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Lophogastrida and Mysida (Crustacea) of the "DIVA-1" deep-sea expedition to the Angola Basin (SE-Atlantic)

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Abstract. Three species of Lophogastrida and eight Mysida are documented for samples from 5161–5497 m bottom depth in the Angola Basin. Previously known latitudinal ranges are extended southward for five species, and bathymetric ranges extended beyond 5000 m for six species. Upon revision of the subfamily Petalophthalminae (Mysidae), four species previously attributed to the genus *Petalophthalmus* are integrated into *Ipirophthalmus* gen. nov. as *I. liui* gen. et comb. nov., *I. caribbeanus* gen. et comb. nov., *I. oculatus* gen. et comb. nov., and *I. macrops* gen. et comb. nov., mainly based on the structure of eyes and presence of setae on the telson. *Petalophthalmus cristatus* sp. nov. is described based on its reduced cornea and the structure of eyestalks, rostrum, mandibles, and telson. The structure of mouthparts, foregut and maxillipeds suggests an omnivorous mode of life. The diagnosis of the tribe Calyptommini (Mysidae: Erythropinae) is widened to cover the 3-segmented, uniramous fourth male pleopod and the non-incised eyeplate with horn-like rudiments of eyestalks in *Abyssomysis cornuta* gen. et sp. nov. The structure of mandibles, foregut, and second maxilliped suggest detritus feeding in this species. Keys to the Calyptommini and Petalophthalminae are given.

Keywords. Taxonomic revision, first description, biogeography, abyssal zone, equatorial East Atlantic.

Introduction

Previous knowledge of the Lophogastrida and Mysida in deep waters of the Angola Basin is based on meso- to bathypelagic samples taken by the "Valdivia" Expedition in Sep. 1898 at six stations, with vertical hauls towed from 600–4000 m depth up to the surface (station and sampling data available in Deutsche Tiefsee-Expedition 1899). Five species of Lophogastrida and seven species of Mysida were recorded (Illig 1930; Wittmann in press). Using updated synonymy, the "Valdivia" lophogastrids from the Angola Basin are *Fagegnathophausia gracilis* (Willemoës-Suhm, 1875), *Neognathophausia gigas* (Willemoës-Suhm, 1873), *Eucopia grimaldii* H. Nouvel, 1942, *E. sculpticauda* Faxon, 1893 and *E. unguiculata* (Willemoës-Suhm, 1875). The corresponding Mysida are *Arachnomysis leuckartii* Chun, 1887, *A. megalops* Zimmer, 1914, *Boreomysis microps* G.O. Sars, 1883, *Caesaromysis hispida* Ortmann, 1893, *Echinomysis chuni* Illig, 1905, *Euchaetomera glyphidophthalmica* Illig, 1906 and

Euchaetomeropsis merolepis (Illig, 1908). The "Valdivia" material shares three lophogastrid species but no mysids with the below-reported yield of the "DIVA-1" Expedition. The great difference between the yields of these expeditions probably reflects both the different bathymetric distribution of the species and the use of different sampling gear.

The gears used by the "Valdivia" did not reach down to the oceanic abyssal plain of the Angola Basin. One century later this was achieved by the "DIVA-1" Expedition with RV "*Meteor*" during cruise M48 (Kröncke & Türkay 2003). The first leg in July 2000 focused on compositional changes of the benthic organism assemblages along a transect of about 700 km from 22°21′ S, 3°19′ E to 16°25′ S, 5°27′ E, depth range 5148–5500 m (Balzer *et al.* 2006). This transect is crossed by the Angola-Benguela Front of oceanic water masses (Kröncke & Türkay 2003). Besides being designed to collect great numbers of invertebrates, special emphasis was placed on determining the diversity of peracarid crustaceans, with a preliminary list of taxa, including the Lophogastrida and Mysida, provided by Brandt *et al.* (2005). Ten out of 35 stations yielded lophogastrids and mysids (Table 1); in comparison, the other peracarid orders were represented by many more specimens and species. Nonetheless, this material revealed a wealth of biogeographical and taxonomical novelties, including revisions of the subfamily Petalophthalminae Czerniavsky, 1882 (fam. Petalophthalmidae Czerniavsky, 1882) and of the tribe Calyptommini W.M. Tattersall, 1909 (fam. Mysidae Haworth, 1825), with first descriptions of two genera and two species; and the ranges of seven other species were extended.

Material and methods

Repositories

SMF   =   Senckenberg Museum, Frankfurt am Main, Germany
ZMH   =   Zoological Museum of Hamburg, Germany

Abbreviations

BL   =   body length
=   station numbers in Table 1

Material

Not counting exuviae and fragments, 41 specimens of mysids and 14 lophogastrids were studied from benthic and pelagic samples taken in July 2000 by the "DIVA-1" deep-sea expedition with RV "*Meteor*" at ten stations in the Angola Basin (Table 1). Here not included are undeterminable fragments of four mysid specimens from station nos 320, 339 and 348. The materials are preserved in ethanol, unless explicitly stated as mounted in Swan medium on slides, and kept at SMF and ZMH. The expedition log, station data and most of the here treated sampling data are provided in Balzer *et al.* (2006). The non-closing Agassiz Trawl with mesh size 10 mm is further detailed in Türkay *et al.* (2006). The self-closing epibenthic sledge was equipped with epinet and supranet, each with mesh-size 0.3 mm, as detailed by Brandt *et al.* (2006). These nets were only partly specified on vial labels of the material examined.

Laboratory methods

Preparation, measurements and examination of materials as in Wittmann (2008). Body length measured according to Tattersall & Tattersall (1951) from the anterior margin of the carapace to the posterior margin of the telson, excluding the spines. Antennae, eyes, carapace and pleonites measured along dorsal midline unless stated otherwise. As novelties the eyeplate was detached and expanded on slides in *Abyssomysis cornuta* gen. et sp. nov., eyes together with ocular symphysis on one slide in *Petalophthalmus cristatus* sp. nov. The statolith mineral was determined according to Wittmann *et al.* (1993).

Table 1. Sampling data[1] of the "METEOR" cruise 48 leg 1 to the Angola Basin, SE-Atlantic: Lophogastrida and Mysida.

Station (aria)	Start coordinates	End coordinates	Depth (m)	UTC	Gear	Species recorded[2]
#318 (1)	22°19.978′ S 3°18.342′ E	22°20.249′ S 3°18.439′ E	5179–5180	9 Jul. 2000 13:25–14:44	epibenthic sledge	*Paramblyops rostratus* *Parapseudomma calloplura*
#320 (1)	22°19.914′ S 3°17.956′ E	22°20.049′ S 3°17.957′ E	5161–5162	10 Jul. 2000 11:00–11:28	epibenthic sledge	*Amblyops tenuicauda* *Parapseudomma calloplura*
#321 (1)	22°20.640′ S 3°23.567′ E	22°26.150′ S 3°27.046′ E	5161–5162	10 Jul. 2000 22:02–01:00	Agassiz Trawl	*Eucopia grimaldii* *Fagegnathophausia gracilis* *Neognathophausia gigas*
#324 (2)	19°58.517′ S 2°59.366′ E	–	5493	13 Jul. 2000 02:28	box corer (KG2)	*Siriella thompsonii*
#327 (2)	20°0.733′ S 3°2.230′ E	20°6.409′ S 3°7.197′ E	5487–5497	15 Jul. 2000 16:35–20:00	Agassiz Trawl	*Petalophthalmus cristatus*
#329	20°3.520′ S 3°4.710′ E	20°3.833′ S 3°4.980′ E	surface	15 Jul. 2000 18:21–18:33	plankton net, Bongo (Bo1)	*Siriella thompsonii*
#344 (5)	17°4.935′ S 4°40.805′ E	17°7.454′ S 4°42.276′ E	5460–5460	25 Jul. 2000 11:36–15:25	epibenthic sledge	*Abyssomysis cornuta* *Boreomysis bispinosa* *Parapseudomma calloplura* *Pseudomma nanum*
#348 (6)	16°16.989′ S 5°27.279′ E	16°19.280′ S 5°27.205′ E	5430–5433	28 Jul. 2000 16:54–20:38	epibenthic sledge	*Abyssomysis cornuta* *Amblyops tenuicauda* *Boreomysis bispinosa* *Paramblyops rostratus* *Parapseudomma calloplura*
#350 (6)	16°13.329′ S 5°26.837′ E	16°14.820′ S 5°26.702′ E	5433–5434	29 Jul. 2000 15:42–18:39	epibenthic sledge	*Abyssomysis cornuta* *Paramblyops rostratus* *Parapseudomma calloplura* *Pseudomma nanum*
#351 (6)	16°25.238′ S 5°27.170′ E	16°31.854′ S 5°27.354′ E	5429–5430	30.VII.00 01:57–04:57	Agassiz Trawl	*Eucopia grimaldii*

[1] sampling data depicted from vial labels in combination with station list and area code in Balzer *et al.* (2006).
[2] for authorship of taxa see main text.

Terminology and taxonomy

Terminology and taxonomy as in Wittmann *et al.* (2014). Drawings of sex-specific features are labelled by symbols for females or males, respectively, in Figs 5–8. The absence of such labels implies absent or unapparent sex-specific differences.

Results

<div align="center">

Order Lophogastrida Boas, 1883
Family Gnathophausiidae Udrescu, 1984
Genus *Neognathophausia* Petryashov, 1992

Neognathophausia gigas (Willemoës-Suhm, 1873)

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Material examined (non-type only)

ANGOLA BASIN • 1 imm. (BL = 40 mm); 22°20.640′ S, 3°23.567′ E to 22°26.150′ S, 3°27.046′ E; bottom depth 5161–5162 m; 10 Jul. 2000; DIVA-1 exped., #321; Agassiz Trawl; ZMH 58243.

Type locality

Implicitly defined by monotypy. Willemoës-Suhm (1873, 1875) based the first description on a single male specimen caught between Bermuda and the Azores, 38°22′ N, 37°21′ W, depth 2200 fathoms (4023 m).

Distribution

According to San Vicente (2016) this meso- to bathypelagic species shows a panoceanic distribution, latitudinal range 66º N–74º S, depth range 650–4023 m. This species has been reported by Illig (1930) as the synonym *Gnathophausia drepanephora* Holt & Tattersall, 1905, from material taken by the "Valdivia" Expedition in the Angola Basin. See Discussion for a biogeographical assessment of the new record from 5161–5162 m bottom depth in the Angola Basin.

<div align="center">

Genus *Fagegnathophausia* Petryashov, 2015

Fagegnathophausia gracilis (Willemoës-Suhm, 1875)

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Material examined (non-type only)

ANGOLA BASIN • 1 imm. (BL = 57 mm); 22°20.640′ S, 3°23.567′ E to 22°26.150′ S, 3°27.046′ E; bottom depth 5161–5162 m; 10 Jul. 2000; DIVA-1 exped., #321; Agassiz Trawl; ZMH 58242.

Type locality

Implicitly defined by monotypy. Willemoës-Suhm (1875) based the first description on a single male specimen from 170 nautical miles (315 km) east of St. Paul's Rocks, 1°22′ N, 26°36′ W, depth 1500 fathoms (2743 m).

Distribution

Circumtropical, bathypelagic, depth range 500–5225 m (Fage 1941; Clarke 1962; Vereshchaka 1990, 1995; Meland & Aas 2013; San Vicente 2016; Hendrickx 2019). According to Clarke (1962) newly released juveniles may migrate upward to 500 m depth. This species has been reported by Illig (1930) as *Gnathophausia gracilis* Willemoës-Suhm, 1875, from material taken by the "Valdivia" Expedition in the Angola Basin. The new record from this basin extends the previously known latitudinal range of 34° N–18° S southward to 22° S. See Discussion for an assessment of the vertical distribution in the Angola Basin.

Family Eucopiidae G.O. Sars, 1885
Genus *Eucopia* Dana, 1855

Eucopia grimaldii H. Nouvel, 1942

Material examined (non-types only)

ANGOLA BASIN • 1 imm. (BL = 28.3 mm); 22°20.640′ S, 3°23.567′ E to 22°26.150′ S, 3°27.046′ E; bottom depth 5161–5162 m; 10 Jul. 2000; DIVA-1 exped., #321; Agassiz Trawl; ZMH 58244 • 2 ♀♀ subad. (BL = 42.6–46.2 mm), 5 imm. (BL = 18.7–24.6 mm); same collection data as for preceding; ZMH 58246 • 1 ♀ ad. (BL = 35.1 mm), 1 ♂ (BL = 25.4 mm), 1 imm. (BL = 17.8 mm); 16°25.238′ S, 5°27.170′ E to 16°31.854′ S, 5°27.354′ E; bottom depth 5429–5430 m; 30 Jul. 2000; DIVA-1 exped., #351; Agassiz Trawl; ZMH 58245 • 1 ♂ (BL = 31.7 mm, in separate vial); same collection data as for preceding; SMF 55188.

Type locality

Not specified. Nouvel (1942) did not differentiate between NE- or NW-Atlantic specimens upon first description.

Distribution

This meso- to bathypelagic species shows a panoceanic distribution, mainly occurring in tropical to temperate regions, also found in the Bering Sea, Antarctica, Mediterranean, Caribbean, Gulf of Mexico, off Madagascar, 66° N–64° S, depth range 200–4829 m (Springer & Bullis 1956; Astthorsson 1987; Petryashov 1993, 2005a, 2005b; Ariani & Wittmann 2005; Fukuoka 2009; Price *et al.* 2009; Burnham 2015; San Vicente 2010, 2016). This species will be reported by Wittmann (in press) from material taken by the "Valdivia" Expedition in the Angola Basin. See Discussion for a biogeographical assessment of the new records from 5161–5430 m bottom depth in the Angola Basin.

Order Mysida Boas, 1883
Suborder Petalophthalmida Tchindonova, 1981
Family Petalophthalmidae Czerniavsky, 1882

Subfamily **Petalophthalminae** Czerniavsky, 1882

Petalophthalmidae Czerniavsky, 1882: 56 (in key).

Petalophthalmidae – Tattersall & Tattersall 1951: 113 (*partim*). — O.S. Tattersall 1955: 58 (*partim*). — Murano 1971: 46. — Lagardère 1983: 814. — Tchindonova 1993: 152 (*partim*). — Nouvel *et al.* 1999: 78 (*partim*). — Meland & Willassen 2007: 1096 (*partim*). — Fukuoka 2009: 409. — Price & Heard 2009: 939. — Ortiz *et al.* 2012: 985. — Petryashov 2014: 185 (*partim*). — San Vicente *et al.* 2014: 78. — Sawamoto 2014 (*partim*). — Many additional references not listed.
Petalophthalminae – Wittmann *et al.* 2014: 331. — Meland *et al.* 2015: table 4. — San Vicente & Corbari 2015: 243. — San Vicente 2017: 154. — Mees & Meland 2019 (in database).
Petalophthalmidae Holt & Tattersall, 1906: 21–22 (this invalid taxon erroneously described as a new one although already having been established by Czerniavsky (1882), who used the same name based on the same implicitly defined type genus).

Diagnosis (revised from Wittmann *et al.* 2014)

Petalophthalmidae with large antennula showing distinct sexual dimorphism; eyes normal or modified, in any case not miniaturized, visual elements present or absent; mandibular palp long, powerful, and prehensile; thoracopods 1–2 without exopod, thoracopods 3–8 with well-developed exopod; powerful

subchelae are formed by opposition of dactylus with large claw to the propodus in thoracic endopod 1, and to the carpopropodus in endopod 2; merus of endopod 1 with large endite; ischium of endopod 2 with again larger, subquadrangular endite; endopod 5 with more than three segments; endopods 3–4 and 6–8 normal or reduced to different degrees; well-developed oostegites on thoracopods 2–8; female pleopods uniramous or biramous, male pleopods biramous; exopod of uropods with subterminal suture.

Type genus

Petalophthalmus Willemoës-Suhm, 1874.

Genera included

Petalophthalmus Willemoës-Suhm, 1874 [4 species]
Ipirophthalmus gen. nov. [4 species]
Pseudopetalophthalmus Bravo & Murano, 1997 [2 species]
Parapetalophthalmus Murano & Bravo, 1998 [1 species]

Distribution

The pooled taxa of Petalophthalminae show a panoceanic distribution between 56° N and 46° S, total depth range 0–5500 m, mainly 100–500 m.

Genus ***Petalophthalmus*** Willemoës-Suhm, 1874

Petalophthalmus Willemoës-Suhm, 1874: XIV [male only; females belong to *Birsteiniamysis inermis* (Willemoës-Suhm, 1874)]

Petalophthalmus – Willemoës-Suhm 1875: 43 (male only). — Perrier 1893: 1026. — Faxon 1895: 223. — Tattersall & Tattersall 1951: 120. — Pillai 1965: 1684 (*partim*). — O.S. Tattersall 1968: 273 (*partim*). — Panampunnayil 1982: 643 (*partim*). — Kathman *et al.* 1986: 214. — Bravo & Murano 1997a: table 1. — San Vicente & Corbari 2015: fig. 8 (*partim*). — San Vicente 2017: 154. — Mees & Meland 2019 (in database).

Revised diagnosis

Petalophthalminae with antennal scale setose all around; eyes not miniaturized, nonetheless cornea reduced, without or with some scattered visual elements, together not forming a compound sensory organ; anterior margin of carapace without pair of distinct submedian processes, rostrum present or absent; lacinia mobilis absent in one mandible, developed in the other one; pars centralis absent or reduced to one spine (tooth, digitus); thoracic endopods 3–4 reduced to 1–2 short segments; thoracic endopods 5–8 slender, with more than five segments; flagellum of thoracic exopods 3–8 with 13–21 segments; pleopods biramous in males, biramous or uniramous in females; telson large, subquadrangular, terminal margin truncate with or without slight emargination, terminal margin without or with two submedian groups of small teeth, in any case with 7–13 large, toothed spines, without setae.

Type species

Petalophthalmus armiger Willemoës-Suhm, 1875.

Distribution of the species included

Petalophthalmus armiger with panoceanic distribution, 56° N to 46° S, mesopelagic to abyssobenthic, 900–4572 m depth;
Petalophthalmus cristatus sp. nov. from the SE-Atlantic, Angola Basin, depth ≤ 5497 m;

Petalophthalmus papilloculatus San Vicente, Frutos & Cartes, 2014, from the NE-Atlantic, Galicia Bank off Iberian Peninsula, 1536–1809 m depth;
Petalophthalmus papuaensis San Vicente & Corbari, 2015, from the tropical W-Pacific, Bismarck Sea, 800–1065 m depth.

Petalophthalmus cristatus sp. nov.
urn:lsid:zoobank.org:act:D4D691BD-4E1A-4D8B-B5A2-36979FBA2558
Figs 1–4

Diagnosis (based on adult female only)

Petalophthalmus with eyes elongate ovoid, dorsoventrally flattened by a factor of 1.4; no visual elements developed; stalk with short papilla on mesial margin. Inner margin of outer antennular flagellum subbasally with short, distally rounded, longitudinal crista. Antennal scale with distinct apical segment. Carapace with essentially transverse, centrally concave anterior margin, rostrum forms a proximally widening crista in dorsal view and an acute triangle in lateral view. Masticatory part of left mandible with well-developed lacinia mobilis, right mandible without. Mandibular palp powerful, (when stretched) anteriorly extending beyond antennular trunk; apical segment with 7 long, strong setae; apical segment half as long as median segment; basal segment with rounded lobe near disto-medial edge (dashed line in Fig. 2A). Thoracopods 1–2 without exopods; thoracopods 3, 8 with exopods bearing a 17-segmented flagellum; exopods 4–7 with 18-segmented flagellum. Merus of thoracic endopod 2 with smooth setae along outer margin. Endopods 3–4 rudimentary, unsegmented, lobe-like. Endopod 5 fully developed, slender, elongate; carpus not fused with propodus; disto-medial edge of propodus with two proximally microserrated setae (Fig. 3D); dactylus with very short, stout, terminally bent claw serrated by strong teeth. Endopods 6–8 again more slender, longer than exopods; carpus fused with propodus; dactylus with small, slightly bent, smooth claw. Female pleopods uniramous, reduced to 3-segmented endopods, increasing in length caudally. Apical segment extremely miniaturized in pleopod 1 (Fig. 3O), well developed in pleopods 2–5. Exopod of uropod extends beyond endopod, the latter beyond telson; endopod without statocyst and spines. Exopod 2-segmented, basal segment with small, barbed seta and two spines on disto-lateral corner (Fig. 4G). Telson subquadrangular with rounded terminal edges; dense series of 23–24 spines only on distal 40% of lateral margins, proximal portions smooth. Telson almost truncate, mid-terminally emarginated by only 1% of its length. Terminal margin with short, bilaterally toothed, median spine, on each side flanked by three small teeth and again more laterally by five large, bilaterally toothed spines; the most lateral spine shorter than the sublateral one; spine length decreases from sublateral to innermost spines.

Etymology

The species name is a Latin adjective with masculine ending, referring to the longitudinal crista on the inner margin of the outer antennular flagellum and to the longitudinal median crista forming the rostrum.

Material examined

Holotype (by present designation)
ANGOLA BASIN • ♀ ad. (BL = 28.3 mm, brood pouch empty, dissected and mounted on 14 slides); SE-Atlantic, Angola Basin; 20°0.733′ S, 3°2.230′ E to 20°6.409′ S, 3°7.197′ E; bottom depth 5487–5497 m; 15 Jul. 2000; DIVA-1 exped., #327; Agassiz Trawl; ZMH 58247.

Type locality

Station #327 (Table 1) in the abyssal plain of the Angola Basin; 20°1′ S, 3°2′ E to 20°6′ S, 3°7′ E; bottom depth 5487–5497 m. Sample taken with Agassiz Trawl, therefore not definitely excluded that the material entered the gear during ascent.

Description

All features of the diagnosis. Body moderately slender, cephalothorax contributes 34% total length, pleon 46%, telson 20%, carapace 29%.

CARAPACE (Fig. 1A–C). Leaving ultimate 1.5 thoracic somites mid-dorsally exposed; antero-lateral edges rectangular, terminally rounded; small bulge behind rostrum; cervical sulcus weak but distinct. Posterior margin of carapace emarginated; emargination unapparent upon inspection *in situ* (Fig. 1A–B), but well visible in carapace detached and expanded on slide (Fig. 1C).

EYES (Fig. 1A–C). No external corneal structures visible. Definite ocular papilla on mesial margin visible in dorsal view (Fig. 1B–C) but not so in lateral view (Fig. 1A). Eyes ⅕ carapace length; dorsoventrally weakly compressed with length ⁵⁄₂ maximum width in dorsal view vs ⁷⁄₂ maximum height in lateral view. Eyes appear wider in Fig. 1C due to pressure exerted by cover glass.

ANTENNULA (Fig. 1A–B, D–E). Trunk long and slender, 1.1 times length of carapace. Three-segmented, whereby segments 1–3 are 46–48%, 35–37%, and 17% total trunk length, respectively. Basal segment with small spine in subterminal position. Terminal margin of distal segment dorsally produced in a triangular, setose lobe. Width at basis of outer flagellum is ⅘ that of inner flagellum. Width of longitudinal crista near basis is ¼ width of outer flagellum, length is ⅔ width of outer flagellum.

ANTENNA (Fig. 1A–B, F). Sympod on its mesial margin with small lobe bearing a minute spine at tip. Peduncle 3-segmented, whereby segments 1–3 contribute 9–11%, 40–44%, and 47–49% to total peduncle length. Mesial margin of basal segment with small lobe ending in a large spine. Flagellum tiny, short, 6-segmented. Antennal scale extends slightly beyond antennal peduncle, i.e., clearly beyond basal segment of antennular trunk. Scale 0.6 times length of carapace; scale length six times maximum width. Scale subdivided by a slightly oblique articulation; apical segment 4–5% total scale length.

LABRUM (Fig. 1G–H). Roughly trapezoidal in ventral view; caudal margin densely setose, with three bunches of slender spines facing the mandibles.

MANDIBLES (Fig. 2A–C). Palpus ¾ length of carapace; segments 1–3 contribute 8–9%, 58–60%, and 32–33% to total length, respectively. Basal (first) segment laterally with spine on the tip of a triangular lobe. Analogous, smaller structure set subbasally on outer margin of median segment; apart from that, outer margin smooth all along; inner margin almost all along with numerous smooth, in part spine-like, long setae with shorter ones in between. Terminal segment reflexed, together with seven very long, strong setae rendering the palpus a large prehensile appendage. Left mandible with large processus incisivus ending in three blunt teeth; lacinia mobilis well developed with four, mostly less blunt teeth; pars centralis reduced to a single finger-like process; processus molaris with weakly sclerotized ridges and with ventral and dorsal ridges of stiff bristles. Right mandible with large processus incisivus bearing three rounded lobes representing surrogates of teeth; no lacinia mobilis developed; pars centralis reduced to a finger-like process; processus molaris trilobate.

LABIUM (Fig. 2D). Normal, bilobate. Inner face of the lobes all along densely setose, with dense series of stiff bristles (short spines) extending from half to ⅔ length from basis.

MAXILLULA (Fig. 1I–J). Small, distal segment shorter than exopod of maxilla. This segment terminally with nine unilaterally serrated spines, namely four smaller ones on caudal face plus five large ones on rostral face. No pores visible. Endite subterminally with three setae barbed along their median to subterminal portions, basal third smooth. Terminal margin of endite with two additional setae showing longer barbs from their basal to subapical portions; additional two such setae subterminally on ventral margin.
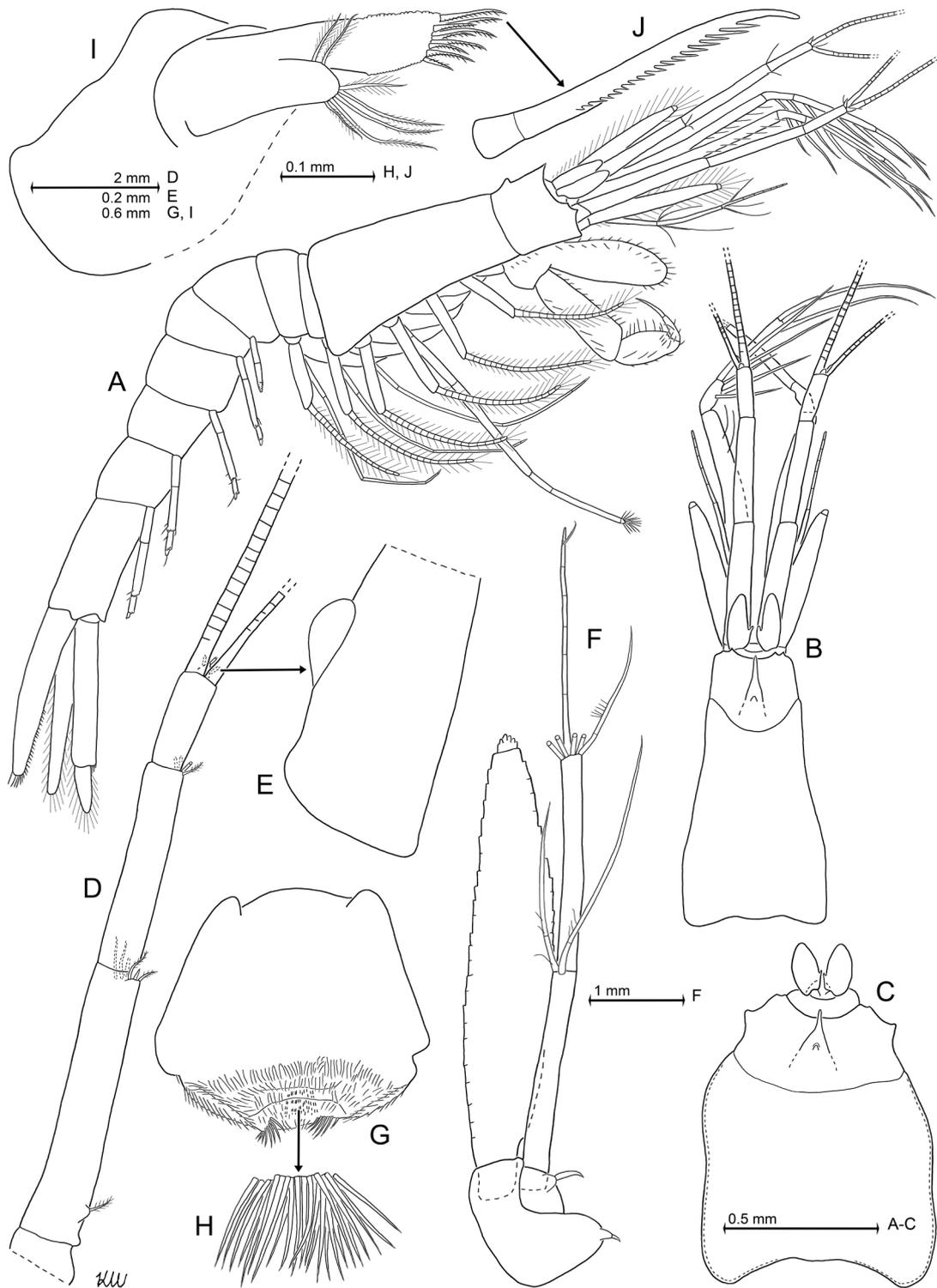
Fig. 1. *Petalophthalmus cristatus* sp. nov., holotype, adult female with body length 28.3 mm (ZMH 58247). **A**. Habitus. **B**. Anterior body region, dorsal (most setae omitted). **C**. Carapace with attached frons, ocular symphysis and eyes, expanded on slide. **D**. Antennula, ventral. **E**. Detail of D, below drawing plane (showing basis of outer flagellum). **F**. Antenna, ventral (setae of scale omitted). **G**. Labrum. **H**. Detail of G, below drawing plane (showing spine bunch from posterior face). **I**. Maxillula. **J**. Detail of I, showing serrated spine.
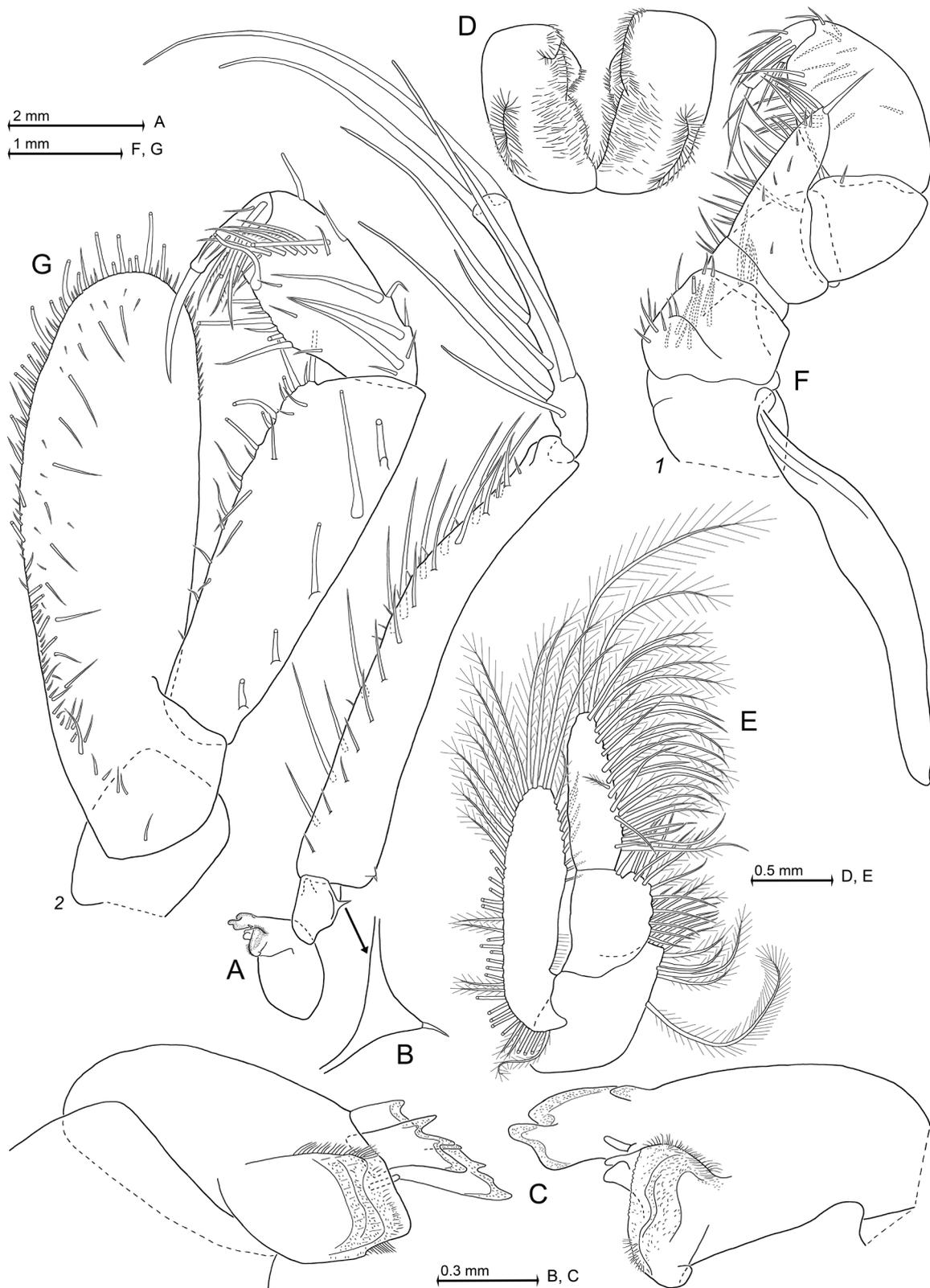
Fig. 2. *Petalophthalmus cristatus* sp. nov., holotype, adult female with body length 28.3 mm (ZMH 58247). **A**. Right mandible with palpus. **B**. Detail of A, showing outer lobe ending in a spine. **C**. Masticatory parts of both mandibles. **D**. Labium. **E**. Maxilla. **F**. Thoracopod 1. **G**. Endopod of thoracopod 2.

MAXILLA (Fig. 2E). Sympod with striking, very long, barbed seta on inner face; this seta more densely barbed along its distal half; sympod with well-projecting endite, the latter setose on its distal half. Palp 2-segmented, with stout proximal and slender distal segment; the latter contributing 60% to total length, its length three times maximum width; distal segment densely setose along distal and inner margins, outer margin smooth; its most distal setae plumose, longer than distal segment. Basal segment of palp with densely setose, weakly projecting endite. Exopod slender, length four times maximum width; exopod reaches to mid of distal segment of palp; exopod densely setose all along outer margin and on distal half of inner margin; proximal quarter of inner margin with dense series of minute hairs.

FOREGUT (Fig. 4A–E). Object in Fig. 4A dorsally opened, laterally unfolded and expanded on slide; posterior half distorted. Gross morphology as described by Kobusch (1998) and De Jong-Moreau & Casanova (2001) for *Petalophthalmus armiger*. Gastric mill restricted to anterior half of the cardiac portion of the foregut. Anterior part of each laterale with 29–30 smooth spines (Fig. 4C) increasing in length posteriorly. Spines in ribbon-like arrangement on posterior half of this part of the lateralia. Posterior part of the right lateralia broken in this object; left ones intact, with linear series of throughout slender spines (Fig. 4B), the spines smooth except for tuft of acute spinules at tip. Dorso-lateral infoldings of the cardia each with antero-posterior series of setae, anteriorly starting with numerous long, smooth setae, continued by shorter setae with stiff bristles on apical half, and finally by 12–14 spine-like setae with continuous gradient from basally widened, oblong setae (Fig. 4D) all along with dense series of acute bristles (spinules) to basally smooth sheets (Fig. 4E) with oblique terminal margin densely occupied by such bristles. Pyloric portion of foregut with two slender, posteriorly directed, soft processes resembling spines (below drawing plane in Fig. 4A). Foregut empty in this specimen.

THORACOPODS IN GENERAL (Figs 2F–G, 3A–I). Total length of exopods as well as their flagella increase from exopod 3 to 7, whereas that of exopod 8 ranges between nos 3 and 4. Basal plate of exopods slender, lateral margins parallel, disto-lateral edge rounded; length four times width in exopods 3–7, only three in exopod 8; basal plates 3–4, 8 with roughly equal length, plates 5–7 about 1.3 times longer. Flagella densely setose. Total length decreases from endopods 5 to 8. Dactylus 1–2, 5–8 not fused with claw (nail), endopods 3–4 without claw. Marsupium formed by seven pairs of oostegites emerging as setose epipods on thoracopods 2–8.

FIRST THORACOPOD (first maxilliped, Fig. 2F). Epipod long, slender, smooth all around, scaphocerite-like, not contributing to the marsupium. Endopod strong, robust, densely setose on inner face from basis to dactylus; coxa with triangular endite (dashed line in Fig. 2F) on rostral face (below drawing plane); merus with large, distally projecting endite; propodus swollen, length 1.5 times maximum width; dactylus elongate, with strong, curved, smooth claw.

SECOND THORACOPOD (second maxilliped; Figs 1A, 2G). Epipod (if termed as such) represented by the first oostegite. Endopod robust, larger than that of the first thoracopod. Praeischium simple, smooth. Inner face of ischium with very large, broadly linguiform, subquadrangular endite with length about three times maximum width, endite distally projecting up to distal half of carpopropodus; mesial and terminal margins of endite all along with cuspidate setae; lateral margin with shorter such setae only on distal quarter, remainder smooth. Merus subquadrangular, distally widening, its length about three times maximum width; many smooth setae along inner margin, five such setae along outer margin. Carpopropodus swollen, length 1.9–2.1 times maximum width, three large and six small, smooth setae on outer margin, numerous smooth setae along inner margin, plus ten barbed setae on distal third of caudal face; dactylus elongate, with several setae and apically with strong, curved, smooth claw.

THIRD AND FOURTH THORACOPODS (Fig. 3A–B). Endopods unarmed, smooth, terminally well rounded, each only ⅖ length of basal plate of respective exopod.
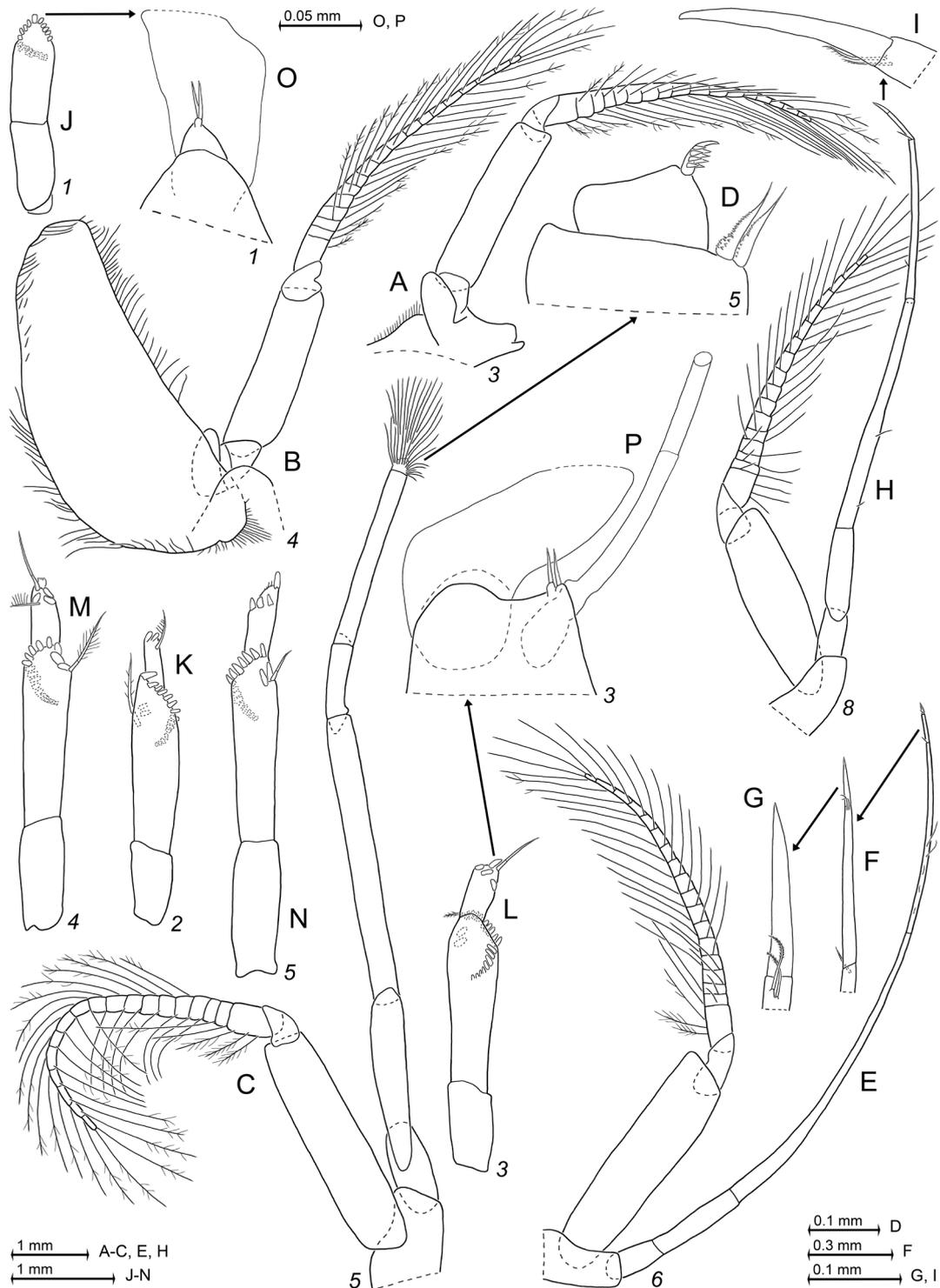
Fig. 3. *Petalophthalmus cristatus* sp. nov., holotype, adult female with body length 28.3 mm (ZMH 58247). **A**. Endopod and exopod of thoracopod 3. **B**. Thoracopod 4. **C**. Endopod and exopod of thoracopod 5. **D**. Detail of C (non-modified setae omitted), showing dactylus and distal portion of propodus. **E**. Endopod and exopod of thoracopod 6. **F**. Detail of E, showing dactylus. **G**. Second order detail of E, showing distal portion of dactylus with nail. **H**. Endopod and exopod of thoracopod 8. **I**. Detail of H, showing distal portion of dactylus with nail. **J–N**. Series of pleopods 1–5, rostral (J–K, M–N) or caudal (L) aspect. **O**. Tip of pleopod 1. **P**. Tip of pleopod 3.

FIFTH THORACOPOD (Fig. 3C–D). Endopod $\frac{7}{5}$ length of exopod. Endopod with praeischium 0.3 (overlapping with ischium), ischium 0.6, carpus 0.3, propodus 0.6, and dactylus 0.04 times length of merus, each not subdivided (the same size relations reported by San Vicente *et al.* (2014), for ischium to dactylus in *P. papilloculatus*). The here reported size relations take into account that praeischium and ischium are overlapping due to their oblique articulation. Setation of dactylus and of terminal margin of propodus together contributing to a strong brush of setae; short claw armed with eight strong teeth (Fig. 3D). Propodus with two modified setae at disto-medial edge (Fig. 3D).
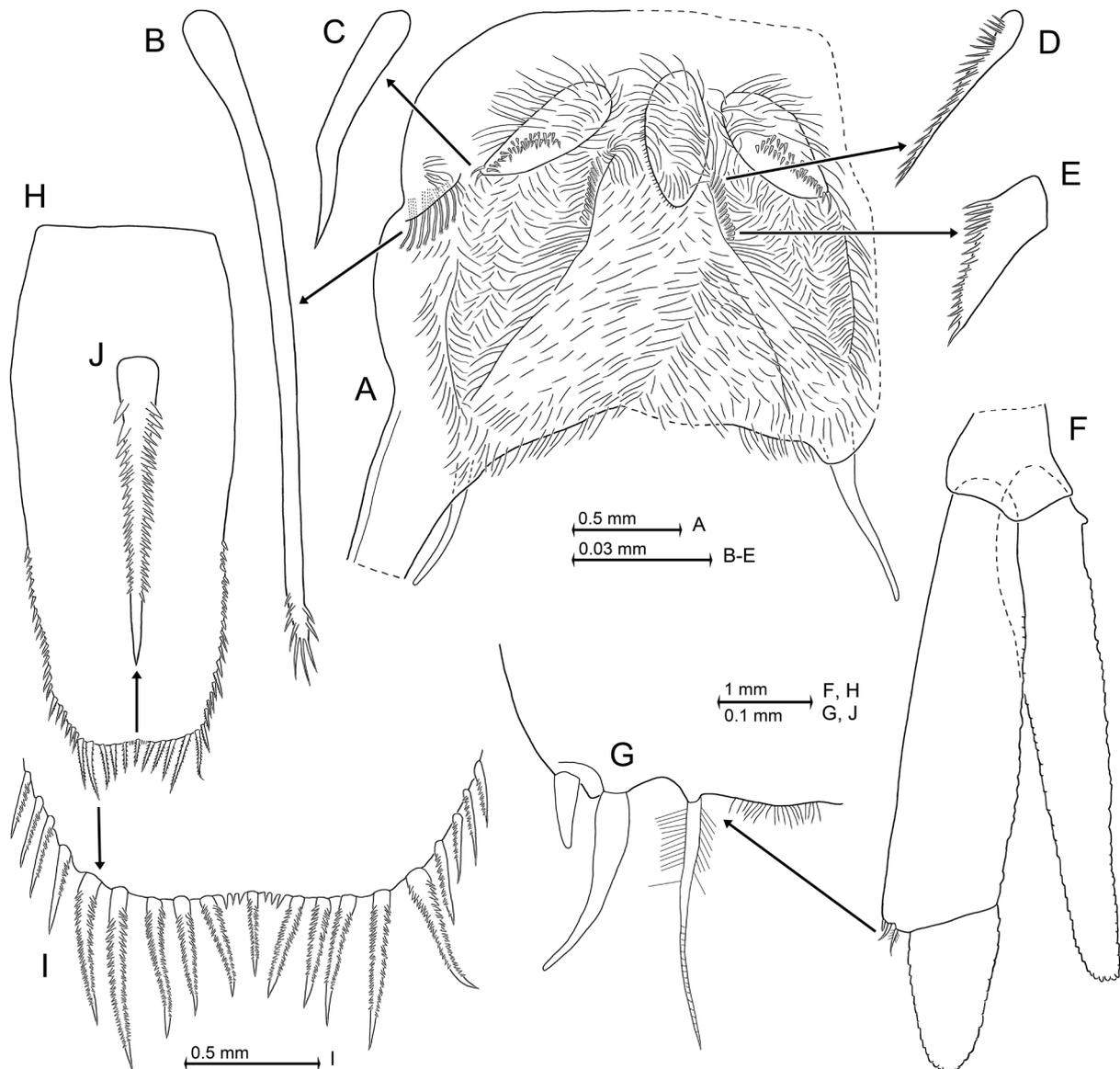
Fig. 4. *Petalophthalmus cristatus* sp. nov., holotype, adult female with body length 28.3 mm (ZMH 58247). **A**. Foregut dorsally opened, laterally unfolded and expanded on slide, distorted. **B–E**. Details of A, showing spines of gastric mill. **F**. Uropods. **G**. Detail of F, showing disto-lateral corner of basal segment of exopod. **H**. Telson. **I–J**. Details of H, showing terminal margin and medio-terminal spine, respectively.

Sixth to eighth thoracopods (Fig. 3E–I). Endopods $^6/_5$ length of exopods. Merus 6–8 contribute 40–46% to endopod length measured from praeischium to dactylus. Endopods with praeischium 0.13–0.21, ischium 0.3–0.4, carpopropodus 0.6–0.7, and dactylus 0.09–0.15 times length of merus, each element not subdivided.

Pleon (Figs 1A, 3J–P). Pleonites 1–5 measure 0.6, 0.5, 0.5, 0.5, and 0.6 times length of pleonite 6. Apical segment of pleopods 1–5 contributes 1%, 17%, 16%, 18%, 18% to total length; median segment 54%, 57%, 57%, 50%, 47%; basal segment 45%, 26%, 27%, 32%, 33%. Apical segment of pleopod 1 with a pair of minute spines on tip (Fig. 3O); pleopods 2–5 with such pair on caudo-terminal edge (Fig. 3P). Spines are 1.1–1.2% length of pleopod 1 or 0.7–0.8% of pleopods 2–5, respectively. Median segment of all pleopods with 15–19 papillae arranged in semicircle covering part of rostral and caudal faces (Fig. 3J–N). Pleopods 2–5 with separate pair of papillae in subterminal position on the anterior margin of median segment; other 2–5 papillae on terminal third of apical segment. Papillae much larger than spines and those setal bases present on apical segment (Fig. 3P).

Uropods (Fig. 4F–G). Endopod slender, length six times maximum width; lateral margins straight, setose all around. Endopod as long as telson, nonetheless, due to its more caudal insertion shortly extending beyond telson (Fig. 1A). Exopod 1.15 times endopod or telson length. Exopod 2-segmented, total length five times maximum width, apical segment ¼ total length; basal segment 1.3 times broader than apical segment. Basal segment with smooth outer margin and densely setose inner margin; apical segment densely setose all around. The free latero-terminal portion of basal segment with small, smooth, blunt spine at disto-lateral corner, bordered by a threefold longer spine of that type in more mesial position, followed by an even longer, basally barbed seta, and finally a dense series of minute bristles close to insertion of apical segment (Fig. 4G).

Telson (Fig. 4H–J). Length 2.3 times maximum width or 1.5 times length of pleonite 6. Distal 40% of each lateral margin with dense series of smooth spines except for the most distal 6–7 spines being unilaterally toothed. By contrast, all large spines of terminal margin bilaterally toothed. Terminal margin with two sets of three closely adjoining small teeth arranged in laterally increasing size, one set on each side of the bilaterally toothed, median spine (Fig. 4J).

Ipirophthalmus gen. nov.
urn:lsid:zoobank.org:act:CC361198-98AD-4399-8483-3912AA62D2A0

Petalophthalmus – Pillai 1965: 1684 (*partim*). — O.S. Tattersall 1968: 273 (*partim*). — Panampunnayil 1982: 643 (*partim*). — Wang 1998: 202–203. — San Vicente & Corbari 2015: fig. 8 (*partim*).

Type species
Petalophthalmus liui Wang, 1998, by present designation.

Etymology
The generic name is a Latinized noun with masculine ending, formed as a condensate of the Ancient Greek adjective ὑπηρετικός (functional) with the noun ὀφθαλμὸς (eye), underlining the difference from the reduced visual elements in the genus *Petalophthalmus*.

Diagnosis
Petalophthalminae with antennal scale setose all around; eyes with well-developed, functional cornea; anterior margin of carapace with rostrum flanked by a pair of processes; thoracic endopods 5–8 slender, each with more than three segments; flagellum of thoracic exopods 3–8 with 10–14 segments; male

pleopods biramous, female pleopods uniramous or biramous; telson large, subquadrangular, terminal margin truncate without or with distinct mid-terminal emargination, terminal margin with two submedian groups of small teeth, with 7–8 large, toothed spines and 1–2 pairs of long setae, these setae arising from the emargination, if present, otherwise from homologous submedian position.

Species included

– *Ipirophthalmus liui* (Wang, 1998) gen. et comb. nov., recombined from *Petalophthalmus liui* Wang, 1998, known only from the northern South China Sea, depth 194–219 m;

– *Ipirophthalmus caribbeanus* (O.S. Tattersall, 1968) gen. et comb. nov., recombined from *Petaloph-thalmus caribbeanus* O.S. Tattersall, 1968, from the Caribbean, mesopelagic in 329–366 m depth;

– *Ipirophthalmus oculatus* (Illig, 1906) gen. et comb. nov., recombined from *Petalophthalmus oculatus*, Illig, 1906, from the NW-Arabian Sea, W-Indian Ocean, off Japan, mesopelagic to bathybenthic, depth ≤ 1200 m;

– *Ipirophthalmus macrops* (Tchindonova & Vereshchaka, 1991) gen. et comb. nov., recombined from *Petalophthalmus macrops* Tchindonova & Vereshchaka, 1991, from the W-Indian Ocean: off Madagascar, benthopelagic in 360–555 m depth.

Suborder Mysida Boas, 1883
Family Mysidae Haworth, 1825
Subfamily Boreomysinae Holt & Tattersall, 1905
Genus *Boreomysis* M. Sars, 1869

Boreomysis bispinosa O.S. Tattersall, 1955

Material examined (non-types only)

ANGOLA BASIN • 1 imm. (BL = 8.3 mm, eyes missing); 17°4.935′ S, 4°40.805′ E to 17°07.454′ S, 4°42.276′ E; bottom depth 5460–5460 m; 25 Jul. 2000; DIVA-1 exped., #344; epinet of epibenthic sledge; ZMH 58248 • 1 ♀ ad. (estimated BL = 12.6 mm, cephalothorax and exuvia); 16°16.989′ S, 5°27.279′ E to 16°19.280′ S, 5°27.205′ E; bottom depth 5430–5433 m; 28 Jul. 2000; DIVA-1 exped., #348; supranet of epibenthic sledge; ZMH 58249.

Type locality

Not stated by O.S. Tattersall (1955). On page 14 she indicated a "female type" taken off Cape Town, depth 1350–1250 m, and a "male type" NE of St. Helena, depth 1450–700 m. A rough estimate by the present author suggests that the stations are from 34° S, 17° E and 15° S, 5° W, respectively.

Distribution

Previously reported from the Atlantic Ocean and from the Atlantic sector of the Southern Ocean, 51° N–54° S, 36° W–17° E (O.S. Tattersall 1955; Mauchline & Murano 1977; Hargreaves 1997; Wittmann *et al.* 2004; Petryashov 2005b; San Vicente 2011). The animals were sampled with benthic as well as pelagic gears. The here documented records in the SE-Atlantic at 16–17° S, 5° E are within the already known geographical range, while the bathymetrical range of 700–4050 m is now extended down to 5430–5460 m (see also Discussion).

Subfamily Siriellinae Czerniavsky, 1882
Tribus Siriellini Czerniavsky, 1882
Genus *Siriella* Dana, 1850

Siriella thompsonii (H. Milne Edwards, 1837)

Material examined (non-types only)

ANGOLA BASIN • 2 ♀♀ subad. (BL = 4.8–5.0 mm), 2 juv.; 20°3.520′ S, 3°4.710′ E to 20°3.833′ S, 3°4.980′ E; surface; 15 Jul. 2000; DIVA-1 exped., #329; plankton net, Bongo (Bo1); ZMH 58271 • 1 juv. (BL = 3.1 mm, in 2 parts); 19°58.517′ S, 2°59.366′ E; bottom depth 5493 m; 13 Jul. 2000; DIVA-1 exped., #324; box corer (KG2); ZMH 58270.

Type locality

Not specified by H. Milne Edwards (1837), who reported this species upon first description from the North Atlantic anywhere between Madeira and the Antilles.

Distribution

Mainly circumtropical, in temperate to tropical waters of all large oceans including the Red Sea, Mediterranean, Caribbean and Gulf of Mexico, 45° N to 40° S (W.M. Tattersall 1923, 1951; O.S. Tattersall 1955, 1962; Ii 1964; Stuck *et al.* 1979; Price *et al.* 1986; Petryashov 2005a; Murano & Fukuoka 2008; Price & Heard 2009; Miyashita & Calliari 2014; San Vicente 2017). Holopelagic, mainly offshore, also nearshore, mostly taken with plankton samples during the night in 0–50 m depth. Most of the population descends during the daytime down to a so far documented lower limit of ≤ 550 m. The present record from station 329 was taken with a Bongo net at the sea surface during the day. The record from station 324 was taken during the night with a box corer closed at the bottom in 5493 m depth (see Discussion).

Subfamily Erythropinae Hansen, 1910
Tribus Amblyopsini Tchindonova, 1981
Genus *Amblyops* G.O. Sars, 1872

Amblyops tenuicauda W.M. Tattersall, 1911

Amblyops tenuicauda W.M. Tattersall 1911: 43–45, pl. 2 fig. 2, pl. 6 figs 2–8.

Amblyops tenuicauda – Illig 1930: 572 (in key). — Tattersall & Tattersall 1951: 253, fig. 59. — Mauchline & Murano 1977: 46, table 1. — Frutos & Sorbe 2008: online table. — San Vicente *et al.* 2012: 769.
Amblyops tenuicaudus [invalid subsequent emendation] – San Vicente 2017: 160, 178, fig. 4.

Nomenclatorial note

W.M. Tattersall (1911) did not explicitly state a *derivatio nominis*, however he noted on page 45 "From the type it differs rather markedly in the form of the telson...". This suggests that he derived the species name from the narrow telson. Be that as it may, '*cauda*' is a Classical Latin noun, while the respective adjective would be '*caudalis*'. Therefore, the species name '*tenuicauda*' is to be treated as an amalgamated noun in apposition rather than an adjective. According to Article 31.2.1 of the Nomenclatorial Code (ICZN 1999), a noun in apposition is to be retained, with gender ending unchanged.

Material examined (non-types only)

ANGOLA BASIN • 7 juvs (BL = 1.8–2.6 mm); 22°19.914′ S, 3°17.956′ E to 22°20.049′ S, 3°17.957′ E; bottom depth 5161–5162 m; 10 Jul. 2000; DIVA-1 exped., #320; ZMH 58258 • 1 imm. (BL = 5.4 mm); 16°16.989′ S, 5°27.279′ E to 16°19.280′ S, 5°27.205′ E; bottom depth 5430–5433 m; 28 Jul. 2000; DIVA-1 exped., #348; supranet of epibenthic sledge; ZMH 58257.

Type locality

Not stated by W.M. Tattersall (1911). Upon first description, he reported materials from six stations off Ireland, NE-Atlantic, 50–52° N, 11–12° W, depth 447–770 fathoms (817–1408 m). One additional sample was stated by him on page 44, but accidentally omitted from the station data on page 69, finally indirectly quoted by Tattersall & Tattersall (1951) as pertaining to the samples from the Faroe Islands.

Distribution

Previously reported from the NE-Atlantic in the range of 44–60° N, 5–12° W, depth 450–1408 m (Tattersall & Tattersall 1951; Frutos & Sorbe 2008; San Vicente 2017). The here documented records in the SE-Atlantic at 16–22° S, 3–5° E, depth 5161–5433 m, represent large extensions of the known geographical as well as bathymetrical ranges (see also Discussion).

Genus *Paramblyops* Holt & Tattersall, 1905

Paramblyops rostratus Holt & Tattersall, 1905

Material examined (non-types only)

ANGOLA BASIN • 1 ♂ ad. (BL = 16 mm, in 2 parts); 22°19.978′ S, 3°18.342′ E to 22°20.249′ S, 3°18.439′ E; bottom depth 5179–5180 m; 9 Jul. 2000; DIVA-1 exped., #318; ZMH 58261 • 1 imm. (BL = 9.0 mm, in 2 parts), 1 juv. (BL = 6.5 mm); 16°16.989′ S, 5°27.279′ E to 16°19.280′ S, 5°27.205′ E; bottom depth 5430–5433 m; 28 Jul. 2000; DIVA-1 exped., #348; supranet of epibenthic sledge; ZMH 58259 • 2 ♀♀ imm. (BL = 6.5–8.3 mm); same collection data as for preceding; ZMH 58260 • 1 ♀ subad. (BL = 14.5 mm); 16°13.329′ S, 5°26.837′ E to 16°14.820′ S, 5°26.702′ E; bottom depth 5433–5434 m; 29 Jul. 2000; DIVA-1 exped., #350; supranet of epibenthic sledge; SMF 55191.

Type locality

Not stated by Holt & Tattersall (1905). Upon first description, they reported material from seven stations at the NE-Atlantic slope, depth 181−382 fathoms (331−699 m). A rough estimate by the present author suggests that the stations are in the range of 50–54° N, 10–13° W.

Distribution

Previously reported from the North Atlantic and Mediterranean, 34–61° N, 72° W–14° E, depth 200–2900 m (Hansen 1908, 1927; W.M. Tattersall 1909, 1951; Colosi 1929; Lagardère 1972; Nouvel & Lagardère 1976; Mauchline 1986; Cartes & Sorbe 1995; Cartes *et al.* 2004; Vanquickelberghe 2004; Fanelli 2007; Petryashov 2009; San Vicente 2010, 2017; Sorbe & Elizalde 2013). Sorbe & Elizalde (2013) considered this species as part of the suprabenthic fauna. The here documented records in the SE-Atlantic at 16−22° S, 3−5° E, depth 5179−5434 m, represent large extensions of the known geographical as well as bathymetrical ranges (see also Discussion).

Statoliths

Statoliths mineralized with fluorite; diameter 124 µm in the ♂ ad. 16 mm, vs 89 µm in the ♀ subad. 14.5 mm, and 62 µm in the imm. 9.0 mm (2 statoliths per specimen examined).

Tribus Pseudommini Wittmann, Ariani & Lagardère, 2014
Genus *Pseudomma* G.O. Sars, 1870

Pseudomma nanum (Holt & Tattersall, 1906)

Material examined (non-types only)

ANGOLA BASIN • 1 imm. (BL = 7.2 mm); 17°4.935′ S, 4°40.805′ E to 17°07.454′ S, 4°42.276′ E; bottom depth 5460–5460 m; 25 Jul. 2000; DIVA-1 exped., #344; epinet of epibenthic sledge; ZMH 58262 • 1 imm. (BL = 6.8 mm); 16°13.329′ S, 5°26.837′ E to 16°14.820′ S, 5°26.702′ E; bottom depth 5433–5434 m; 29 Jul. 2000; DIVA-1 exped., #350; epinet of epibenthic sledge; SMF 55192.

Type locality

Not explicitly stated by Holt & Tattersall (1906). On page 36 they indicated "length of the type female 8 mm, of the type male (adult) 6.5 mm". Such body sizes fit only with the material listed by them on pages 37–38 as having been caught off Ireland, 48−50 nautical miles (89−93 km) WNW of Tearaght, depth 360–387 fathoms (658−708 m). Coordinates roughly estimated by the present author as 52°24′ N, 11°54′ W.

Distribution

Previously reported from the NE-Atlantic and Mediterranean, 38−62° N, 12° W−21° E, depth 360−2200 m (W.M. Tattersall 1911; Nouvel & Lagardère 1976; Mauchline 1986; Gordon & Duncan 1987; Meland & Brattegard 1995; Madurell & Cartes 2003; Sorbe & Elizalde 2013; Petryashov 2014; San Vicente 2017). Madurell & Cartes (2003) considered this species as suprabenthic. The here documented records in the SE-Atlantic at 16−17° S, 5° E, depth 5433−5460 m, represent strong extensions of the known geographical as well as bathymetrical ranges (see also Discussion).

Genus *Parapseudomma* Nouvel & Lagardère, 1976

Parapseudomma calloplura (Holt & Tattersall, 1905)

Material examined (non-types only)

ANGOLA BASIN • 1 ♀ ad. (BL = 20.0 mm); 22°19.978′ S, 3°18.342′ E to 22°20.249′ S, 3°18.439′ E; bottom depth 5179–5180 m; 9 Jul. 2000; DIVA-1 exped., #318; ZMH 58263 • 1 ♀ ad. (BL = 23.3 mm, head missing); 22°19.914′ S, 3°17.956′ E to 22°20.049′ S, 3°17.957′ E; bottom depth 5161–5162 m; 10 Jul. 2000; DIVA-1 exped., #320; ZMH 58264 • 2 imm. (damaged, BL = 6.1–7.0 mm); 17°4.935′ S, 4°40.805′ E to 17°07.454′ S, 4°42.276′ E; bottom depth 5460–5460 m; 25 Jul. 2000; DIVA-1 exped., #344; ZMH 58266 • 1 imm. (BL = 9.4 mm, in separate vial); same collection data as for preceding; ZMH 58265 • 1 ♀ subad. (BL = 21.1 mm), 1 ♀ subad. (BL = ca. 14 mm, with tailfan missing); same collection data as for preceding; ZMH 58267 • 1 ♀ subad. (BL = 17.2 mm); same collection data as for preceding; ZMH 58268 • 1 ♀ ad. (BL = 17.3 mm, head missing); 16°16.989′ S, 5°27.279′ E to 16°19.280′ S, 5°27.205′ E; bottom depth 5430–5433 m; 28 Jul. 2000; DIVA-1 exped., #348; SMF 55193 • 1 ♂ imm. (BL = 11.2 mm); 16°13.329′ S, 5°26.837′ E to 16°14.820′ S, 5°26.702′ E; bottom depth 5433–5434 m; 29 Jul. 2000; DIVA-1 exped., #350; ZMH 58269.

Type locality

Not stated by Holt & Tattersall (1905). They reported materials from four stations off Ireland, depth 199–382 fathoms (363–696 m). A rough estimate by the present author suggests that the stations are in the range of 52–54° N, 12–13° W.

Distribution

Previously reported from the NE-Atlantic and Mediterranean, 35–58° N, 13° W–14° E, depth 94–1200 m, and from the NW-Pacific off Japan, 35–37° N, 137–140° E, depth 220–660 m (W.M. Tattersall 1909, 1911; Colosi 1929; Băcescu 1941, 1989; Murano 1974; Nouvel & Lagardère 1976; Mauchline & Murano 1977; Mauchline 1986; Cartes & Sorbe 1995; Cartes *et al.* 2003; Frutos & Sorbe 2013; Sorbe & Elizalde 2013; San Vicente 2017). Frutos & Sorbe (2013) sampled this species in the near-bottom water layer. The here documented records in the SE-Atlantic at 16−22° S, 3−5° E, depth 5161−5460 m, represent a strong extension of the known bathymetrical range; within the Atlantic also a strong southward extension (see Discussion).

Statoliths

Statoliths mineralized with fluorite, diameter 133−169 µm (n = 6 statoliths of 3 adults).

Tribus **Calyptommini** W.M. Tattersall, 1909

Calyptomminae W.M. Tattersall 1909: 137.

Calyptomminae – W.M. Tattersall 1911: 59–60 (definition).
Erythropini – Illig 1930: 572 (in key, *partim*). — Tattersall & Tattersall 1951: 186 (*partim*). — Mauchline 1980: 21 (*partim*). — Tchindonova 1981: 26 (*partim*).
Leptomysini – Mauchline 1980: 22 (*partim*).
Calyptommini – Nouvel *et al.* 1999: 79. — Meland & Willassen 2007: 1093, table 1, fig. 3 (molecular phylogeny). — Wittmann *et al.* 2014: 337 (definition). — Meland *et al.* 2015: 18, table 3 (classification). — San Vicente 2017: 161.

Diagnosis

Revised from Wittmann *et al.* (2014) in order to receive *Abyssomysis* gen. nov. Eyeplate without distinct median cleft, plate mainly formed by a transverse median bridge, eyes rudimentary or absent. Antennal scale well developed, its smooth outer margin ending in a tooth; antennal gland hypertrophic. Labrum normal, symmetrical. Females with 2–3 pairs of oostegites. Pleopods uniramous, reduced to unsegmented endopods in both sexes, except that the fourth male pleopod may be sub-segmented in certain species. Uropods normal. Telson entire, lateral margins not serrated but for the most part or entirely smooth, terminal portions with spines, no setae.

Type genus

Calyptomma W.M. Tattersall, 1909.

Inventory

Three genera with a total of five species are now included: *Calyptomma* W.M. Tattersall, 1909, with only the nominotypical species *C. puritani* W.M. Tattersall, 1909, and *Michthyops* W.M. Tattersall, 1911, with *M. parvus* (Vanhöffen, 1897), *M. theeli* (Ohlin, 1901) and *M. arcticus* Petryashov, 1993, finally the below described *Abyssomysis* gen. nov. with its only species *A. cornuta* gen. et sp. nov.

Distribution

The species of *Calyptomma* and *Michthyops* are mostly bathybenthic, living on or close to the sea floor of the Arctic Ocean, North Atlantic and Mediterranean. Only *M. theeli* has been found in a wider depth range of 27–2245 m. With the below records of *A. cornuta* gen. et sp. nov. the geographical range of the

tribe is extended to 17° S in the SE-Atlantic, and the bathymetrical range to the abyssobenthos down to 5460 m depth. For additional distribution data see key to species below.

Abyssomysis gen. nov.
urn:lsid:zoobank.org:act:41771FE0-7B94-4422-803C-C4B2292B9BAF

Type species

Abyssomysis cornuta gen. et sp. nov. by monotypy and present designation.

Diagnosis

Calyptommini with eyeplate formed by a transverse, median lamina (= ocular symphysis) connecting separate, rudimentary eyestalks; lamina not incised, visual elements absent. Carapace normal, anteriorly rounded. Antennula with well-developed, setose appendix masculina; proximal segment of trunk without ventral carina. Antennal sympod without spiniform extension; antennal scale well developed, entire, its smooth outer margin ending in a prominent tooth, terminal lobe well-developed. Labrum with small, knob-like rostral process. Mandibles with distinct molar part; lacinia mobilis present on left mandible, absent or vestigial on right mandible. First thoracopods normal; basis of endopod with long, setose endite. Females with three pairs of functional oostegites. Penes normal. Pleopods of both sexes reduced to unsegmented, plate- or rod-like endopods, except that the fourth male pleopod is sub-segmented. Both rami of the uropods unsegmented, setose all around, without spines. Telson short, terminally truncate; lateral margins smooth, terminal margin with spines.

Etymology

The generic name is an amalgamated noun with female ending, referring to the occurrence of this mysid in the abyssal plain.

Abyssomysis cornuta gen. et sp. nov.
urn:lsid:zoobank.org:act:A4017620-6EAC-4567-A3EB-BDF006954C63
Figs 5–8

Diagnosis

Abyssomysis gen. nov. with eyeplate in the form of a narrow, transverse band with lateral, apically acute or narrowly rounded rudiments of the eyestalks resembling horns. Anterior margin of carapace evenly rounded, upturned on the edge, forming a weakly separated rim as a rostral plate. Only distal portions of the eye rudiments extend beyond the rostral plate. Antennular trunk longer than antennal scale in males, shorter than scale in females. Male trunk with comparatively large appendix masculina bearing a dense brush of long setae. Antennal peduncle not reaching beyond antennal scale in females, whereas reaching well beyond in males. Left mandible with lacinia mobilis well developed in both sexes. Right mandible without lacinia mobilis in females, but with lacinia reduced to a tiny, slender, apically toothed spine in males (Fig. 6D). Median segment of palpus of both mandibles with only three setae in terminal position, remaining portions of palpus smooth in females, whereas distal ⅔ of the median segment showing dense series of at least 14 setae in males. Females with pleopods 1–5 continuously increasing in length caudally. Males with pleopods 1–3, 5 increasing in length caudally, pleopod 4 is not in series by being the longest; fourth pleopod 3-segmented, its basal segment contributes ⅘ pleopod length, the two apical segments each ¹⁄₁₀. Pleomere 6 longer than combined pleomeres 4–5. Telson 0.3–0.4 times length of pleomere 6; telson length 1.0–1.1 times maximum width near basis; terminal margin with two pairs of large, robust spines; outer robust spines shorter than inner ones.
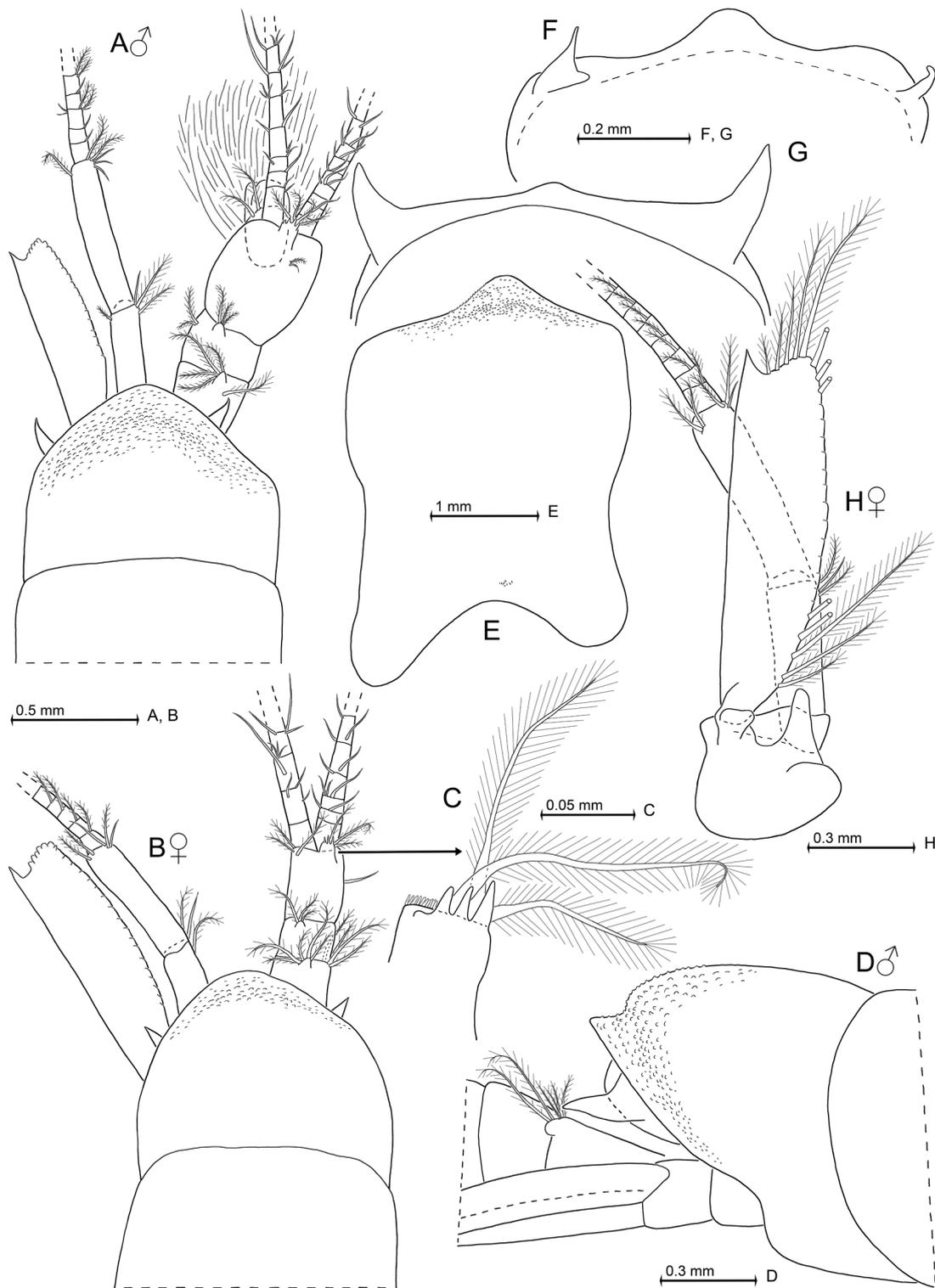
Fig. 5. *Abyssomysis cornuta* gen. et sp. nov., holotype, adult male with body length 6.6 mm (A: ZMH 58250), paratypes female 7.9 mm (B–C, E–F, H: ZMH 58256) and male 6.7 mm (D, G: ZMH 58254). **A–B**. Cephalic region of male (A) and female (B), dorsal; left antennula, right antenna and setae of antennal scale omitted. **C**. Detail of panel (B) showing lobe from terminal segment of antennula. **D**. Head in lateral view, setae of antennal scale omitted. **E**. Carapace expanded on slide. **F–G**. Eyeplate expanded on slide, for female (F) and male (G). **H**. Antenna, dorsal.
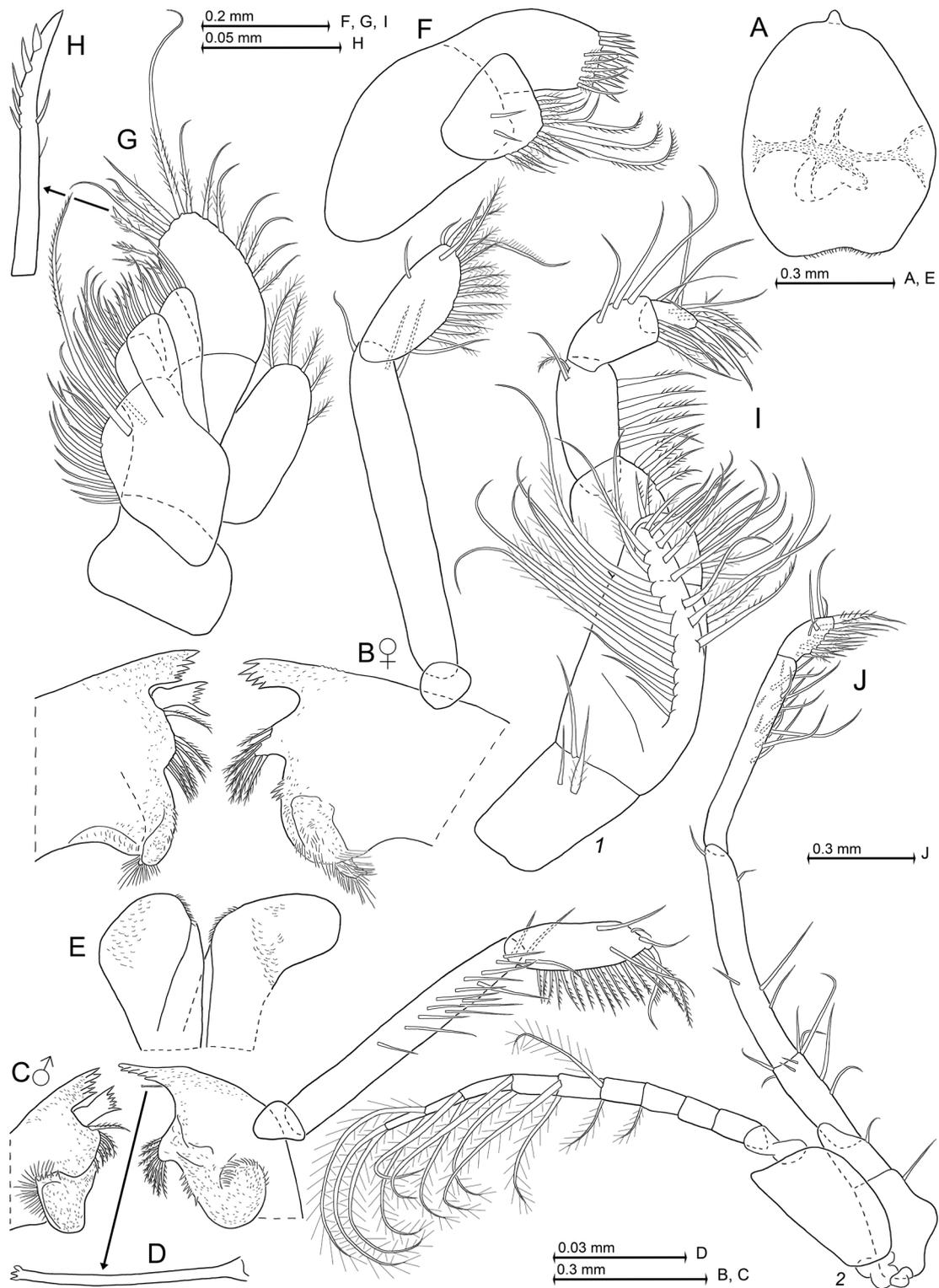
Fig. 6. *Abyssomysis cornuta* gen. et sp. nov., paratypes female with body length 7.9 mm (A–B, E–F, I: ZMH 58256) and males 6.7 mm (C–D, G–H: ZMH 58254), 6.8 mm (J: SMF 55190). **A**. Labrum. **B–C**. Mandibles with right palpus in female (B) and male (C), rostral. **D**. Detail of panel (C) showing reduced lacinia mobilis in right mandible of male. **E**. Labium. **F**. Maxillula. **G**. Maxilla. **H**. Detail of G showing modified spine-seta. **I**. First thoracic endopod. **J**. Second thoracopods.

Etymology

The species name is a Latin adjective with female ending, referring to the pronged eyeplate, well contrasting from that in the remaining Calyptommini so far known.

Type material examined (by present designation)

Holotype

ANGOLA BASIN • ♂ ad. (BL = 6.6 mm); 16°13.329′ S, 5°26.837′ E to 16°14.820′ S, 5°26.702′ E; bottom depth 5433–5434 m; 29 Jul. 2000; DIVA-1 exped., #350; supranet of epibenthic sledge; ZMH 58250.

Paratypes

ANGOLA BASIN • 1 ♂ ad. (BL = 6.7 mm, on slides); same collection datas as for holotype; ZMH 58254 • 1 ♀ ad. (BL = 7.9 mm on slides); same collection datas as for holotype; ZMH 58256 • 1 ♂ ad. (BL = 6.1 mm, in vial), 1 ♀ imm. (damaged, BL = 6.7 mm, in vial); same collection datas as for holotype; ZMH 58255 • 1 ♀ ad. (BL = 8.0 mm in vial); 17°4.935′ S, 4°40.805′ E to 17°07.454′ S, 4°42.276′ E; bottom depth 5460–5460 m; 25 Jul. 2000; DIVA-1 exped., #344; SMF 55189 • 1 ♂ imm. (BL = 3.4 mm, on slides); same collection data as for preceding; ZMH 58251 • 1 ♀ ad. (damaged, estimated BL = 7.0 mm, in vial); 16°16.989′ S, 5°27.279′ E to 16°19.280′ S, 5°27.205′ E; bottom depth 5430–5433 m; 28 Jul. 2000; DIVA-1 exped., #348; ZMH 58253 • 1 ♂ ad. (BL = 6.8 mm, on slides); same collection data as for preceding; SMF 55190 • 1 ♀ imm. (damaged, BL = 5.4 mm, in vial); same collection data as for preceding; ZMH 58252.

Type locality

Station #350 (Table 1) in the abyssal plain of the Angola Basin, 16°14′ S, 5°27′ E, depth 5433–5434 m.

Description of the holotype (Fig. 5A)

All diagnostic features of males. Body length 6.6 mm, specimen not dissected. Cephalothorax without rostrum measures 40% body length, pleon without telson 51%. The great contribution by the pleon is largely due to the elongate sixth pleomere. Carapace including rostrum measures 38% body length. Carapace weakly inflated, with distinct cervical sulcus, anterior third of cephalic portion with knobbly cuticle. Carapace posteriorly emarginated, leaving half of ultimate thoracomere dorsally exposed. Eyes without visual elements. Small, horn-like rudiments of eyestalks widely set apart on a common eyeplate probably homologous to the ocular symphysis. Eyeplate dorsally covered by rostral plate, only part of eyestalk rudiments projecting from behind the rostrum in dorsal view.

ANTENNAE SENSU LATO (Fig. 5A). Antennular trunk is 15% body length. Trunk 1.1 times antennal scale length. Trunk conical with distally increasing width. Terminal segment is 1.4–1.5 times width of basal segment. Transverse articulations between the three segments of the trunk. Segments 1–3 contribute 35%, 20%, and 45% to total trunk length, respectively. Appendix masculina inserts ventrally behind inner flagellum, appendix ⅓ trunk length, its setae up to ⅔. Basal segment of antennular trunk not produced at outer distal corner. Setose lobe dorsally in about median position shortly behind the anterior margin of each segment. Lobe of distal segment with four barbed setae and transverse series of four forward projecting teeth. Tooth size increases laterally. Antennal scale ⅐ body length; its length four times maximum width. Apical lobe contributes 7% to total scale length, lobe wider than long, with seven plumose setae. Antennal peduncle ⅗ scale length, segments 1–3 are 0.1, 0.4, and 0.5 times peduncle length, respectively. Sympod with long, linguiform, terminally rounded lobe on dorsal face.

MOUTHPARTS. Mandibular palpus slender. Its proximal segment, short, smooth all around. Median segment contributing ⅗ to palpus length. Distal ⅔ of median segment with dense series of obliquely

outward-backward projecting setae. Distal segment with dense comb of setae. Terminal segment three times as long as wide, ⅓ palp length.

Thoracopods. Endopod 2 large, carpus and propodus fused, dactylus with medially projecting brush of barbed setae. Sympods 3–8 with anteriorly facing, terminally rounded lobe close to (broken) insertion of praeischium of endopod (basis fused with sympod). Paired penes short, knob-like.

Pleon (Fig. 7D). Sixth pleomere ⅙ body length. Pleomeres 1–5 are 0.3–0.4 times length of pleomere 6. Scutellum paracaudale sinusoid, evenly rounded. Pleopods with setose edge as found in most species of the subfamily Erythropinae. Pleopods 1–3 reduced to setose plates, pleopods 4–5 to setose rods. Pleopod 4, when stretched posteriorly, reaches to the distal seventh of pleonite 6. Tip of pleopod 4 with two setae. The larger seta about as long as the combined two distal segments. Median and basal segments each ending in a pair of shorter setae. Basal segment with two additional setae in subterminal position and other about eight setae ⅓ segment length from basis. Uropods setose all around, exopod terminally rounded, endopod about as long as exopod, each 1.2 times length of sixth pleomere, and extending 0.7 times their length beyond telson. Telson with smooth lateral margins. Potential presence of a minute median tooth (as in some paratypes, Fig. 7I) on terminal margin could not be checked without dissection. The inner robust spines on terminal margin measure 45% telson length, the outer ones 37%. For additional details of telson see above Diagnosis and below Description of paratypes.

Description of paratypes

Body length of adult females 7.0–8.0 mm (n = 3), males 6.1–6.8 mm (n = 4, including holotype). Cephalothorax without rostrum measures 32–40% body length, pleon without telson 51–56%. Carapace including rostrum measures 31–38% body length. Carapace leaving posterior 0.5–1.0 thoracomere dorsally exposed. Carapace with distinct cervical sulcus *in situ*; sulcus not visible in detached carapaces. No pores (> 1 µm) on carapace.

Antennae sensu lato (Fig. 5A–C, H). Antennular trunk strongly dimorphic, size is 10% body length in females, 15–17% in males. Trunk 0.7–0.8 times antennal scale length in females, 1.1–1.2 in males. Trunk almost cylindrical in females, whereas conical with distally increasing width in males. Terminal segment is 0.8–1.0 times width of basal segment in females, 1.3–1.4 in males. Segments 1–3 contribute 43–46%, 19–20%, and 35–39% to total trunk length in females; 32–38%, 18–20%, and 43–50% in males, respectively. Antenna (Fig. 5H) non-dimorphic, scale length 3–6 times maximum width. Apical lobe contributes 5–9% to total scale length, lobe with 6–8 plumose setae. Antennal peduncle 0.9–1.0 times scale length in females, 1.1–1.3 in males.

Mouthparts (Fig. 6A–H). Labrum with frontal lobe bearing a small sinusoid rostral extension; the two posterior lobes terminally with median field of minute, stiff bristles, dorsally with cuticular ridges (dashed lines in Fig. 6A). Median segment of mandibular palpus 5–6 times as long as wide. Pars incisiva of both mandibles with 5–6 moderately sized teeth, processus molaris strongly cuticularized. Lacinia mobilis of left mandible with six teeth; for right lacinia see Diagnosis. Pars centralis of left mandible with 6–7 'spines' bearing stiff bristles or denticles. Right centralis with 8–9 'spines' of that kind distally projecting from a large median lobe. Paired labia mostly smooth, inner terminal edge with small field of stiff setae, lacking spines or teeth. Lateral portions of labia locally with knobbly surface similar to that present in anterior portions of carapace. Distal segment of maxillula (Fig. 6F) ending in 10–14 slender, acute, smooth spines; subterminally with 4–6 small, basally barbed setae on caudal face. Mesial margin of endite with dense set of setae, 3–4 of which are strong, extending beyond the distal segment, the latter setae on their distal half barbed by stiff bristles. Maxilla (Fig. 6G–H) with well-developed exopod, 2-segmented palp and four strongly setose endites arising from trunk; exopod elliptical, extending only slightly beyond basal segment of palp, terminally with five plumose setae that decrease in size laterally;
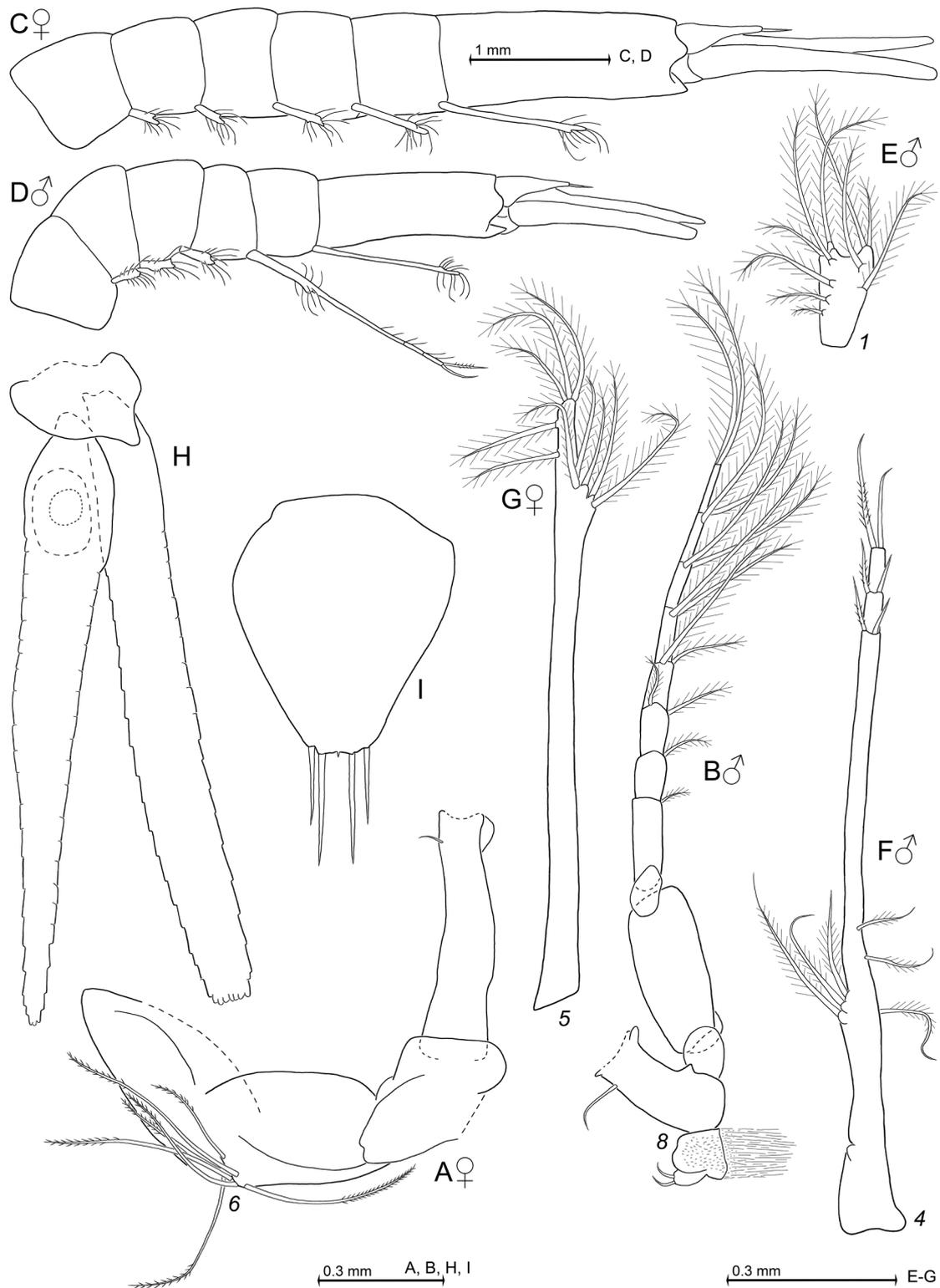
Fig. 7. *Abyssomysis cornuta* gen. et sp. nov., holotype, adult male with body length 6.6 mm (D: ZMH 58250), paratypes female 7.9 mm (A, C, G: ZMH 58256) and males 6.7 mm (B, F: ZMH 58254), 6.8 mm (E, H–I: SMF 55190). **A**. Sixth thoracic sympod with oostegite. **B**. Eighth thoracic sympod with exopod and penis. **C–D**. Pleon in female (C) and male (D), lateral. **E**. First male pleopod. **F**. Fourth male pleopod. **G**. Fifth female pleopod. **H**. Uropods, ventral. **I**. Telson.

apical segment of palp is 1.6–1.8 times length of basal segment; terminal margin of apical segment weakly convex, almost truncate, distally with 4–5 modified spine-setae armed with various numbers of spinules and barbs (Fig. 6H); outer edge with a subbasally barbed seta which is longer than the apical segment; inner margin of this segment mostly smooth, with spines and setae only along its distal third, outer margin well setose; first (basal) endite with long, terminally barbed seta overreaching the palp (measured without setae and spines); endites 2–3 each with normal setae plus 3–6 modified setae whose barbs are to varying degree transformed to denticles; endite 4 with smooth or barbed setae only.

Foregut (Fig. 8E–H). Entire foregut with setae and moderately-sized spines only, no clavate spines or heavily armed spines or teeth. Primary cardiac filter formed ventrally by combs of stiff setae at inlet of oesophagus. Cardiac part of foregut with series of short, smooth spines with setae in between, on mesial and terminal margins of lateralia; with slender, microserrated spines (Fig. 8F) on disto-lateral portions of lateralia; and with apically pronged, proximally smooth, slender spines (Fig. 8G) on lateral
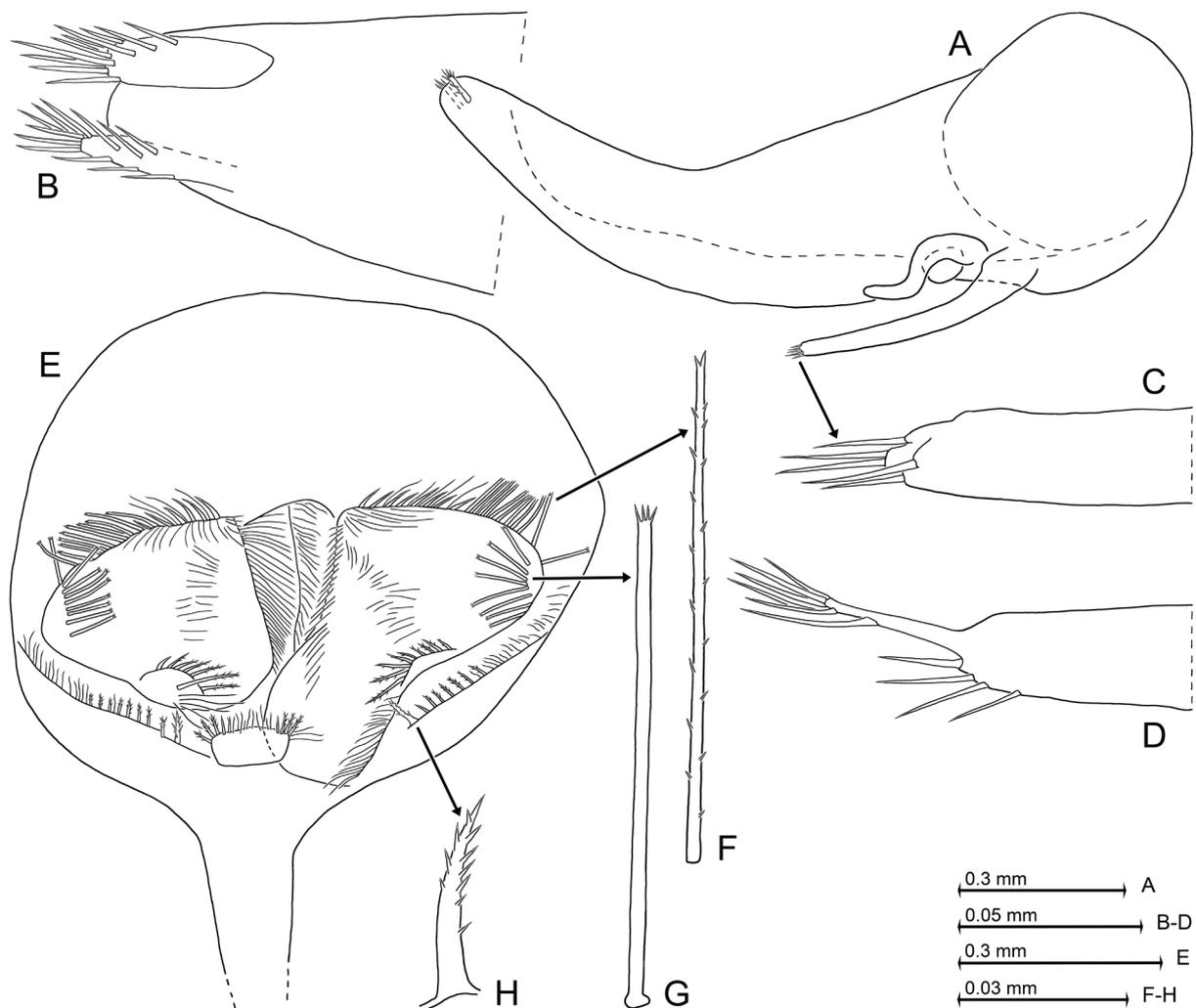
Fig. 8. *Abyssomysis cornuta* gen. et sp. nov., paratype female with body length 7.9 mm (E–H: ZMH 58256) and three of its nauplioid larvae at substage N2 (A–D). **A**. Nauplioid in toto, lateral. **B**. Tip of nauplioid abdomen in another specimen, obliquely dorsal. **C**. Detail of panel (A) showing tip of antennula. **D**. Tip of nauplioid antennula in another specimen. **E**. Cardiac portion of foregut, dorsal aspect, dorsal wall omitted. **F–H**. Details of E, showing modified spines.

portions. Stouter, centro-apically serrated spines (Fig. 8H) of various sizes on posterior part of lateralia, on dorso-lateral infolding, and on disto-lateral edges of superomedianum. Lateralia with weak and superomedianum with even weaker but distinct setation in addition to armature of spines. No setae present in pyloric part of foregut.

THORAX (Figs 6I–J, 7A–B). Thoracic exopods 1, 8 with terminally weakly widened basal plate rounded on outer edge. Exopods 2–7 with larger plate that is terminally more strongly widened, its edge more narrowly rounded. Exopods 1, 8 with 8-segmented, exopods 2–7 with 9-segmented, setose flagellum. Endopod 1 (Fig. 6I) only 10–13% body length measured from basis to dactylus; coxa with 0–3 setae close to segmental border with basis; basis with long, slender, all along setose endite; remaining segments without endite; dactylus with slender, smooth claw. First thoracic epipod foliaceous, linguiform, without seta. Endopod 2 (Fig. 6J) measures 28–37% body length; this is more than twice the size of endopod 1; basis with indistinct endite representing a rounded, weak prominence from inner margin; merus of both sexes longer than combined praeischium plus ischium, but shorter than combined carpopropodus plus dactylus; dactylus with brush of setae, without claw. Endopods 3–8 broken. Oostegite 1 (Fig. 7A) comparatively large, contributing to the anterior closure of the marsupium; oostegites 2–3 normal, even larger. Oostegites 1–3 proximally and dorsally with setae bearing short, acute barbs along distal 30–50%; ventral margin of oostegites 2–3 with plumose setae covering the slit between opposite, homologous oostegites. Penes (Fig. 7B) short, apically bilobate, with two large (related to penis size), smooth setae. No median processes visible on sternites 4–8 of both sexes.

PLEON (Fig. 7C–I). Sixth pleomere ⅕–⅙ body length. Width of pleopods, uropods and telson perspectively narrowed in Fig. 7C, D. Pleopod 4, when stretched posteriorly, reaches (without setae) to distal third of pleonite 5 in females, almost to the end of that pleonite in males. Tip of male pleopod 4 (Fig. 7F) with one smooth seta and one slightly longer, medially barbed seta. The smooth seta shorter up to about as long as the combined two apical segments. The median and the basal segments also end in a pair of such setae, but with both setae shorter and the smooth one more robust. The long basal segment subterminally with 0–2 additional, smooth, robust setae; additional 6–9 longer, barbed setae at ⅓ segment length from basis.

ENDOPOD OF UROPODS (Fig. 7H) with comparatively small statocyst containing a small statolith mineralized with fluorite; statoliths spherical in dorsal view, diameter 71–89 μm, this is 1.0–1.2% body length (n = 10 statoliths of 5 adults). Statolith formula not well established. Terminal margin of telson (Fig. 7I) with or without a minute median tooth. The inner robust spines of telson measure 41–45% telson length, the outer ones 31–37%.

Distribution

Recorded at stations #344, #348 and #350 in the abyssal plain of the Angola Basin, range 16°13′ S to 16°17′ S, 4°40′ E to 5°27′ E, depth 5430–5460 m (Table 1). All positive samples were taken with self-closing epibenthic sledge. At least one sample was captured in the lower, another one in the upper net, suggesting that at least some specimens were positioned shortly above the sediment.

Eggs and larvae

Considering only non-damaged specimens, the female with 8.0 mm body length carried eight eggs with diameters of 0.47–0.50 mm, the female with 7.9 mm carried six nauplioid larvae at substage N2 with 1.3–1.5 mm body length. Nauplioids (Fig. 8A–D) with smooth cuticle all around, except for 5–10 slender spines at tip of antennula and a pair of cercopods in subapical position on abdomen. Each cercopod armed with a fan of numerous acute, slender spines.

Gut contents

Two dissected foreguts contained mainly fine, unidentifiable material, mineral particles and fragments of detritus; maximum size of particles 12 µm. These components also found in midgut and hindgut, with greater fraction of mineral particles also in oesophagus. There were no traces of meiofauna or macrofauna in oesophagus and foregut.

Discussion

Horizontal distribution

The three species of Lophogastrida and one species of Mysida collected by "DIVA-1" in the Angola Basin show panoceanic or circumtropical distribution, respectively, with roughly symmetrical latitudinal limits: 66° N–74° S in *Neognathophausia gigas*, 66° N–64° S in *Eucopia grimaldii*, 45° N–40° S in *Siriella thompsonii*, and 34° N–22° S in *Fagegnathophausia gracilis*. The new record at 22° S made the latitudinal limits of the latter species roughly symmetrical. The limits of 51° N–54° S are also symmetrical in the Mysida species *Boreomysis bispinosa* but confined to the Atlantic Ocean including the Atlantic sector of the Southern Ocean.

Four of the Mysida species reported here have previously been known only from the Northern Hemisphere. Their latitudinal range is now extended southward to the Angola Basin in the SE-Atlantic. The resulting limits are 60° N–22° S in the E-Atlantic for *Amblyops tenuicauda*, 61° N–22° S in the E-Atlantic and Mediterranean for *Paramblyops rostratus*, 62° N–17° S in the E-Atlantic and Mediterranean for *Pseudomma nanum*, and 58° N–22° S in the E-Atlantic, W-Mediterranean and NW-Pacific (off Japan) for *Parapseudomma calloplura*. The data for the here first-described species from the Angola Basin are 20° S for *Petalophthalmus cristatus*, 16–17° S for *Abyssomysis cornuta* gen. et sp. nov.

Among the five here listed, non-panoceanic Mysida species from the N-Atlantic, only *Boreomysis bispinosa* has also been previously reported from the S-Atlantic. The new southern limits encountered in the Angola Basin are in line with the conclusions by Brandt *et al.* (2005) that the abyssal isopod fauna of the Angola Basin appears to be isolated from the subantarctic and South African deep fauna; and that the Walvis Ridge may represent a main distribution barrier for the abyssobenthos in the south of the Angola Basin.

The epibenthic sledge samples yielded smaller numbers of abyssobenthic Mysida species in the southern study area no. 1 compared to the northern areas 5–6 (Table 1). However, the numbers of positive stations and species were insufficient to test the significance of that pattern. Based on relatively abundant peracarid taxa – mostly isopods and cumaceans (but only a few mysids) – Brandt *et al.* (2005) found significantly lower species diversity in the southernmost station compared to the northern stations. They argued that the difference may reflect higher food concentrations as concluded from higher biomass and taxa numbers recorded by Kröncke & Türkay (2003) in box corer samples at the more northern stations. According to the latter authors the different yields appear to be related to different water masses north and south of the Angola-Benguela Front crossing the study area, whereby the production in the north appears favoured by the input of nutrients and suspended matter from rivers.

In analogy, the "Valdivia" expedition yielded in the Gulf of Guinea a higher diversity of Lophogastrida and Mysida with vertical hauls from 600–4000 m depth to the surface in the northern, warmer waters of the Guinea Current compared with hauls from 3000–4000 m to the surface in the more southern, colder waters of the Benguela Current (see yields in samples listed by Illig 1930: 485–486; species list supplemented by Wittmann in press).

Vertical distribution

The circumtropical lophogastrid *Fagegnathophausia gracilis* is essentially bathypelagic, previously known from a depth range of 500–5225 m. The panoceanic *Neognathophausia gigas* is meso- to bathypelagic, range 650–4023 m; *Eucopia grimaldii* is also essentially meso- to bathypelagic, range 200–4829 m. The bottom depths, 5161–5430 m, of the new samples in the Angola Basin are mostly greater than the previously published limits, but the actual sampling depths may have been shallower due to the use of a non-closing device (Agassiz Trawl). All five Lophogastrida species sampled by the combined "Valdivia" and "DIVA-1" expeditions in waters of the Angola Basin show a circumtropical to panoceanic distribution and are essentially meso- to bathypelagic; none are epipelagic.

In the Angola Basin the normally epipelagic Mysida species *Siriella thompsonii* was sampled with the Bongo net at the surface, while one juvenile specimen was taken with the box corer at 5493 m bottom depth. Catching this species with a box corer sounds unlikely but has its precedence in a single specimen recorded by Price *et al.* (1986) in a daytime grab sample from 46 m depth in the Gulf of Mexico. The precise sampling depth cannot be judged for *Petalophthalmus cristatus* taken at or over 5487–5497 m bottom depth in the Angola Basin because it was captured with a non-closing device (Agassiz Trawl).

The remaining six Mysida species in the present collection were taken on and a short distance above the sea floor of the Angola Basin with a self-closing epibenthic sledge that gives reliable information on sampling depth. Among these all five previously described species were known only from less than 5000 m depth. Depth limits of the present samples are integrated with published limits, yielding the following new ranges: 700–5460 m in *Boreomysis bispinosa*, 450–5433 m in *Amblyops tenuicauda*, 200−5434 m in *Paramblyops rostratus*, 360−5460 m in *Pseudomma nanum*, and 94−5460 m in *Parapseudomma calloplura*. The range is 5430−5460 m in the here first described *Abyssomysis cornuta* gen. et sp. nov.

Among the species taken with epibenthic sledge, *Pseudomma nanum* was present only in the epinet, despite the fact that this species was considered suprabenthic by Madurell & Cartes (2003). *Boreomysis bispinosa*, *Amblyops tenuicauda*, *Paramblyops rostratus*, *Parapseudomma calloplura* and *Abyssomysis cornuta* gen. et sp. nov. appeared in both epinet as well as supranet, pointing at least partly to a suprabenthic habit. In accordance with this, *B. bispinosa* has already previously been taken with both benthic and pelagic devices. Sorbe & Elizalde (2013) considered *Paramblyops rostratus* as suprabenthic. Frutos & Sorbe (2013) sampled *Parapseudomma calloplura* in the near-bottom water layer.

All seven Mysida species (listed in the Introduction) sampled by the "Valdivia" expedition in waters of the Angola Basin show a circumtropical to panoceanic distribution. Among these species six are essentially meso- to bathypelagic, only *Arachnomysis megalops* is mesopelagic, and none are epipelagic. These seven species were not found in the "DIVA-1" material, most likely due to greater sampling depth and exclusion of pelagic species by the prevailing use of devices that keep the nets open only during contact with the sea floor.

Feeding and deep-sea adaptation

The weak grinding surface of the processus molaris in both mandibles, the reduced lacinia mobilis in the right mandible and the absence of large, heavily armed spines or teeth in the foregut (Fig. 8E−H) suggest weak abilities of *Abyssomysis cornuta* gen. et sp. nov. for macerating large and/or hard particles. The second thoracic endopod has no claw, but resembles a brush with a long, slender broomstick. These features point to sweeping for soft food rather than predation. Finely particulate organic material together with minute mineral particles in the foregut (examined in two specimens) confirm that the mouth-parts are used for sweeping detritus from the sediment surface. The absence of the secondary filter also favours infiltration of mineral particles from the foregut into the midgut. The maximum particle size of

12 μm in the foregut fits with sediment parameters in the study area, where Kröncke & Türkay (2003) obtained 95−99% of the sediment samples by passing through a sieve with 63 μm mesh size. As a striking analogy, the masticatory part with lacinia mobilis absent in the right mandible of *Mysimenzies hadalis* Băcescu, 1971 (tribe Mysimenziesini) shows an astounding similarity, almost identical with that found in *A. cornuta* gen. et sp. nov. females. Details about feeding are not known in the former species.

Reduction of the lacinia mobilis on one of the two mandibles is also found in at least nine bathyal to abyssal species of the genera *Hansenomysis* Stebbing, 1893, *Bacescomysis* Murano & Krygier, 1985, *Petalophthalmus* and *Ipirophthalmus* gen. nov. These three genera belong to the Petalophthalmidae and are morphologically remote from *Abyssomysis* gen. nov. and *Mysimenzies* Băcescu, 1971. In the respective species of Petalophthalmidae, the lacinia mobilis of the left or the right mandible is reduced to varying degrees (Birstein & Tchindonova 1958; Băcescu 1971a, 1971b; De Jong-Moreau *et al.* 2001; San Vicente & Corbari 2015; present study). Based on the strong setation of perioral structures Băcescu (1971b) argued that *Hansenomysis* species are detritus feeders. This was confirmed by SEM-studies that De Jong-Moreau *et al.* (2001) performed on the processus molaris in *Bacescomysis abyssalis* Murano & Krygier, 1985, a species closely related to *Hansenomysis*. They found a smoother and more concave processus compared to that in omnivorous Mysida from bathyal to sublittoral environments, which show a phytophagous and carnivorous tendency.

The feeding type is less clear for the above-described *Petalophthalmus cristatus* sp. nov. because it has a trilobate processus molaris with a weaker setation in the right mandible. The broom-like thoracic endopod 5 may hint at detritus feeding. In line with this, the spines of the gastric mill are small in relation to the size of the foregut (Fig. 4A−E). The numbers and absolute sizes of the spines are not larger than those found in much smaller sized, sublittoral species of the family Mysidae, many of which show a predatory mode of life (e.g., three species of *Mysidopsis* G.O. Sars, 1864, studied by Wittmann & Griffiths 2018). At the same time, the prehensile, heavily armed thoracic endopods 1–2 (found in all species of *Hansenomysis*, *Petalophthalmus* and *Ipirophthalmus* gen. nov.) and the giant mandibular palps (in *Petalophthalmus* and *Ipirophthalmus* gen. nov.) are indicative of a predatory habit. As a possible synthesis of the divergent characteristics, *P. cristatus* sp. nov. may be omnivorous, probably advantageous for survival in oligotrophic, deep oceanic waters.

As an additional, striking analogy of *Abyssomysis cornuta* gen. et sp. nov. with species of Petalophthalmidae, all seven currently acknowledged bathyal to abyssal species of *Bacescomysis* and seven species of *Hansenomysis* show a non-incised, transverse eyeplate with well-developed horn-like extensions lacking visual elements. The remaining eleven species of *Hansenomysis* exhibit rounded, lappet-like or inconspicuous extensions (Faxon 1895; Băcescu 1971b; Lagardère 1983; Murano & Krygier 1985; Bravo & Murano 1997b; Casanova & de Jong 2005; San Vicente & Sorbe 2008). Due to the lack of visible sensory structures the horns and lappets are here interpreted as remnants of convergent eye reduction in dark, deep waters. This is also valid for the larger eyes with reduced cornea in the here revised genus *Petalophthalmus*.

Morphology of the Petalophthalminae and establishment of *Ipirophthalmus* gen. nov.

Only five species today, considered valid, have been described between 1875 and 1998 as pertaining to the genus *Petalophthalmus*. This contrasts with as many as three additional species, including the new one, in the period 2014–2020. The recent increase to a total of eight species has highlighted a previously unnoticed morphological divergence within this genus. This first group includes the type species *P. armiger* together with *P. papilloculatus*, *P. papuaensis* and *P. cristatus* sp. nov., characterized by reduced eyes, anterior carapace margin without pair of distinct submedian processes, and terminal margin of the telson with spines but without setae. The second group comprises *P. liui*, *P. macrops*, *P. oculatus* and *P. caribbeanus* with well-developed, functional cornea, anterior carapace margin with

a pair of submedian processes flanking the rostrum, and terminal margin of the telson with setae and spines. The latter set of characters is shared with both so far known species of *Pseudopetalophthalmus*, suggesting an inconsistency between the former morphological concepts of *Petalophthalmus* and *Pseudopetalophthalmus*. In order to eliminate this supposed inconsistency (polyphyly) of the two character sets within the genus *Petalophthalmus*, the species *P. liui*, *P. macrops*, *P. oculatus* and *P. caribbeanus* are transferred to a separate genus, here named *Ipirophthalmus* gen. nov. The redefined *Petalophthalmus* and the new *Ipirophthalmus* gen. nov. share an antennal scale that is setose all around, differing by that feature from the remaining two genera of the subfamily Petalophthalminae, namely from *Pseudopetalophthalmus* and *Parapetalophthalmus* characterized by a smooth outer portion of the antennal scale ending at a single spine.

The type species *Ipirophthalmus liui* and *I. macrops* along with all four now known species of *Petalophthalmus* share thoracic endopods 3–4 reduced to only 1–2 segments, and endopod 5 elongate, ending in a brush of setae (Fig. 3C). These legs were reported as being different in the remaining two species here also assigned to *Ipirophthalmus* gen. nov.: Pillai (1968) reported an elongate endopod 4 ending in a brush of setae upon redescription of *P. oculatus* (now *I. oculatus*) based on a single specimen. San Vicente & Corbari (2015), however, concluded that Pillai (1968) may have confounded endopod 5 with endopod 4, due to the habitus of this specimen illustrated by Pillai (1968: fig. 1) with thoracopods 3–4 broken. Upon first description of *P. caribbeanus* (now *I. caribbeanus*), O.S. Tattersall (1968) noted without presentation of figures: "Third thoracic appendage long and very slender with the distal end armed with a cluster of setae surrounding a very minute nail". According to Lagardère (1983) and Fukuoka (2009), any (up to all) of the endopods 3–5 ending in a brush are also found in a number of species of *Hansenomysis* Stebbing, 1893, *Ceratomysis* Faxon, 1893 and *Bacescomysis* Murano & Krygier, 1985, all belonging to the subfamily Hansenomysinae Wittmann, Ariani & Lagardère, 2014, within the family Petalophthalmidae. That type of endopod was so far reported from diverse species in five out of a total of seven genera; this wide distribution suggests symplesiomorphy for both subfamilies of the Petalophthalmidae.

Validity of *Petalophthalmus cristatus* sp. nov.

The new species fits perfectly with the above-revised diagnosis of the genus *Petalophthalmus*. Accordingly, its validity requires a detailed discussion solely of the differences from the remaining three species of its genus:

The characters reported by Hendrickx & Hernández-Payán (2018) upon redescription of *Petalophthalmus armiger* Willemoës-Suhm, 1875 differ from the new species in the outer flagellum of antennular peduncle without subbasal ridge; antennal flagellum of female figured by these authors with more (> 11) segments; merus of thoracic endopod 2 with outer margin smooth, carpopropodus with only three setae on outer margin; flagellum of thoracic exopods 3–4 with more segments (19–21); endopod 5 with subequal praeischium, ischium and merus (vs much longer merus in Fig. 3C), carpus not shorter than propodus; female pleopods terminally without pair of spines (vs present in Fig. 3O–P); basal segment of uropodal exopod without basally barbed seta (in addition to spines) on disto-lateral corner.

Petalophthalmus papilloculatus San Vicente, Frutos & Cartes, 2014 differs, according to its first description, from the new species by a small, acute tooth behind anterior margin of carapace, no rostrum developed; outer flagellum of antennular peduncle without subbasal ridge; antennal flagellum with fewer (5) segments in females; pars centralis of right mandible without digitus; distal segment of maxillula with few (7) serrated spines; claw of thoracic endopods 1–2 fused with dactylus; coxa of endopod 1 without endite; merus of endopod 2 with smooth outer margin, carpopropodus without barbed setae apart from the usual smooth setae; flagellum of exopods 3–4 with more segments (19–20);

endopod 8 shorter than exopod; endopod of uropods not extending beyond telson; basal segment of exopod with three spines but no barbed seta on disto-lateral corner.

Petalophthalmus papuaensis San Vicente & Corbari, 2015, differs according to its first description, from the new species by the presence of some scattered visual elements in the globular cornea; small, acute tooth behind anterior margin of carapace, no rostrum developed; outer flagellum of antennula without subbasal ridge; antennal flagellum of female with more (7) segments; processus molaris of right mandible not trilobate; distal segment of maxillula with fewer (7) serrated spines; coxa of thoracic endopod 1 without endite; carpopropodus of endopod 2 without barbed setae apart from the usual smooth setae; endopod 5 without apical claw, terminal margin of propodus armed with two short cuspidate setae in addition to the pair of microserrated setae, the latter as in Fig. 3D; flagellum of thoracic exopods with few segments: exopods 3–4 with 13–15, exopod 5 with 16, exopods 6–8 with 13–16; female pleopod 1 unsegmented; female pleopods 1–4 (possibly also no. 5) terminally without pair of spines as in Fig. 3O–P; basal segment of uropodal exopod with three spines but no barbed seta on disto-lateral corner.

Historical outline of the tribe Calyptommini W.M. Tattersall, 1909

Based on the undivided eyeplate and the rod-like pleopods 1–5 in both sexes, W.M. Tattersall (1909) established the subfamily Calyptomminae as a monotypic taxon upon first description of *Calyptomma puritani* W.M. Tattersall, 1909. Hansen (1910) did not list this subfamily in his key to subfamilies and tribes of the Mysidae. Shortly thereafter, W.M. Tattersall (1911) redefined the Calyptomminae in order to receive the most similar genus *Michthyops* W.M. Tattersall, 1911, newly established by him for two species previously attributed to the genus *Pseudomma* G.O. Sars, 1870, by Vanhöffen (1897) and Ohlin (1901). Without indication of details, Illig (1930) and Tchindonova (1981) listed *Calyptomma* and *Michthyops* within the tribe Erythropini, whereas Mauchline (1980) placed *Calyptomma* within the Leptomysini but *Michthyops* within the Erythropini. Finally, Nouvel *et al.* (1999) reinstituted the Calyptomminae at tribe level as Calyptommini and followed W.M. Tattersall (1911) by inclusion of *Calyptomma* as well as *Michthyops*. A close relationship of the two genera was confirmed with sequencing of nuclear small-subunit ribosomal DNA by Meland & Willassen (2007) and Chevaldonné *et al.* (2015), who equally obtained *Michthyops parva* (Vanhöffen, 1897) (now as *M. parvus*) and *Calyptomma* sp. as closely-related species within the subfamily Erythropinae. The reinstitution proposed by Nouvel *et al.* (1999) was acknowledged by Wittmann *et al.* (2014), Meland *et al.* (2015) and San Vicente (2017). In accordance with the resulting system, Wittmann *et al.* (2014) provided revised diagnoses of the tribes Erythropini and Calyptommini, the latter now revised further as explained below.

Monotypy, validity and affiliation of *Abyssomysis cornuta* gen. et sp. nov.

The sexual dimorphism among the ten specimens studied here goes beyond published data for most species in the order Mysida. Unusual dimorphisms of the new species are the structure and relative dimensions of the antennal peduncle, lacinia mobilis, and by the setation of the mandibular palpus. Importantly, mandible structure has so far been poorly checked for dimorphisms, and the mandibles are particularly scantly known in the tribe Calyptommini. Be that as it may, the strong differences pose the question whether the five females and five males studied here may represent more than a single species. Arguments for monotypy are supported by the fact that both sexes were found together at three stations, no other specimens were found elsewhere, and based on the detailed structure of eyeplate, maxillula, maxilla, first and second thoracic endopods, and telson.

Within the Erythropinae the new genus and species fits with the tribe Calyptommini W.M. Tattersall, 1909, by eyeplate without median cleft, by uniramous pleopods, reduced to endopods in both sexes, unsegmented in female pleopods 1–5 and male pleopods 1–3, 5, and by non-serrated lateral margins of the telson. However, it differs from all four so far known species of this tribe by rudimentary eyestalks laterally on the eyeplate and by segmentation of the uniramous male pleopod 4.

Uniramous pleopods reduced to unsegmented endopods in both sexes (with the exception of the segmented [uniramous] fourth male pleopod) are shared by the new taxon with *Inusitatomysis insolita* Ii, 1940, the only representative of the tribe Inusitatomysini Wittmann, Ariani & Lagardére, 2014. However, this species differs strongly by well-developed eyes, serrated outer margin of the antennal scale, and a pair of setae arising from the bottom of the telson cleft.

Rudimentary eyestalks laterally on the eyeplate are shared by the new taxon with *Marumomysis hakuhoae* Murano, 1999, and *M. antarctica* San Vicente, 2007, pertaining to the tribe Mysimenziesini Tchindonova, 1981. However, the Mysimenziesini differ from the new taxon by the basal segment of the antennular trunk medio-dorsally with sensory fossette or with setose elevation, by a biramous fourth male pleopod with both rami multi-segmented, and by serrated lateral margins of the telson.

According to the diagnoses by Wittmann *et al.* (2014), all remaining tribes of the Erythropinae show well-developed, biramous male pleopods, with the reservation that males are unknown in the Thalassomysini Nouvel, 1942. This tribe is remote from the new taxon by well-developed, separate eyestalks with a cornea reduced to different degrees, an antennal scale setose all around, a strongly asymmetrical labrum, and four pairs of oostegites.

In summary, *Abyssomysis cornuta* gen. et sp. nov. differs from all remaining taxa of Erythropinae and even from all Mysida by the combination of rudimentary eyestalks laterally on the eyeplate together with uniramous pleopods reduced to unsegmented endopods in both sexes, with the exception of the segmented (uniramous, endopodal) fourth male pleopod. The overall morphological distance appears least from the Calyptommini, whose diagnosis is consequently here amended to cover the respective combination of characters found in the new genus and species.

Key to genera and species of the subfamily Petalophthalminae

Distribution data modified and updated from San Vicente *et al.* (2014).

Petalophthalmidae with mandibular palp long, powerful, and prehensile; thoracopods 1–2 without exopod, thoracopods 3–8 with well-developed exopods; powerful subchelae formed by thoracic endopods 1–2; merus of endopod 1 with large endite; ischium of endopod 2 with again larger, subquadrangular endite; endopod 5 normal-sized or elongate; endopods 3–4, 6–8 normal or reduced to different degrees; female pleopods uniramous or biramous, male pleopods biramous; exopods of uropods with subterminal suture. Subfamily **Petalophthalminae** Czerniavsky, 1882 (panoceanic, depth 0–5500 m, mainly 100–500 m) 1

1. Outer margin of antennal scale with smooth portion ending at a single spine; eyes well developed 9
− Antennal scale setose all around; cornea well developed or reduced 2

2. Eyes without or with strongly reduced visual elements; terminal margin of telson without setae, with spines and in most species also with small teeth. Genus *Petalophthalmus* Willemoës-Suhm, 1874 6
− Cornea well developed, functional; terminal margin of telson with setae, spines, and with small teeth in between. *Ipirophthalmus* gen. nov. 3

3. Antennal scale 2-segmented; disto-lateral corner of the basal segment of the exopod of uropods with spines only, without seta; coxa of thoracic endopod 1 without endite .... *Ipirophthalmus liui* (Wang, 1998) gen. et comb. nov. (northern South China Sea, depth 194–219 m)
− Antennal scale unsegmented; disto-lateral corner of the basal segment of the exopod of uropods with several spines and one seta; coxa of thoracic endopod 1 with endite 4

4. Telson mid-terminally emarginated by, if at all, up to 1% of its length, lateral margins with 21–22 spines each, terminal margin with two long setae, nine large, toothed spines and small teeth in between ....***Ipirophthalmus macrops*** (Tchindonova & Vereshchaka, 1991) gen. et comb. nov. (W-Indian Ocean: off Madagascar, benthopelagic, depth 360–555 m)
   – Telson mid-terminally emarginated by, if at all, up to 5% of its length, lateral margins with less than 20 spines each, terminal margin with four long setae, seven large, toothed spines and small teeth in between 5

5. Telson mid-terminally emarginated by about 5% of its length, lateral margins with 12–15 spines each; eyestalk without ocular papilla; female pleopods biramous ....***Ipirophthalmus caribbeanus*** (O.S. Tattersall, 1968) gen. et comb. nov. (Caribbean, mesopelagic, depth 329–366 m)
   – Telson mid-terminally emarginated by about 2% of its length; lateral margins with 17–18 spines each; eyestalk with ocular papilla; female pleopods uniramous ....
   ....***Ipirophthalmus oculatus*** (Illig, 1906) gen. et comb. nov. (NW-Arabian Sea, W-Indian Ocean, off Japan, mesopelagic to bathybenthic, depth ≤ 1200 m according to Illig 1906, compatible with 220–430 m indicated by San Vicente *et al.* 2014)

6. Anterior margin of carapace truncate, without rostrum; eyes without or with some small, scattered visual elements 8
   – Anterior margin of carapace with triangular rostrum forming a longitudinal crista; eyes without visual elements 7

7. Eyes leaf-like; merus of thoracic endopod 2 with outer margin smooth, carpopropodus with three short setae on outer margin; thoracic endopod 5 with subequal praeischium, ischium and merus; carpus not shorter than propodus ....***Petalophthalmus armiger*** Willemoës-Suhm, 1875 (panoceanic, 56° N to 46° S, bathypelagic to abyssobenthic, depth 900–4572 m)
   – Eyes elongate ovoid, dorsoventrally flattened by a factor of 1.4; merus of thoracic endopod 2 with five large setae on outer margin, carpopropodus with three long and six short setae on outer margin; merus of thoracic endopod 5 longer than combined praeischium and ischium; carpus less than half length of propodus ....
   ....***Petalophthalmus cristatus*** sp. nov. (SE-Atlantic: Angola Basin, depth ≤ 5497 m)

8. Eyes without eyestalks and without visual elements. Merus of thoracic endopod 2 with outer margin smooth, carpopropodus with three setae on outer margin; thoracic endopod 5 with subequal ischium, merus and carpus, each longer than praeischium, propodus 2-segmented with proximal segment half length of the distal one; telson with 25–37 spines on distal ⅔ of each lateral margin ....
   ....***Petalophthalmus papilloculatus*** San Vicente, Frutos & Cartes, 2014 (NE-Atlantic: Galicia Bank off Iberian Peninsula, depth 1536–1809 m)
   – Eyes with definite eyestalks, globular cornea containing some scattered visual elements not forming a compound sensory organ; merus of thoracic endopod 2 with outer margin bearing seven setae, carpopropodus with three long and six short setae along outer margin; endopod 5 with subequal praeischium, ischium and merus, carpus ⅔ length of propodus; telson with 20–22 spines on distal half of each lateral margin ....***Petalophthalmus papuaensis*** San Vicente & Corbari, 2015 (tropical W-Pacific: Bismarck Sea, depth 800–1065 m)

9. Thoracic endopods 6–8 rudimentary, with only 1–2 segments; thoracic endopods 3–4 terminating in two setae ....monotypic genus ***Parapetalophthalmus*** Murano & Bravo, 1998; species ***P. suluensis*** Murano & Bravo, 1998 (central Indo-Pacific: Sulu Sea, depth 285–306 m)
   – Thoracic endopods 3–8 with more than four segments terminating in strong claw. Genus ***Pseudopetalophthalmus*** Bravo & Murano, 1997 10

10. Claw of thoracic endopods 1–2 fused with dactylus; thoracic endopods 3–5 with carpopropodus longer than merus; lateral margins of telson with four spines ....***Pseudopetalophthalmus australis*** (Panampunnayil, 1982) (west coast of Australia, nocturnal surface to subsurface plankton)
– Claw of thoracic endopods 1–2 not fused with dactylus; thoracic endopods 3–5 with carpopropodus shorter than merus; lateral margins of telson with 7–8 spines ....***Pseudopetalophthalmus japonicus*** Bravo & Murano, 1997 (east coast of central Japan, epibenthic, depth 74–130 m)

Key to genera and species of the tribe Calyptommini

Distribution data modified and updated from Petryashov (2014).

Mysidae: Erythropinae with eyeplate showing no distinct median cleft, plate mainly formed by a transverse median bridge, eyes rudimentary or absent. Smooth outer margin of antennal scale ending in a tooth. Pleopods uniramous, reduced to sparsely setose rods or plates in both sexes. Telson entire, its lateral margins mostly smooth, terminal portions with spines .... Tribus **Calyptommini** W.M. Tattersall, 1909 (Arctic and Atlantic oceans, Mediterranean, 81° N to 17° S, depth 27–5460 m, mainly bathybenthic) …..…… 1

1. Lateral portions of eyeplate with anteriorly directed, conical lobes; telson about as long as wide; appendix masculina strong, with large brush of setae ....
.......***Abyssomysis cornuta*** gen. et sp. nov. (abyssal plain of the Angola Basin, depth 5430–5460 m)
– Eyeplate without antero-lateral protrusions; telson length at least twice the width at basis; appendix masculina reduced, without brush of setae 2

2. Anterior margin of eyeplate in the middle with a deep, rounded depression; antennal scale short, not extending beyond antennular trunk; telson subtriangular, terminally rounded .... monotypic genus ***Calyptomma*** W.M. Tattersall, 1909, with species ***Calyptomma puritani*** W.M. Tattersall, 1909 (Mediterranean, depth 600–1860 m)
– Anterior margin of eyeplate without or with a very small median depression; antennal scale clearly extending beyond antennular trunk; telson trapezoid, terminally rounded. Genus ***Michthyops*** W.M. Tattersall, 1911 3

3. Eyeplate completely or for the most part covered by flattened anterior edge of carapace; length of antennal scale exceeds seven times width; terminal margin of telson with 3–4 pairs of robust spines ....***Michthyops arcticus*** Petryashov, 1993 (Arctic: Canadian basin, north of Laptev Sea, depth 1079–3550 m)
– Eyeplate covered by anterior edge of carapace for less than half its length; length of antennal scale less than seven times width 4

4. Telson length less than 2.5 times maximum width near basis; terminal margin of telson with three pairs of robust spines ....
..............................***Michthyops parvus*** (Vanhöffen, 1897) (N-Atlantic, Arctic, depth 183–2900 m)
– Telson length exceeds 2.5 times maximum width near basis; terminal margin of telson with 4–8 (mostly 5–6) pairs of robust spines ....
.........................***Michthyops theeli*** (Ohlin, 1901) (Circumarctic, Greenland Sea, depth 27–2245 m)

Acknowledgements

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