale: 0.1 mm), P2: pereiopod 2 (scale: 0.1 mm), P5: pereiopod 5 (scale: 0.1 mm), U: pleonite 6 and uropods (scale as in P2).
Remarks

The new species is the first record of the genus Eudorella in the southeastern Atlantic.

Among all known Eudorella species with the uropods’ exopod equal in length to endopod’s basal article, there are only two having the peduncle shorter than the basal article of the endopod like in the new species: E. difficilis Blake, 1929 and E. bacescui Petrescu, 1991. The new species differs from E. bacescui in having the uropods’ peduncle longer than pleonite 6.

Records for depths of more than 1000 m are: E. abyssi Sars, 1887, E. aequirramis Hansen, 1920, E. hispida Sars, 1869, E. intermedia Hansen, 1920, E. parvula Hansen, 1920, and E. truncatula Bate, 1856, all of them described for the north Atlantic and all with the uropods’ exopod longer than the basal article of the endopod.

Leucon (Crymoleucon) nudirhinus sp. n.

Fig. 3, Fig. 9(3)

Material: 1 nonovigerous female (holotype), 1 nonovigerous female, slightly damaged, 1 female, used for dissection, station 338 (epibenthic sledge, supranet); 3 females, 1 subadult male, station 340 (epibenthic sledge, epinet); 1 subadult male with developing pleopods, 1 subadult male, station 344 (epibenthic sledge, epinet); 2 ovigerous females, 2 nonovigerous females (one of them used for SEM), station 350 (epibenthic sledge, epinet); 2 nonovigerous females, station 350 (epibenthic sledge, supranet); 1 juvenile, station 341 (box corer no. 8), ZMH: K 40662; 2 subadult males, 1 ovigerous female, 2 nonovigerous females, station 348 (epibenthic sledge, epinet), SMF 30272.

Holotype: nonovigerous female, ZMH: K 40661

Date: 22 July 2000

Leg.: Brandt and Wägele

Locus typicus: Angola Basin, station 338 (epibenthic sledge, supranet): 18°19.4’S 04°39.7’E (depth: 5397 m) to 18°20.8’S 04°38.6’E (depth: 5398 m)

Diagnosis: Accessory flagellum of first antenna longer than basal article of main flagellum, long pseudorostrum without teeth or hair-like setae, dorsomedian three teeth on ocular lobe, three to six teeth behind ocular lobe, proportion of basis to carpus of second pereiopod is 2:1, ischi um small but distinct.

Etymology: The new species is named after its long pseudorostrum without any teeth or setae.

Description: is based on holotype, nonovigerous female, 4.2 mm long. Carapace smooth, dorsomedian three teeth on anterior dorsomedian part, three to six teeth on posterior dorsomedian part, two teeth on anterolateral part of carapace, dorsomedian denticulation reaching middle of carapace; pseudorostrum directed forward, without teeth or hair-like setae, long, half as long (0.5 times) as carapace measured from ocular lobe to posterior margin of carapace; siphonal tube not longer than pseudorostrum; ocular lobe reduced; no eyes; two teeth above indistinct antennal notch; anteroventral margin of carapace slightly serrate; integument with fine scaly structure; five thoracic segments visible; pleon little longer than carapace and free thoracic segments combined; uropods’ shorter than uropods’ peduncles.

Remarks

The new Leucon-species belongs to the subgenus Crymoleucon (Watling 1991) because of the relatively long accessory flagellum of the first antenna. It is characterised by the long pseudorostrum similar to L. macrorhinus Fage, 1951 from the Mediterranean, L. serrudirostris Ledoyer, 1988 from the Mozambique Channel, and L. savulescui Petrescu, 1992 from the Peru-Chile Trench. The first two species mentioned have the pseudorostrum directed slightly upwards, and teeth or serrulation on the dorsal part of the pseudorostrum while L. savulescui and the new species do not. On the other hand, the new species has up to nine teeth.
Fig. 3. *Leucon (Crymoleucon) nudirhinus* sp. n., nonovigerous female. H: habitus (scale: 1 mm), A1: antenna 1, Mxp3: maxilliped 3, P2: pereiopod 2 (scale: 0.1 mm), P3: pereiopod 3, P4: pereiopod 4, P5: pereiopod 5, U: pleonite 6 and uropods. Scale a: 0.1 mm (A1, Mxp3, P3, P4, P5, U).
on the anterior dorsomedian part of the carapace and the already known species do not. \textit{L. savulescui} has a double row of teeth at the posterior middorsal part of the carapace, which is not the case in the new species. As in the new species the ischium of pereiopod 2 is distinct (this is not the case in the other two species mentioned first) the length proportions of basis to carpus are different: it is 2.1 in the new species, 1.8 in \textit{L. macrorhinus} and 1.9 in \textit{L. serrudoirostris}.

**Leucon (Epileucon) longirhynchus** sp. n.

**Fig. 4, Fig. 9(4)**  
**Material:** 1 nonovigerous female, station 338 (holotype, epibenthic sledge, supranet); 1 male, 1 young female, 1 subadult female, dissected, station 340 (epibenthic sledge, epinet); 1 male, dissected, 1 subadult female, 1 nonovigerous female used for SEM, station 350 (epibenthic sledge, epinet); 1 juvenile, station 350 (epibenthic sledge, supranet); ZMH: K 40664; 1 ovigerous female, broken, station 348 (epibenthic sledge, epinet); SMF 30273; 1 subadult male, station 324 (box corer no. 6), SMF 30274.  
**Holotype:** nonovigerous female, ZMH: K 40663.  
**Date:** 22 July 2000  
**Leg.:** Brandt and Wägele  
**Locus typicus:** Angola Basin, station 338 (epibenthic sledge, supranet); 18°19.4’S 04°39.7’E (depth: 5397 m) to 18°20.8’S 04°38.6’E (depth: 5398 m)  
**Diagnosis:** Long, acute pseudorostrum, pereiopod 2 basis longer than rest of appendage, antennal notch shallow, not distinct; anteroventral margin of carapace little serrate.  
**Etymology:** the new species is named after its long pseudoorostrum.  
Description is based on holotype, nonovigerous female, 6.6 mm long. Carapace dorsomedian line with five teeth distributed in anterior half; pseudorostrum long, acute, only little shorter (0.8 times) than carapace measured from anterior tip of ocular lobe to posterior margin, with small tooth at ventral proximal part; siphonal tube not longer than pseudorostrum; ocular lobe reduced; eyes missing; antennal notch shallow, not distinct; anteroventral margin of carapace little serrate; five thoracic segments visible, fifth pereionite with ventral hook; pleon little longer than carapace and free thoracic segments combined; pleonite 6 produced between uropods’ peduncles, shorter than uropods’ peduncle (0.7 times), anal valves visible in dorsal view.  
Description of appendages based on paratype male. Antenna 1 peduncle not geniculate, basal and second article twice as wide as distal; accessory flagellum subequal to basal article of three segmented main flagellum; maxilliped 3 basis little longer than rest of appendage, little geniculate, distally broadened with four long plumose setae at outer distal margin, ischium short, merus with long plumose seta at outer distal margin, carpus second longest article, propodus and dactylus equal in length, dactylus with four distal setae; exopod present; pereiopod 1 basis shorter than rest of appendage, little bent, ischium little shorter than half of merus, propodus second longest article, little longer than carpus, dactylus with four strong distal and three subterminal setae; exopod present; pereiopod 2 basis longer than rest of appendage, ischium not distinct, ischiobasis and merus with one strong simple seta each at distal margin, carpus little longer than merus, with two strong simple setae distally, dactylus 1.9 times longer than propodus, with ten plumose setae and one subterminal spine like seta; exopod present; pereiopod 3 basis longer than rest of appendage, ischiurindistinct, merus, carpus, and propodus short, with two (merus and carpus) or one (propodus) long plumose seta each at distal margin; dactylus very short, with strong plumose seta terminally; exopod present; pereiopod 4 basis longer than rest of appendage, ischiurindistinct; basis, ischiurmerus, and propodus with one, carpus with three plumose setae distally, dactylus short, with one plumose seta terminally; exopod present; pereiopod 5 shorter than basis of pereiopod 3; basis longer than rest of appendage, ischiur and merus equal in length, carpus only little longer, ischiur, merus and carpus each with two long plumose setae terminally, propodus with one plumose seta distally and dactylus with one terminally.  
Uropods’ peduncle 1.5 times longer than pleonite 6, five short setae at inner margin; exopod shorter (0.7 times) than endopod, reaching 1/3 of distal article of two segmented endopod; endopod basal article with 5 strong spines at inner margin, 1.7 times longer than distal, which carries five spines at inner margin, one long, annulated spine terminally and two shorter ones subterminally.  

**Remarks**  
There are three species in the subgenus \textit{Epileucon} (Jones 1956; Watling 1991) with a long pseudorostrum and the uropods’ exopod longer than the basal article of the endopod as in the new species: \textit{L. tenuirostris} Sars, 1887, \textit{L. longirostris} Sars, 1871, and \textit{L. ensis} Bishop, 1981a. The new species differs from \textit{L. ensis} and \textit{L. tenuirostris} by having a longer basis compared to the rest of appendage of pereiopod 2. The pseudorostrum is more acute and slender and not serrate, as in \textit{L. ensis}. The dorsomedian line and anteroventral margin is not as heavily serrate as in \textit{L. tenuirostris} and \textit{L. longirostris}. The pseudorostrum in \textit{L. longirostris} is more than 1/3 of the total carapace length, that means half as long as carapace measured from the anterior tip of the ocular lobe, but in the new species the pseudorostrum is only little shorter (0.8 times) than the carapace. Unfortunately there is no information concerning the
Fig. 4. *Leucon (Epileucon) longirhynchus* sp. n. H: Habitus female (left), with ventral hook of pleonite 5 in higher magnification, and male (right), scales: 1 mm; A1: antenna 1, Mxp3: maxilliped 3, P1: pereiopod 1, P2: pereiopod 2, P3: pereiopod 3, P4: pereiopod 4, P5: pereiopod 5, U: pleonite 6 and right uropod. Scale a: 0.1 mm.
pereiopods, especially pereiopod 2, given for *L. longirostris*, but the length proportion between pseudorostrum and carapace and the dorsomedian and anterolateral serration of the carapace are reasonable characters to separate the new species from the already described ones.

**Leucon (Leucon) homorhynchus** Bishop, 1981b

*Fig. 5, Fig. 9(2)*

**Material:** 1 ovigerous female, station 338 (epibenthic sledge, supranet); 1 subadult female, 1 male, 1 female used for SEM, station 340 (epibenthic sledge, epinet); 1 female dissected, 1 female figured, 3 damaged juveniles, station 348 (epibenthic sledge, supranet); 2 ovigerous females, 1 subadult male, 2 juveniles, station 350 (epibenthic sledge, epinet); 2 ovigerous females, station 350 (epibenthic sledge, supranet), ZMH: K 40665; 1 subadult female, 1 subadult male, station 344 (epibenthic sledge, supranet); SMF 30275; 1 female dissected, 1 female with developing oostegites, station 348 (epibenthic sledge, epinet), SMF 30276.

**Remarks**

Bishop (1981b) states the following character combination to distinguish this species from the other *Leucon (Leucon)* species: scattered teeth just above and below carapace lateral suture, pseudorostrum roughly horizontal, first antenna accessory flagellum minute, second and third peduncular segments each with distal plumose setae, pereiopod 2 unusually long. Bishop stressed the high degree of variation in the number of carapace teeth and the variation of the uropod shape in males from different stations.

As the species from the Angola Basin has the character combination given by Bishop (1981b), it is very likely to be *L. (L.) homorhynchus*. The distribution of this species is reported for both sides of the Atlantic in depths between 1700 to 4700 m. The new record extends the depth distribution to 5398 m.

**Leucon (Macrauloleucon) dentirostris** sp. n.

*Fig. 6, Fig. 9(5)*

**Material:** 1 female (holotype), 1 subadult male, station 338 (epibenthic sledge, supranet); 1 female, dissected, station 344 (epibenthic sledge, epinet); 2 females, dissected, station 348 (epibenthic sledge, epinet); 1 nonovigerous female used for SEM, station 350 (epibenthic sledge, epinet), ZMH: K 40667.

1 ovigerous female, 1 nonovigerous female, station 350 (epibenthic sledge, epinet), SMF 30277.

**Holotype:** female, ZMH: K 40666

**Date:** 22 July 2000

**Leg.:** Brandt and Wägele

**Locus typicus:** Angola Basin, station 338 (epibenthic sledge, supranet): 18°19’4°S 04°39.7’E (depth: 5397 m) to 18°20.8’S 04°38.6’E (depth: 5398 m)

**Diagnosis:** Pseudorostrum half (0.49 times) as long as carapace, with seven teeth on dorsal, six teeth on ventral margin; maxilliped 3 merus with at least two teeth.

**Etymology:** the new species is named after the dorsal and ventral teeth on the pseudorostrum.

Description based on holotype, female, 3.7 mm long. Carapace dorsomedian line with teeth on the anterior half; pseudorostrum half (0.49) as long as carapace (measured from anterior margin of ocular lobe to posterior margin), with seven teeth on dorsal, six teeth on ventral margin; siphonal tube long (broken in holotype, but present in paratypes); ocular lobe reduced; eyes missing; antennal notch narrow, with one short and two long teeth dorsally and three teeth ventrally, anterolateral corner not much produced; anteroventral margin of carapace with strong teeth; five thoracic segments visible; pleon longer than carapace and free thoracic segments combined; pleonite 6 shorter than uropods’ peduncle.

Description of appendages based on paratype, female. Antenna 1 geniculate between second and third article of peduncle, second article with two strong and three hair like setae, third article with four long plumose setae at distal half, accessory flagellum little shorter than basal article of main flagellum, the latter four segmented, distal two articles short; maxilliped 1 slender, basis shorter than rest of appendage, distally broadened with three long plumose setae, ischiopresent, merus with two teeth at outer margin and one long plumose seta distally, carpus and propodus subequal in length, dactylus as long as propodus with one strong terminal seta and three setae subterminally; exopod present; pereiopod 1 slender, basis shorter than rest of appendage, ischiopresent and merus with one distal tooth each, carpus and propodus subequal in length; exopod present; pereiopod 2 basis shorter than rest of appendage, ischiunot distinct, merus short, carpus second longest article, propodus shorter than merus, dactylus 1.8 times longer than propodus; exopod present; pereiopod 3 basis longer than rest of appendage, ischiopresent, merus 0.8 times as long as carpus, carpus broad with two strong, terminally annulated plumose setae, propodus 0.6 times as long as carpus, with two strong plumose setae distally, dactylus short, terminal setae 3.7 times longer than article; exopod present; pereiopods 4 and 5 similar in shape to pereiopod 3, but basis shorter than rest of appendage and exopod missing.

Uropods’ peduncle shorter than basal article of endopod; exopod longer than two segmented endopod;
Fig. 5. *Leucon (Leucon) homorhynchus*, nonovigerous female. H: habitus (scale: 1 mm), A1: antenna 1, Mxp3: maxilliped 3, P1: pereiopod 1, P2: pereiopod 2, P3: pereiopod 3, P4: pereiopod 4, P5: pereiopod 5, U: pleonite 6 and uropods; Scale a: 0.1 mm (A1, P4, P5), scale b: 0.1 mm (Mxp2, Mxp3, P1, P2, P3, U).
Fig. 6. *Leucon* (*Macrauloleucon*) *dentirostris* sp. n., nonovigerous female. H: habitus (scale: 1 mm), A1: antenna 1 (scale: 0.1 mm), Mxp2: maxilliped 2 (same scale as Mxp3), Mxp3: maxilliped 3 (scale: 0.1 mm), P1: pereiopod 1 (scale: 0.1 mm), P2: pereiopod 2 (same scale as in Mxp3), P3: pereiopod 3 (same scale as in P4), P4: pereiopod 4 (scale: 0.1 mm), P5: pereiopod 5 (same scale as in P4), U: pleonite 6 and right uropod, left: inner distal part of endopod’s basal article in higher magnification (scales: 0.1 mm).
endopod basal article with four strong setae at inner margin, three teeth between middle setae, two teeth between distal setae; distal article with five teeth at inner margin, one long terminal and one shorter subterminal seta.

Remarks

The new species is assigned to the subgenus *Macrauloleucon* (Watling 1991) because the siphonal tube is very long and the accessory flagellum of the first antenna extends beyond the middle of the main flagellum’s first article. A comparison of the species is given in Table 2. The new species differs from the known species in having teeth dorsally and ventrally to the pseudorostrum. Number and arrangement of the teeth on merus and carpus of maxilliped 3 and the inner margin of uropods’ endopod basal article are different from the known species (Table 2).

*Leucon (Macrauloleucon) duodentatus* sp. n.

Fig. 7, Fig. 9(6)

*Material:* 1 nonovigerous female, station 348 (dissected, epibenthic sledge, epinet), 1 juvenile male, station 350 (holotype, epibenthic sledge, supranet), ZMH: K 40669.

*Holotype:* juvenile male, ZMH: K 40668

*Date:* 29 July 2000

*Loc:* Brandt and Wägele

*Locus typicus:* Angola Basin, station 350 (epibenthic sledge, supranet); 16°14.3’S 05°26.8’E (depth: 5389 m) to 16°14.9’S 05°26.7’E (depth: 5389 m)

*Diagnosis:* Pseudorostrum relatively long, length proportion pseudorostrum to carapace more than 0.5, one pair of teeth dorsally, long hair-like setae at distal tip of pseudorostrum; no teeth at anterolateral part of carapace; no teeth at maxilliped 3 merus and ischium.

*Etymology:* the new species is named after the pair of dorsal teeth on the pseudorostrum.

Description is based on holotype, young male, 2.9 mm long. Carapace dorsomedian line serrate in anterior half; pseudorostrum relatively long, one pair of teeth dorsally, long hair-like setae at distal tip; siphonal tube long; ocular lobe reduced; eyes missing; antennal notch very small, several long teeth instead of anterolateral tooth; anterolateral margin of carapace with strong teeth; five thoracic segments visible; pleon longer than carapace and free thoracic segments combined; pleonite 6 short, 0.8 times as long as uropods’ peduncle, tip of anal valves visible in dorsal view.

Description of appendages based on paratype, nonovigerous female. Antenna 1 peduncle geniculate between articles 2 and 3, third article longest, with four long plumose setae, accessory flagellum little shorter than basal article of main flagellum, the latter three segmented, two long aesthetasc; maxilliped 3 basis little shorter than rest of appendage, distally broadened with three long, plumose setae, merus and propodus equal in length, carpus second longest article, with one tooth at outer distal margin, dactylus little longer than propodus, with one strong distal seta and three setae subdistally; exopod present; pereiopod 1 slender, basis longest article, shorter than rest of appendage, ischium and merus with one tooth each distally, propodus second longest article, little longer than carpus, dactylus with four strong simple setae; exopod present; pereiopod 2 basis longest article, ischium not distinct, merus 0.4 times as long as carpus, carpus second longest article, with two strong spines distally, propodus shorter than merus, dactylus half as long as carpus, tapering, with two distal setae more than 3 times longer than dactylus, and four subterminal setae; exopod present; pereiopod 3 short, basis longer than rest of appendage, ischium distinct, little shorter than merus and carpus, which are equal in length, propodus and dactylus equal in length, short, terminal spine four times longer than dactylus; exopod present; pereiopod 4 broken in paratype; pereiopod 5 basis shorter than rest of appendage, ischium little shorter than merus, carpus little longer than merus, with two long plumose setae distally, propodus little shorter than merus, with one distal plumose seta, dactylus about half as long as propodus, with terminal seta simple and strong, one shorter subterminal seta.

Uropods’ peduncle 1.2 times longer than pleonite 6, and 0.8 times as long as endopods’ basal article; exopod little shorter than endopod, endopod two segmented, basal article 2.4 times longer than distal, which has four teeth and three setae at inner margin, one slender, plumose setae distally.

Remarks

A comparison of the species from the subgenus *Macrauloleucon* (Watling 1991) is given in Table 2. The new species differs from all other species out of this subgenus in the length proportion pseudorostrum to carapace being more than 0.5, the antennal notch small but distinct, a pair of teeth dorsally on pseudorostrum, no teeth at maxilliped 3 merus and ischium, no teeth at anterolateral part of carapace.

*Leucon (Macrauloleucon) brigittehilbigae* sp. n.

Figs. 8 and 9(7)

*Material:* 2 adult males (1 used for SEM), 1 female with developing oostegites, 1 subadult female, station 348 (epibenthic sledge, epinet); 1 nonovigerous female (holotype), 1 subadult male used for dissection, station 348 (epibenthic sledge, supranet); 1 nonovigerous female used for SEM, station 350 (epibenthic sledge, supranet),
Table 2. Comparing selected characters of the *Leucon* (*Macrauloleucon*) species

<table>
<thead>
<tr>
<th><em>Leucon</em> (<em>Macrauloleucon</em>)</th>
<th><em>L. siphonatus</em></th>
<th><em>L. spinulosus</em></th>
<th><em>L. stenorhynchus</em></th>
<th><em>L. parasiphonatus</em></th>
<th><em>L. weddelli</em></th>
<th><em>L. dentirostris</em> sp.n.</th>
<th><em>L. duodentatus</em> sp.n.</th>
<th><em>L. drigittehilbigae</em> sp.n.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus typicus</td>
<td>Ireland</td>
<td>Arctic</td>
<td>Japan</td>
<td>Antarctica</td>
<td>Antarctica</td>
<td>Angola Basin</td>
<td>Angola Basin</td>
<td>Angola Basin</td>
</tr>
<tr>
<td>Antennal notch</td>
<td>Shallow</td>
<td>Small</td>
<td>Small</td>
<td>Tiny to missing</td>
<td>Tiny</td>
<td>Small</td>
<td>Small, distinct</td>
<td>Small</td>
</tr>
<tr>
<td>P2 ischium</td>
<td>N.d.</td>
<td>Small</td>
<td>Small</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
</tr>
<tr>
<td>Number of teeth on:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mxp 3 ischium</td>
<td>N.d.</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0-1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mxp 3 merus</td>
<td>N.d.</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2-3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Mxp 3 carpus</td>
<td>N.d.</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0-1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P1 basis</td>
<td>N.d.</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dorsal teeth on pseudorostrum</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Missing</td>
<td>Missing</td>
<td>Present</td>
<td>1 pair</td>
<td>Present</td>
</tr>
<tr>
<td>Ventral teeth on pseudorostrum</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
<td>Missing</td>
<td>Present</td>
<td>Missing</td>
<td>Present</td>
</tr>
<tr>
<td>Teeth at frontal lobe?</td>
<td>Missing</td>
<td>Present</td>
<td>3</td>
<td>Missing</td>
<td>Present</td>
<td>Missing</td>
<td>Missing</td>
<td>4</td>
</tr>
<tr>
<td>Serration of dorsomedian line of carapace</td>
<td>1–2 teeth</td>
<td>Anterior third</td>
<td>Anterior quarter</td>
<td>Missing</td>
<td>2 teeth</td>
<td>Anterior third</td>
<td>Anterior third</td>
<td>Missing</td>
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<tr>
<td>Teeth at uropod endopod</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Basal article</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>8</td>
<td>3 + 2 distally</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Distal article</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>3-4</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Length proportion:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pseudorostrum to carapace</td>
<td>0.48</td>
<td>0.42</td>
<td>0.48</td>
<td>0.44</td>
<td>0.41</td>
<td><strong>0.49</strong></td>
<td><strong>0.51</strong></td>
<td>0.41</td>
</tr>
<tr>
<td>Uroendo basal:distal article</td>
<td>2.5</td>
<td>3.5</td>
<td>2.9</td>
<td>2.4</td>
<td>2.6</td>
<td>2.4</td>
<td>2.4</td>
<td>2.2</td>
</tr>
</tbody>
</table>

N.d. = no details known. Important characters in bold.
**Fig. 7.** *Leucon (Macauleleucon) duodentatus* sp. n. H: habitus of young male (scale: 1 mm), appendages of nonovigerous female, A1: antenna 1 (scale: 0.1 mm), Mxp3: maxilliped 3 (same scale as in A1), P1: pereiopod 1 (scale: 0.1 mm), P2: pereiopod 2 (same scale as in P1), P3: pereiopod 3 (same scale as in P1), P5: pereiopod 5 (same scale as in A1), U: pleonite 6 and right uropod (same scale as in P1).
Fig. 8. *Leucon (Macrauloleucon) brigittehilbigae* sp. n. **H**: habitus nonovigerous female (scale: 1 mm), **A1**: antenna 1 (scale: 0.1 mm), **Mxp2**: maxilliped 2 (same scale as in **A1**), **Mxp3**: maxilliped 3 (scale: 0.1 mm), **P1**: pereiopod 1 (scale: 0.1 mm), **P2**: pereiopod 2 (same scale as in **Mxp3**), **P3**: pereiopod 3 (same scale as in **P1**), **P4**: pereiopod 4 (scale as in **P5**), **P5**: pereiopod 5 (scale: 0.1 mm), **U**: pleonite 6 and uropods (scale: 0.1 mm).
Fig. 9. Anterolateral margin of the carapace of *Bytholeucon angolensis* sp. n. (1), *Leucon* (*Leucon*) homorhynchus (2), *Leucon* (*Crymoleucon*) nudirhinus sp. n. (3), *Leucon* (*Epileucon*) longirhynchus sp. n. (4), *Leucon* (*Macrauloleucon*) dentirostris sp. n. (5), *Leucon* (*Macrauloleucon*) duodentatus sp. n. (6), *Leucon* (*Macrauloleucon*) *brigittehilbigae* sp. n. (7); scale: 0.5 mm.
Diagnosis: Carapace with teeth at anterolateral part of carapace, two teeth on ocular lobe; pseudorostrum moderate long; maxilliped 3 with one tooth each at ischium, merus and carpus; distal article of uropods' endopod 0.4 times as long as basal article; no teeth at uropods' endopod inner margin.

Etymology: The new species is dedicated to my dear friend Dr. Brigitte Hilbig, a highly reputed specialist in polychaetes.

Description is based on holotype, female, 5.6 mm long. Carapace with teeth at anterolateral part, two teeth on ocular lobe; pseudorostrum moderate long, 0.4 times as long as carapace measured from anterior tip of ocular lobe to posterior margin, 4 teeth dorsally and 4 teeth ventrally on pseudorostrum, long hair-like setae at terminal tip of pseudorostrum; siphonal tube long; ocular lobe reduced; eyes missing; antennal notch indistinct with long teeth; anterolateral corner rounded, with teeth; anteroventral margin of carapace heavily serrate; five thoracic segments visible; pleon very little longer than carapace and free thoracic segments combined; last pleonite 0.8 times as long as uropods' peduncle, tip of anal valves visible in dorsal view.

Description of appendages based on paratype, subadult male. Antenna 1 peduncle geniculate between articles 2 and 3, third article with four long plumose setae, accessory flagellum as long as basal article of main flagellum, main flagellum three segmented, one aethetic terminally; antenna 2 in adult male reaching beyond pleonite 6; maxilliped 2 merus longer than propodus, twice as long as dactylus, carpus second longest article after basis, terminal seta strong, longer than dactylus; maxilliped 3 basis shorter than rest of appendage, with two teeth at distal inner margin, distally broadened, with two long plumose setae at outer margin; ischium with one tooth at inner margin, merus with one tooth at inner margin and one long plumose seta at outer margin, carpus with one tooth at outer margin, propodus and dactylus equal in length, dactylus with one terminal and three subterminal setae; exopod present; pereiopod 1 slender, basis much shorter than rest of appendage, carpus second longest article after basis, little longer than propodus, dactylus little less than half as long as propodus, with five strong setae at distal end, and five hair-like setae subdistally; exopod present; pereiopod 2 basis shorter than rest of appendage, ischium indistinct, merus broad, carpus second longest article after basis, propodus half as long as merus, dactylus tapering, terminal and subterminal setae twice as long as dactylus; exopod present; pereiopod 3 basis longer than rest of appendage, ischium distinct, little longer than propodus, merus subequal in length to carpus, dactylus half as long as propodus; exopod present; pereiopod 4 basis little longer than rest of appendage, ischium distinct, carpus second longest article, propodus little longer, dactylus little shorter than ischium; exopod present; pereiopod 5 basis shorter than rest of appendage, ischium distinct, merus and carpus equal in length, propodus little longer, dactylus little shorter than ischium.

Uropods' peduncle 1.2 times longer than pleonite 6, subequal in length to endopod's basal article; exopod little longer than two segmented endopod; endopod basal article with three strong setae at inner margin, 2.2 times longer than distal article, which carries a long and one short terminal seta and a pair of setae at distal end.

Remarks
For comparison with the known and new described species of the subgenus Macrauloleucon see Table 2. The new species differs from the other species of this subgenus in having a relatively longer distal article of uropods' endopod, no teeth at uropod endopod inner margin, pseudorostrum relatively short and maxilliped 3 with one tooth each at ischium, merus and carpus. The new species differs especially from L. dentirostris sp. N. in having no teeth at the uropod endopod's distal article and the teeth of the maxilliped 3 are at opposite sides of the merus.

Acknowledgements
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References


