SPIXIANA	43	1	81–92	München, Oktober 2020	ISSN 0341–8391

Addenda to the Lophogastrida and Mysida of the "Valdivia" Expedition 1898–1899, with description of a new species of *Longithorax* Illig, 1906 and range extension in *Echinomysis chuni* Illig, 1905

(Crustacea, Malacostraca)

Karl J. Wittmann

Wittmann, K. J. 2020. Addenda to the Lophogastrida and Mysida of the "Valdivia" Expedition 1898–1899, with description of a new species of *Longithorax* Illig, 1906 and range extension in *Echinomysis chuni* Illig, 1905 (Crustacea, Malacostraca). Spixiana 43 (1): 81–92.

Examination of previously unpublished samples of Lophogastrida and Mysida taken in 1898–1899 by the "Valdivia" Expedition with vertical hauls from 1500–3000 m depth to the surface in the East Atlantic and the Indian Ocean yielded the lophogastrids *Eucopia unguiculata* (Willemoës-Suhm, 1875), *E. grimaldii* H. Nouvel, 1942, *E. scultpicauda* Faxon, 1893, and the mysids *Boreomysis microps* G. O. Sars, 1883, *Hemisiriella parva* Hansen, 1910, *Longithorax valdiviae* sp. nov., *Euchaetomera tenuis* G. O. Sars, 1883, and *Echinomysis chuni* Illig, 1905. This last species is recorded from subantarctic waters east of Bouvet Island as the first representative of its genus outside tropical to temperate zones. *Longithorax valdiviae* sp. nov. from the South Indian Ocean is characterized among other features by multi-segmented sixth thoracic endopods and a modified seta on the tip of the endopod of fourth male pleopods. A revised diagnosis and a key to the species of *Longithorax* Illig, 1906 are given.

Karl J. Wittmann, Department of Environmental Health, Medical University of Vienna, Kinderspitalgasse 15, 1090 Vienna, Austria;
e-mail: karl.wittmann@meduniwien.ac.at

Introduction

The 'Deutsche Tiefsee-Expedition auf dem Dampfer Valdivia 1898–1899', shortly termed "Valdivia" Expedition, was among the major marine biological and oceanographic expeditions of the 19th century. Pelagic and benthic samples were taken on 274 stations from mostly deep waters of the East Atlantic and the Indian Ocean, including a short stretch through the subantarctic sectors of both oceans. The scientific yield was presented mainly between 1902 and 1940 in a great number of publications, particularly the expedition reports in 24 volumes. The Lophogastrida, Mysida, and Euphausiacea, at that time collectively termed 'Schizopoda', were published by G. Illig between 1905 and 1913 in a series of 16 original articles with descriptions of new taxa together with phenological observations. That effort was finally summarized and extended by a large monograph in 1930. Based on "Valdivia" material, Illig presented first descriptions of 19 species of lophogastrids and mysids, and established five new mysid genera, most of which remain acknowledged today. As a first addendum by the present author, the mysid *Mesopodopsis tropicalis* Wittmann, 1992, was first described from material sampled by the "Valdivia" at station no. 60 in the mouth of the Cameroon River.

Most peracarids sampled by the "Valdivia" Expedition, particularly Illig's material, are kept by the Museum für Naturkunde Berlin (inventory available at the homepage of that institution). Smaller holdings of "Valdivia" peracarids are kept by the Zoologische Staatssammlung München, Munich (Germany). Unpublished crustacean samples from these last holdings were inspected in view of potential lophogastrids and mysids, yielding taxonomic and zoogeographic novelties as shown in the following.

Materials and methods

Six mysids and 26 lophogastrids were studied from pelagic samples taken with vertical tows at 19 stations by the "Valdivia" Expedition 1898–1899. Station and sampling data are derived from Deutsche Tiefsee-Expedition (1899); all distances estimated by the present author. Preparation, measurements and examination of materials as in Wittmann (2008). Body size measured according to Tattersall & Tattersall (1951) from anterior margin of carapace to posterior margin of telson, excluding spines. If not stated otherwise, measurements of eyes, antennae, carapace, pleomeres, and telson were made along dorsal mid line. The easily confounded, large intersegmental joint between the basis and flagellum of the thoracic exopods was excluded from counts of segmental numbers. The statolith mineral was determined according to Wittmann et al. (1993). Terminology as in Wittmann et al. (2014).

Abbreviations

bd.	bottom depth
ms.	dissected and mounted in Euparal on slides
ve.	in vial with 75 % ethanol
vt.	vertical tow
ZSM	Zoologische Staatssammlung München
#	"Valdivia" station number

Results

Order Lophogastrida Boas, 1883
Family Eucopiidae G. O. Sars, 1885

Eucopia sculpticauda Faxon, 1893

Material. 1 ♀ subad. with 30.1 mm body length, #39, NE-Atlantic, 153 km SE of Cape Verde Islands, 14°39.5'N 021°51.8'W, vt. 2500–0 m, 30 Aug. 1898, 11 a.m., ve. (ZSMA20190022). – 1 ♂ ad. 23.5 mm, #55, equatorial E-Atlantic, mid Gulf of Guinea, 414 km S of Lagos, 02°36.5'N 003°27.5'E, vt. 1200–0 m, bd. 3513 m, 12 Sep. 1898, 06 a.m., ve. (ZSMA20190023). – 1 ♀ ad. 39.1 mm carrying 2 postnauplioid larvae 6.8, 7.0 mm, #66, equatorial E-Atlantic, 264 km SW of Gamba (Gabon), 03°55.0'S 007°48.5'E, vt. 3000–0 m, 29 Sep. 1898, 08 a.m., ve. (ZSMA20190024). – 1 ♂ ad. 51.5 mm, #207, E-Indian Ocean, 37 km SW of Surat Passage, 05°23.2'N 094°48.1'E, vt. 800–0 m, bd. 1024 m, 6 Jan. 1899, 06 a.m., ve. (ZSMA20190025). – 1 ♂ subad. 11.3 mm, #217, Indian Ocean, Laccadive Sea, 240 km SW of Ceylon, 04°56.0'N 078°15.3'E, vt. 2000–0 m, 17 Feb. 1899, 11 a.m., ve. (ZSMA20190026). – 1 ♀ ad. 28.5 mm carrying 2 nauplioid larvae 4.0, 4.1 mm, #218, Indian Ocean, 360 km E of Maldives, 02°29.9'N 076°47.0'E, vt. 2500–0 m, bd. 4133 m, 18 Feb. 1899, 03 p.m., ve. (ZSMA20190027). – 1 ♀ ad. 39.3 mm, somewhat damaged, #230, W-Indian Ocean, 660 km ENE of the Seychelles, 02°43.8'S 061°12.6'E, vt. 1500–0 m, 3 Mar. 1899, 06 a.m., ve. (ZSMA20190028). – 1 ♂ ad. 27.1 mm, #232, W-Indian Ocean, 360 km ENE of the Seychelles, 03°26.2'S 058°34.2'E, vt. 1500–0 m, 4 Mar. 1899, 10 a.m., ve. (ZSMA20190029).

Type locality. Specified based on the station of the lectotype. Upon first description of this species, Faxon (1893) did not differentiate between materials from offshore stations of the "Albatross" Expedition in E-Pacific and NW-Atlantic. In 1895 he retrospectively designated an adult female from "Albatross" station no. 3407 as the only "type". From today's point of view this could be interpreted as definition of a lectotype, and thus the type locality becomes fixed at 00°04'00"N 090°24'30"W in 885 fathoms (1618 m) depth in open waters between Galapagos Islands, equatorial E-Pacific (see also station list by Agassiz 1892).

Distribution. Panoceanic, from the tropics to subarctic and antiboreal waters, mostly 62°N to 40°S, so far not found in the Mediterranean. Listed for the Antarctic by San Vicente (2016). Meso- to bathypelagic in 180–6000 m (mostly 800–2000 m). Young specimens tend to dwell in shallower water depths than adults. Illig (1930) reported specimens other than the present ones from four out of the eight stations listed above. This species is here published for the first time from station nos 39 (off Cape Verde Islands), 207 (off Sumatra), 217 (off Ceylon), and 218 (off Maldives).

Eucopia unguiculata (Willemoës-Suhm, 1875)

Material. 1 ♂ ad. with 17.9 mm body length, #14, NE-Atlantic, 426 km W of Galicia, 43°32.1'N 014°27.0'W, vt. 1000–0 m, 15 Aug. 1898, 08 a.m., ve. (ZSMA20190014). – 1 ♀ ad. 10.7 mm, #54, equatorial E-Atlantic, Gulf of Guinea, 412 km S of Accra, 01°51.0'N 000°31.2'E, vt. 2000–0 m, 11 Sept. 1898, 06 a.m., ve. (ZSMA20190003). – 1 ♀ ad. 32.7 mm, #55, equatorial E-Atlantic, 414 km S of Lagos, mid Gulf of Guinea, 02°36.5'N 003°27.5'E, vt. 1200–0 m, bd. 3513 m, 12 Sep. 1898, 06 a.m., ve. (ZSMA20190015). – 1 ♀ ad. 29.9 mm, #115, SE-Atlantic, 260 km S of Cape Town, 36°23.4'S 017°38.1'E, vt. 2500–0 m, bd. 4170 m, 14 Nov. 1898, 06 a.m., ve. (ZSMA20190016). – 1 ♂ ad. 31.6 mm, 1 ♀ ad. 29.6 mm, 1 ♀ subad. 25.3 mm, #215, E-Indian Ocean, Gulf of Bengal,

445 km E of Ceylon, 07°01.2' N 085°56.5' E, vt. 2500–0 m, 11 Feb. 1899, 06 a.m., ve. (ZSMA20190017). – 1 ♂ ad. 30.5 mm, 1 ♀ subad. 22.9 mm, #217, Indian Ocean, Laccadive Sea, 240 km SW of Ceylon, 04°56.0' N 078°15.3' E, vt. 2000–0 m, 17 Feb. 1899, 11 a.m., ve. (ZSMA20190018). – 1 ♂ ad. 19.7 mm, 1 ♀ subad. 18.3 mm, 1 imm. 14.5 mm, #232, W-Indian Ocean, 360 km ENE of the Seychelles, 03°26.2' S 058°34.2' E, vt. 1500–0 m, 4 Mar. 1899, 10 a.m., ve. (ZSMA20190019). – 1 ♀ subad. 26.1 mm, 1 imm. 16.9 mm, #240, W-Indian Ocean, 196 km E of Zanzibar, 06°12.9' S 041°17.3' E, vt. 2000–0 m, bd. 2959 m, 14 Mar. 1899, 05 a.m., ve. (ZSMA20190020). – 1 ♀ subad. 26.9 mm, #268, NW-Indian Ocean, Arabian Sea, 289 km SE of Ras Hafun, 09°06.1' N 053°41.2' E, vt. 2000–0 m, bd. 5064 m, 1 Apr. 1899, 05 a.m., ve. (ZSMA20190021).

Type locality. Not specified. Willemoës-Suhm (1875) indicated "from depths of 350 to 2500 fathoms, off the west coast of Africa" upon first description of materials from the "Challenger" Expedition.

Distribution. Panoceanic, marginally in the Antarctic Ocean, so far not found in the Arctic Ocean. Latitudinal range 65° N to 60° S, mostly in tropical to temperate waters, also boreal to subarctic and subantarctic. Depth range 100–6500 m (San Vicente 2016), mostly holopelagic, also close to the bottom, rarely coastal. Dial vertical migration appears to be common (Waterman et al. 1939, Angel & Pugh 2000); young specimens tend to dwell in higher levels than adults. Illig (1930) reported specimens other than the present ones from seven out of the nine stations listed above. This species is now published for the first time from "Valdivia" station nos 115 (off Cape Town) and 240 (off Zanzibar).

Eucopia grimaldii H. Nouvel, 1942

Material. 1 ♂ ad. with 21.1 mm body length, #39, NE-Atlantic, 153 km SE of Cape Verde Islands, 14°39.5' N 021°51.8' W, vt. 2500–0 m, 30 Aug. 1898, 11 a.m., ve. (ZSMA20190011). – 1 ♀ imm. 13.7 mm, #54, equatorial E-Atlantic, Gulf of Guinea, 412 km S of Accra, 01°51.0' N 000°31.2' E, vt. 2000–0 m, 11 Sep. 1898, 06 a.m., ve. (ZSMA20190012). – 1 ♀ ad. 17.9 mm, #64, equatorial E-Atlantic, 32 km NE of São Tomé, 00°25.8' N 007°00.8' E, vt. 2000–0 m, 27 Sep. 1898, 07 a.m., ve. (ZSMA20190013).

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

Distribution. Panoceanic, mainly in tropical to temperate regions, also found in the Mediterranean. Listed by San Vicente (2016) for Alaska and Antarctica. Depth range 300–2600 m (San Vicente 2016). This species has previously not been reported from any stations of the "Valdivia" expedition.

Order Mysida Boas, 1883
Family Mysidae Haworth, 1825
Subfamily Boreomysinae Holt & Tattersall, 1905

Boreomysis microps G. O. Sars, 1883

Material. 1 ♂ ad. with 13.9 mm body length, #89, SE-Atlantic, 855 km NW of Cape Town, 31°21.1' S 009°45.9' E, vt. 3000–0 m, bd. 5283 m, 22 Oct. 1898, 05 a.m., ve. (ZSMA2019000).

Type locality. Indirectly defined by monotypy of the taxon. G. O. Sars (1883) described a single female from "Challenger" Expedition station no. 50, at 42°08' N 63°39' W, this is south of Nova Scotia in the NW-Atlantic.

Distribution. In open marine waters of mostly the Atlantic and Pacific oceans, also found in the Indian Ocean, so far missing in Arctic and Antarctic oceans. Latitudinal range 40° S to 75° N, mostly in tropical to temperate waters, also boreal-subarctic. Depth range 70–3000 m. This holopelagic species may undergo diurnal vertical migration of about 400 m, as observed by Waterman et al. (1939) in the NW-Atlantic. The here reported adult male was sampled at the same "Valdivia" station wherefrom Illig (1930) had already reported an adult female of this species together with an immature of its congener *B. plebeja* Hansen, 1910, plus specimens of other three mysid and two lophogastrid species.

Subfamily Siriellinae Czerniavsky, 1882
Tribe Siriellini Czerniavsky, 1882

Hemisiriella parva Hansen, 1910

Material. 1 ♂ ad. with 6.5 mm body length, ms. (ZSMA 20190005), 1 ♂ subad. 6.0 mm, ve. (ZSMA20190006), #214, NE-Indian Ocean, in southern part of Bay of Bengal, 502 km W of Katchall Island, 07°43.2' N 088°44.9' E, vt. 2000–0 m, bd. 3692 m, 10 Feb. 1899, 06 a.m.

Type locality. Not specified by Hansen (1910), who reported this species upon first description from four stations in the Indo-Australasian Archipelago, range 6° N to 4° S, 120–126° E.

Distribution. Widely distributed in tropical waters of the Indian Ocean and West Pacific (W. M. Tattersall 1951). Latitudinal range 15° N to 16° S. Epipelagic, offshore as well as nearshore, mostly taken with plankton samples in 0–100 m depth. Vertical tows from deep water to surface, such as the present one, do not provide unequivocal evidence that the species may occur in deep waters (c. f. Illig 1930, Pillai 1964). Illig (1930) reported a male of the lophogastrid *Gnathophausia ingens* Dohrn, 1870, from "Valdivia" station no. 214.

Subfamily Erythropinae Hansen, 1910
Tribe Erythropini Hansen, 1910

Genus *Longithorax* Illig, 1906

Longithorax Illig, 1906: 200, 201, fig. 8 (gen. nov., now considered senior synonym).
Longithorax: Hansen (1908): 103, 104 (description of genus, first description of *L. fuscus*).
Longithorax: Zimmer (1914): 292, 293 (first description of *L. capensis*).
Longithorax: Illig (1930): 426–427 (records, description).
Longithorax: Nouvel (1942): 9 (first description of *L. alicei*).
Longithorax: W. M. Tattersall (1951): 120 (new record).
Longithorax: Tattersall & Tattersall (1951): 269, 270 (diagnosis, new records).
Longithorax: O. S. Tattersall (1955): 125–127 (new records, first description of *L. nouveli*).
Longithorax: Birstein & Tchindonova (1958): 329 (species description, new records).
Xenerythrops Ii, 1964: 302, fig. 79 (gen. nov., now considered junior synonym).
Longithorax: Pillai (1973): 87, fig. 46 (records).
Longithorax: Murano (1976): 29, fig. 7 (key, species descriptions).
Xenerythrops: Murano (1976): 31 (stating synonymy with *Longithorax* Illig, 1906).
Longithorax: Murano & Mauchline (1999): 289–293 (first description of *L. megalops*).
Longithorax: Nouvel et al. (1999): 79 (in list of Mysidae genera).
Xenerythrops: Nouvel et al. (1999): 79 (in list of Mysidae genera).
Longithorax: Wittmann et al. (2004): 1265–1271 (revised description of *L. alicei*, new records).
Longithorax: Wittmann et al. (2009): 147 (new record).
Longithorax: San Vicente (2017): 159, tab. 2 (distribution, records).

Type species. *Longithorax similerythrops* Illig, 1906, by monotypy.

Revised diagnosis

Erythropini with eighth thoracomere elongate, occupying 1/4 to 1/3 of cephalothorax (as the most decisive feature). Carapace short, posteriorly emarginate, covering only 1/3 to 2/3 of cephalothorax, leaving ultimate 1–3 thoracic somites dorsally exposed. Eyes well developed to weakly reduced, eyestalks with finger-like process. Antennal scale short, its outer margin smooth and terminating in a tooth at 3/4 to 6/7 scale length; remaining distal portion of the outer margin densely setose, divided or not so by a suture separating a small apical segment; inner margin of the scale setose along entire length. Uropods long, setose all around, endopod with or without spines below statocyst. Telson short, triangular or nearly so, armed with spines on apex; lateral margins smooth or with spines at most on distal third.

Some potentially decisive features were unknown to date in some of the species: mouth parts and maxillipeds weakly developed. Thoracic exopods with large basal plate. Endopods 3–8 long, well segmented, carpus separated from propodus by a weakly oblique to transverse articulation. Marsupium with two pairs of large oostegites. Female pleopods uniramous, reduced to small, (1–2)-segmented, setose rods. Male pleopods well developed, biramous; first endopod one-segmented, endopods 2–5 and exopods 1–5 multi-segmented; basal segment of all endopods bearing an apically setose, pseudobranchial lobe.

Taxonomic inventory and distribution

Genus *Longithorax* Illig, 1906 (cosmopolitan, 61° N to 37° S, pelagic throughout)
*Longitho*rax *alicei* H. Nouvel, 1942 (NE-Atlantic, 28–30° N, meso/bathypelagic)
Longithorax capensis Zimmer, 1914 (Atlantic and W-Indian Ocean, 32° N to 37° S, meso/bathypelagic)
Longithorax fuscus Hansen, 1908 (Atlantic and W-Pacific, 5–61° N, meso/bathypelagic)
Longithorax megalops Murano & Mauchline, 1999 (NE-Atlantic, 44–49° N, bathypelagic)
*Longitho*rax *nouveli* O. S. Tattersall, 1955 (Atlantic and Mid-Pacific, 32° N to 15° S, mesopelagic)
Longithorax similerythrops Illig, 1906 (East and Mid-Indian Ocean, 2° N to 5° S, pelagic)
Longithorax valdiviae sp. nov. (Mid-Indian Ocean, 34° S, pelagic)

Key to the species of *Longithorax* Illig, 1906

Erythropini with elongate eighth thoracomere occupying 1/4 to 1/3 of cephalothorax Genus *Longithorax* Illig, 1906. 1

1 Antennal scale divided by a subterminal suture. 2

– Antennal scale entire. 4

2 Cornea diameter exceeds length of basal segment of antennular trunk in dorsal view. .... *L. megalops* Murano & Mauchline, 1999

– Cornea diameter less than length of basal segment of antennular trunk. 3

3 Large triangular rostrum covers part of eyestalks and antennular trunk in dorsal view. .... *L. valdiviae* sp. nov.

– Rostrum very short, not covering part of eyestalks and antennular trunk. .... *L. alicei* H. Nouvel, 1942

4 Telson armed with 1–2 pairs of spines on apex and with 4–7 spines on terminal third of each lateral margin. ..... *L. fuscus* Hansen, 1908

– Telson armed with 1–2 pairs of spines on apex and with 0–2 subapical spines on each lateral margin. 5

5 Telson with two pairs of small spines on narrow apex, lateral margins smooth. .... *L. similerythrops* Illig, 1906

– Telson with one pair of small spines on narrow apex and with one subapical spine on each lateral margin. 6

6 Length of antennal scale less than three times maximum width. Endopod of uropod with one spine below statocyst. .... *L. capensis* Zimmer, 1914

– Length of antennal scale exceeds three times maximum width. Endopod of uropod without spine below statocyst. .... *L. nouveli* O. S. Tattersall, 1955

Longithorax valdiviae sp. nov.
Figs 1–3

Type material. Holotype ♂ ad. with 8.0 mm body length, #169, mid S-Indian Ocean, 485 km NW of Ile Amsterdam, 34°13.6'S 080°30.9'E, vt. 2000–0 m, bd. 3109 m, 6 Jan. 1899, 05 a.m., ms. (ZSMA20190007).

Etymology. The species name is a noun in genitive singular, referring to the "Valdivia" Expedition.

Type locality. Only known from "Valdivia" station no. 169 in open waters of the South Indian Ocean as detailed above. Illig (1930) did not report any mysid material from this station.

Diagnosis. So far only male known: thoracomeres without median processes; thoracomere 8 elongated, about two times length of thoracomere 7. Carapace without median hump, its well projecting triangular rostrum with blunt tip; rostrum covering part of eyestalks and antennae. Nonetheless, carapace short, only ⅓ body length; anterolateral corner well rounded, not produced. Eyes small but essentially normal, set apart; cornea well pigmented, ⅓ length of eyestalks; cornea with oblique dorso-ventral compression, calotte-shaped in dorsal, elliptical (height 0.7 times length) in lateral view, with numerous visual elements; large papilla on postero-ventral face of eyestalks extends beyond cornea. Antennular trunk large, extending ⅖ of its length beyond antennal scale. Antennal scale short, its length 3.1–3.3 times maximum width; smooth portion of outer margin ending in a strong tooth at ⅘ of total scale length; small, setose apical segment separated by a transverse suture at 9/10 of scale length. Antennal gland normal. Thoracic endopods 3, 5, 6, 8 with transverse to indistinctly oblique articulation between carpus and propodus (endopods 4, 7 broken). Sixth thoracic endopod long, slender, subdivided into 13 segments. Endopods of pleopods 1–5 with 1, 9, 10, 10, 9 segments, exopods with 8, 9, 10, 9, 9 segments, respectively. Basal segment of endopods with roughly cylindrical, terminally broadly rounded pseudobranchial lobe with width about half length. Fourth pleopod with modified seta at tip of its endopod. No additional modified setae on pleopods 1–5. Uropods without spines. Telson very short, triangular, length 1.4 times maximum width; its narrow, truncate apex with a pair of short spines between two longer, slender spines; lateral margins smooth except for one subapical spine on each side.

Description of the male

All features of the diagnosis. Body length 8.0 mm. Cephalothorax measures half body length, pleon without telson ⅖. Carapace leaving posterior three thoracomeres dorsally exposed. Carapace (Fig. 1A,C,D) weakly inflated, with distinct cervical sulcus. No pores (>1 µm) found on carapace.

Antennae (Fig. 1A). Antennular trunk with basal segment not produced at outer distal corner; articulation between median and terminal segments somewhat oblique. Basal segment of trunk 1.1 times longer than broad. Basal segment 0.3, median segment 0.1, terminal segment 0.6, and appendix masculina 0.4 times trunk length. Antennal scale comparatively short, 0.6 times length of antennular trunk. Apical segment wider than long, with five plumose setae. Antennal peduncle shorter than antennular peduncle, its second segment shorter than third. Sympod with inconspicuous, blunt process at outer distal corner.

Mouthparts (Fig. 1E–J). Labrum with frontal margin forming a triangular, blunt extension; widening caudally, dorsally with two rounded posterior lobes; caudal portions with dense cover of minute scale-like fringes. Mandibular palp slender. Basal segment short, smooth all around; median segment setose, 3.5 times as long as maximum width, its outer margin weakly expanded in submedian portions, this segment contributing ⅗ palp length; apical segment again 3.5 times as long as wide, not expanded, ⅓ palp length, with dense series of barbed setae on outer margin, terminally with longer, slender, barbed seta, accompanied by a shorter thick seta bearing bilateral series of stiff barbs. Mandibles weakly asymmetrical, masticatory part small, processus molaris minimalized, spine row lacking, digitus mobilis with three

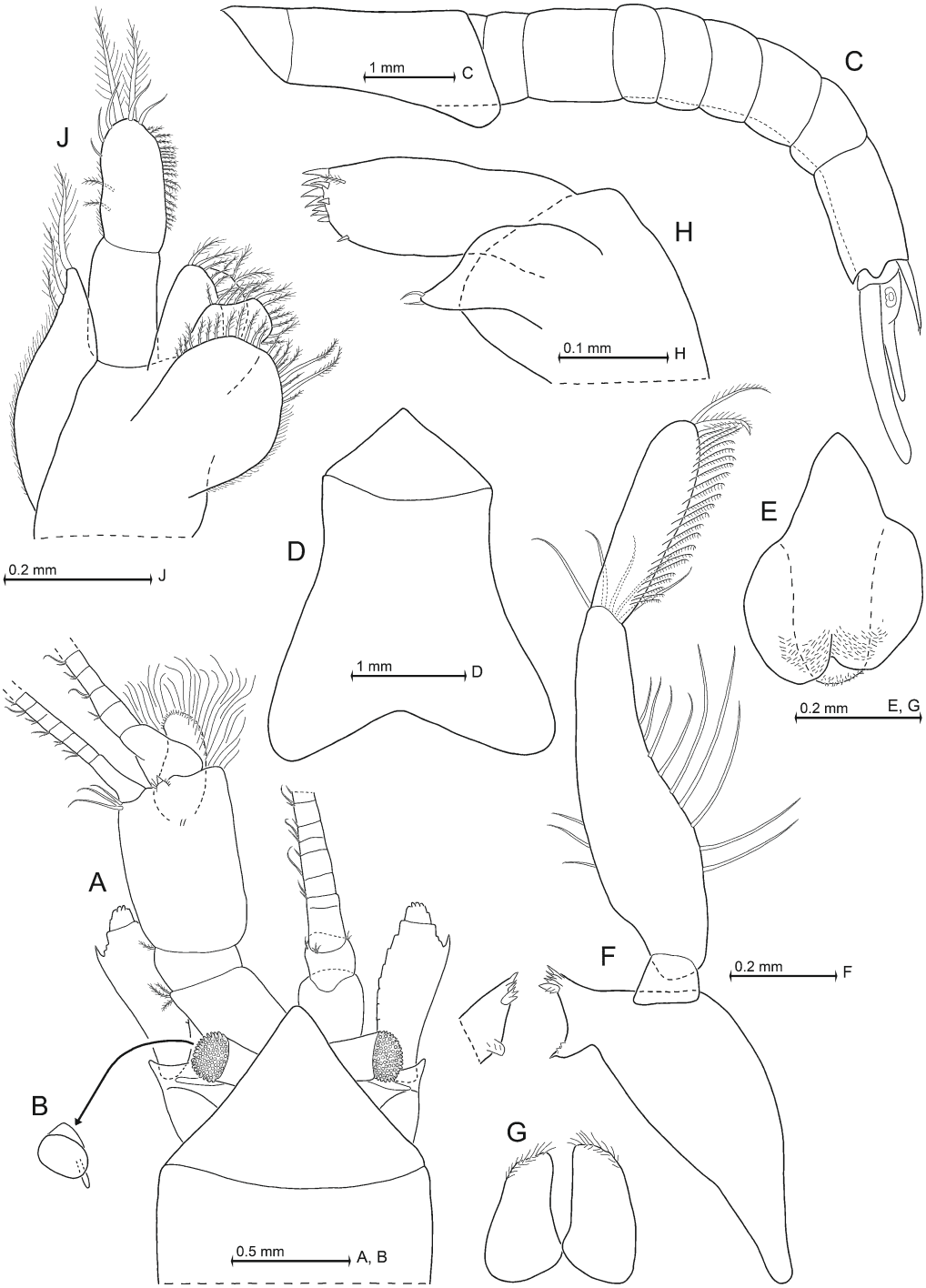

Fig. 1. *Longithorax valdiviae* sp. nov. Holotype male with body length 8.0 mm. **A**. Cephalic region, right antennula and setae of antennal scale omitted. **B**. Left eye, lateral. **C**. Body trunk with carapace and tail fan, lateral. **D**. Carapace expanded on slide. **E**. Labrum, dorsal. **F**. Mandibles with right palp, rostral. **G**. Labium, caudal. **H**. Maxillula, rostral. **J**. Maxilla, rostral.

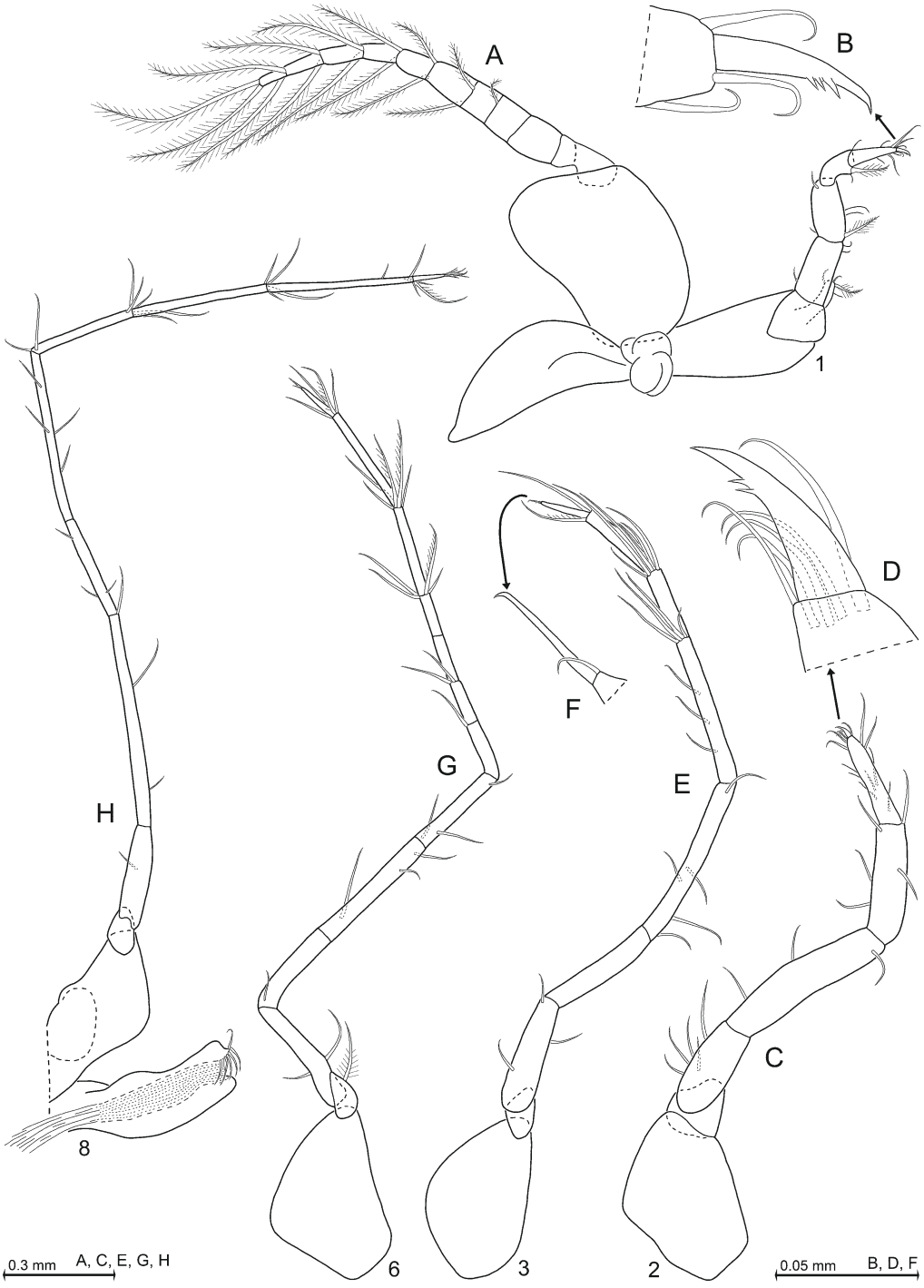

Fig. 2. Thoracopods of *Longithorax valdiviae* sp. nov. Holotype male with body length 8.0 mm. **A**. Thoracopod 1, caudal. **B**. Detail of panel (A) showing tip of dactylus. **C**. Endopod 2, rostral. **D**. Detail of panel (C) showing tip of dactylus. **E**. Endopod 3, rostral. **F**. Detail of panel (E) showing tip of dactylus. **G**. Endopod 6, caudal. **H**. Endopod 8 with penis, rostral.

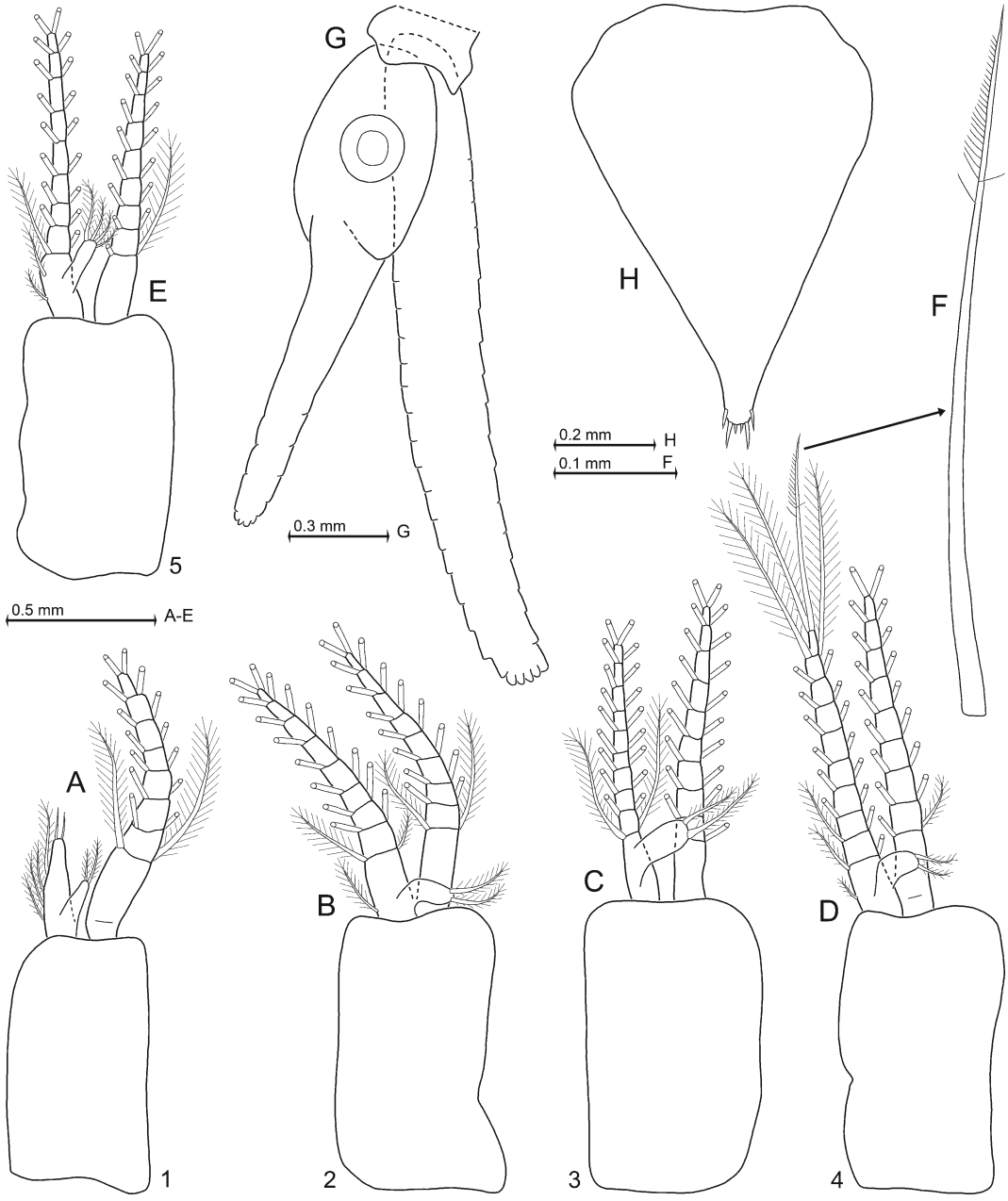

Fig. 3. *Longithorax valdiviae* sp. nov. Holotype male with body length 8.0 mm. **A–E**. Series of pleopods 1–5, caudal. **F**. Detail of panel (D) showing modified seta at tip of fourth endopod. **G**. Uropods, ventral. **H**. Telson, dorsal.

small teeth, pars incisiva with three small teeth on left mandible, four teeth on right mandible. Preparation of foregut failed. Paired labia terminally with stiff setae, lacking spines or teeth. Distal segment of maxillula with ten weak, unequal spines in near terminal position, somewhat scattered; subterminally with one small, barbed seta. Endite of maxillula with two small setae at apex. Maxilla with well-developed exopod, two-segmented palp and four setose endites; exopod narrow, terminally with three plumose setae;

palp with two segments of about equal length, its apical segment with two large, nearly plumose setae at apex, arch of five smooth setae on terminal third, dense series of short setae along inner margin.

Thoracopods (Fig. 2). Thoracic exopods 1, 8 with large, terminally widened basal plate. Exopods 1, 8 with 9-segmented, remaining exopods with 10-segmented, setose flagellum. Endopods 1–3, 5, 6, 8 with 6, 6, 9, 9, 13, 10 segments, respectively (endopods 4 and 7 broken), counting from basis to dactylus. Total length and slenderness increase in series from first endopod (11 % of body length) to eighth endopod (36 %). Slenderness of dactyli also increases in that order. Endopods 1, 2 with short, strong, subterminally toothed claw; endopods 3, 5, 6, 8 with short, apically bent, needle-like claw. Basis of endopod 1 with long, terminally setose endite; ischium without endite. First thoracic epipod linguiform, without seta. Endopod 8 reaches the labrum when stretched anteriorly, or to the middle of pleomere 6 when stretched posteriorly. Paired penes tube-like, subbasally widened; ejaculatory opening flanked by two lobes; upper lobe with series of six smooth setae mostly facing towards the lower lobe.

Pleon (Figs 1C, 3). Pleomeres 1–5 are 0.3, 0.4, 0.4, 0.6 or 0.6 times length of pleomere 6, respectively. Scutellum paracaudale sinusoid, evenly rounded. Pleopods well developed, biramous, well equipped with plumose setae; sympods present in the form of large, wide plates. Pleopod 4, when stretched posteriorly, reaches to the basis, its modified terminal seta to the apex of the telson.

Tail fan (Figs 1C, 3G,H). Telson, endopod, and exopod of uropods are 0.6, 1.0 or 1.5 times length of sixth pleomere, respectively. Uropods long, setose all around; exopod terminally truncate; endopod 0.7 times length of exopod. Endopod extends half its length beyond telson, exopod 0.7 times its length. Statoliths (n = 2) large, maximum diameter 180–190 µm, core diameter 89–98 µm; thickness 110–120 µm. Shape spherical in dorsal view (Fig. 3G), discoidal with weakly convex fundus in lateral view (Fig. 1C); dorsal surface evenly rounded; tegmen not differentiated. Statoliths composed of fluorite.

Euchaetomera tenuis G. O. Sars, 1883

Material. 1 ♀ ad. with 6.0 mm body length, #215, NE-Indian Ocean, Gulf of Bengal, 445 km E of Ceylon, 07°01.2' N 085°56.5' E, vt. 2500–0 m, bd. 3109 m, 11 Feb. 1899, 06 a.m., ve. (ZSMA20190008).

Type locality. Not specified by G. O. Sars (1883). Upon first description of this species based on a single female, he noted on page 42 "South Pacific, off the coast of Chili". In 1885, p. 215, he indicated Nov. 18, 1875 as sampling date. Crosschecking of these data with those in Murray (1895: 1115–1119) suggests that the type locality is near "Challenger" Expedition station no. 298, which is 177 km off the coast of Chile, 34°07' S 073°56' W. That material was sampled at the sea surface.

Distribution. Panoceanic with exception of the Arctic and Antarctic oceans. Latitudinal range 52°N to 45° S, mostly in tropical to subtropical waters, also temperate, boreal, and antiboreal. Depth range mostly 50–5000 m, rarely at the surface. The here reported adult female was sampled at "Valdivia" station no. 215 wherefrom Illig (1930) had already reported an adult female of this species together with an adult male of its congener *E. oculata* Hansen, 1910, plus specimens of four other mysid and two lophogastrid species.

Notes. Statoliths composed of fluorite. Shape spherical in dorsal view, dorsal surface roughly calotte-shaped, evenly rounded; tegmen not differentiated; maximum diameter 160–169 µm, core diameter 89–107 µm; thickness 116–124 µm; fundus weakly convex (n = 2). Statolith formula 2 + 3 + 11 + 2 + 3 = 21 (n = 1).

Echinomysis chuni Illig, 1905

Material. 1 ♀ imm. with 3.4 mm body length, #139, SW-Indian Ocean, 1200 km east of Bouvet Island, 55° 01.0' S 021°34.0' E, vt. 1500–0 m, 5 Dec. 1898, 08 a.m., ve. (ZSMA20190009).

Type locality. Not specified. Illig (1905, 1930) described characters of that taxon without differentiation between Indian Ocean and Atlantic specimens.

Distribution. Widely distributed in open waters of the Indian Ocean, also in the E-Atlantic. Formerly known only from tropical to temperate waters between 10° N and 37° S. The present record extends the southern limit considerably to subantarctic waters at 55° S. Like the eight "Valdivia" samples published by Illig (1930), also the present one was taken by vertical tows within the range of 2500–0 m. A total of three samples reported by W. M. Tattersall (1939), and O. S. Tattersall (1955) were taken mainly during the night in the range of 450–0 m.

Comparison. The present immature female with 3.4 mm body length agrees with Illig's (1905, 1912, 1930) descriptions of *E. chuni* by the following characters: cornea bipartite; antennal scale short, entire, setose all around; carapace and pleon dorsally armed all over with large spines; telson short, subtriangular, its apex with a pair of long setae, lateral margins with spines. Notably, it shows larger eyes and fewer, longer spines on carapace and pleon compared to

the adults of *E. chuni* with 9–11 mm body length described by Illig (1905, 1912, 1930).

In agreement with the adults of *E. chuni*, the present immature specimen is well differentiated from the two remaining, currently known species of the genus *Echinomysis* Illig, 1905: it differs from *E. distinguenda* Coifmann, 1936 by more closely set parts of the bipartite cornea, and from *E. serratus* Vereshchaka, 1990 by shorter antennal scale and by a subtriangular rather than linguiform telson, with convex rather than concave lateral margins. From either species it differs by a shorter carapace leaving the three ultimate thoracomeres dorsally exposed, rather than only the ultimate one.

Discussion

Distribution of *Echinomysis chuni* Illig, 1905

The immature female from "Valdivia" station no. 139 fits morphologically well with the descriptions of *E. chuni* given by Illig (1905, 1912, 1930), except for minor differences indicated above. Such differences are related to changes in character states during growth in many species of Mysidae. This is not so for the above documented diagnostic differences, which exclude that this immature may be classified as any of the two remaining species in the genus *Echinomysis*.

Published records of *E. distinguenda* from the Arabian Sea and *E. serratus* from the E-Pacific are restricted to tropical and subtropical latitudes; only *E. chuni* from the Indian Ocean and E-Atlantic is known from tropical to temperate zones. The present record east of Bouvet Island shifts the southern limit of distribution for the genus *Echinomysis* and its species *chuni* to subantarctic waters at 55° S. A wide latitudinal range of 10° N to 55° S would not be surprising if this actually represents a pelagic deep-water species. However, all published records of *E. chuni* (Illig 1930, W. M. Tattersall 1939, O. S. Tattersall 1955) including the present one were made far above the bottom with non-closing pelagic devices. With such devices one cannot definitely exclude that the animals were caught near the surface. Thus, citations as deep-water species (Zimmer 1927) and of upper depth ranges below 300 m (Mauchline & Murano 1977, Müller 1993, WoRMS Editorial Board 2018) require confirmation by appropriate field data.

Morphology and habit of the genus *Longithorax* Illig, 1906

This genus is outstanding within the family Mysidae by the elongated eighth thoracic somite and the short carapace. As already discussed by Wittmann et al. (2004) the elongate body form together with the strong basal plates of thoracic exopods suggest stronger swimming capability compared with most Mysidae, which are generally weak swimmers unless tail flipping during escape behaviour. Apart from swimming speed, the posterior elongation of the thorax appears to provide space for the very large marsupium in *L. megalops*. However, no published data are available on intact mature marsupia of other species.

Sufficient details of mouth parts and thoracic endopods are known only for *L. megalops*, *L. alicei*, and *L. valdiviae* sp. nov. (Murano & Mauchline 1999, Wittmann et al. 2004, orig.). In each case there are very weak, almost reduced, primary mouth parts, weak maxillipeds (= thoracic endopods 1, 2), and slender thoracic endopods 3–8. Setation patterns are weak in primary as well as secondary mouth parts. These features suggest that these three species are not capable of masticating hard particles (f.i. diatoms) and are poorly adapted for filter feeding as well as for taking more powerful prey. The trophic habit of *Longithorax* species remains puzzling as long as no data are available on stomach contents or from direct observation or employment of sophisticated methods such as stable isotope analysis.

Distinctive features of *Longithorax valdiviae* sp. nov.

All six previously described species of *Longithorax*, and also the new one, are very rare. First descriptions of *L. similerythrops*, *L. fuscus*, and *L. alicei*, were based on single specimens. Not considering an additional juvenile, this is also valid for *L. capensis*. This remains unclear for *L. nouveli* O. S. Tattersall, 1955, because no types were defined upon first description of this taxon. Accordingly, as in most species in this genus, it is not unusual that *L. valdiviae* sp. nov. is here described from a single specimen, in this case a comparatively well-preserved adult male. Due to the rarity of materials, the available species descriptions are somewhat heterogeneous in this genus. For example, a feature most important for species diagnosis in the family Mysidae, including the here treated tribe Erythropini, is the potential presence of modified setae on the fourth pleopod of adult males. This can be clearly judged only for the here described new species (present). With the reservations indicated above, such setae are probably absent in *L. nouveli*. Wittmann et al. (2004) found no such modified seta in a subadult male of *L. alicei*, but such seta cannot be definitively excluded for adult specimens.

Longithorax valdiviae sp. nov. can be distinguished from *L. alicei* and *L. megalops* by its smaller cornea,

from *L. fuscus* and *L. megalops* by the oblique dorso-ventral compression of the cornea. The large rostrum is unlike that of *L. alicei*, *L. megalops*, and *L. fuscus*. The division of the antennal scale by a subterminal suture is not present in *L. capensis*, *L. fuscus*, *L. nouveli*, and *L. similerythrops*. The absence of spines on the endopods of the uropods is unlike the situation in *L. capensis*, *L. fuscus*, and *L. megalops*. The presence of spines on the lateral margins of the telson is unlike the conditions found in *L. alicei* and *L. similerythrops* (not considering latero-apical spines). The short, triangular telson is different from that of *L. fuscus* and *L. similerythrops*, which show a longer, caudally produced telson.

Acknowledgements

The author is greatly indebted to Stefan Friedrich from the Zoologische Staatssammlung München for loan of material and bibliographic data about the "Valdivia" Expedition.

References

Agassiz, L. 1892. Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, etc., by the U.S. Fish Commission Steamer "Albatross" II. General Sketch of the Expedition of the "Albatross" from February to May, 1891. Bulletin of the Museum of Comparative Zoölogy at Harvard College 23(1): 1–90, 22 pls.

Angel, M. V. & Pugh, P. R. 2000. Quantification of diel vertical migration by micronektonic taxa in the northeast Atlantic. Hydrobiologia 440: 161–179.

Birstein, J. A. & Tchindonova, Y. G. 1958. Glibocovodnie misidii severo-zapadnoi tschasii Tihogo Okeana. Trudy lnstituta Okeanologii Akademii Nauk SSSR 27: 258–355.

Coifmann, I. 1936. Alcuni misidacei nuovi raccolti dal Prof. L. Sanzo nella crociera della R. N. Ammiraglio Magnaghi al Mar Rosso (1923–24). Bollettino di Zoologia 7(1): 83–88.

Deutsche Tiefsee-Expedition 1899. Stationen der Deutschen Tiefsee-Expedition 1898–99. 33 pp., Leipzig-Reudnitz (August Hoffmann).

Faxon, W. 1893. VI. Preliminary descriptions of new species of Crustacea. In: Reports on the dredging operations off the west coast of Central America to the Galápagos, to the west coast of Mexico, and the Gulf of California; in charge of Alexander Agassiz, carried on by the U.S. Fish Commission Steamer "Albatross" during 1891. Bulletin of the Museum of Comparative Zoölogy at Harvard College 24(7): 149–220.

– – 1895. XV. The stalk-eyed Crustacea. In: Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the U.S. Fish Commission Steamer "Albatross" during 1891. Memoirs of the Museum of Comparative Zoölogy at Harvard College 18: 1–292, 67 pls.

Hansen, H. J. 1908. Crustacea Malacostraca I. Pp. 1–120, pls I–V in: The Danish Ingolf Expedition, Vol. 3(2). Copenhagen (Bianco Luno).

– – 1910. The Schizopoda of the Siboga Expedition. Pp. 1–77, pls. I–XII in: Siboga Expeditie, Monographie, Vol. 37. Leyden (E. J. Brill).

Ii, N. 1964. Fauna Japonica (7). Mysidae (Crustacea). 610 pp., Tokyo (Biogeographical Society of Japan).

Illig, G. 1905. *Echinomysis chuni* nov. gen. et nov. sp. Zoologischer Anzeiger 29: 151–153.

– – 1906. 2. Bericht über die neuen Schizopodengattungen und -arten der Deutschen Tiefsee-Expedition 1898–1899. I. Mysideen. Zoologischer Anzeiger 30: 194–211.

– – 1912. *Echinomysis chuni*, eine neue pelagisch lebende Mysidee. Zoologica Baetica 67: 129–138, pls XV–XVIII.

– – 1913. 7. Ein weiterer Bericht über die Schizopoden der Deutschen Tiefsee-Expedition 1898–1899. *Kreagromysis megalops* n. gen. et spec. nov. Zoologischer Anzeiger 43: 271–273.

– – 1930. Die Schizopoden der Deutschen Tiefsee-Expedition. Pp. 397–620 in: Chun, C. (ed.). Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898–1899, Vol. 22. Jena (Gustav Fischer Verlag).

Mauchline, J. & Murano, M. 1977. World list of the Mysidacea, Crustacea. Journal of the Tokyo University of Fisheries 64: 39–88.

Müller, H.-G. 1993. World catalogue and bibliography of the recent Mysidacea. 491 pp., Wetzlar (Wissenschaftlicher Verlag H.-G. Müller).

Murano, M. 1976. Mysidacea from the Central and Western Pacific III. Genera *Eoerythrops*, *Holmesiella*, *Pteromysis*, *Longithorax* and *Katerythrops* (tribe Erythropini). Publications of the Seto Marine Biological Laboratory 23: 19–50, pl. I.

– – & Mauchline, J. 1999. Deep-sea mysids from the North Atlantic Ocean with description of four new species. Crustaceana 72: 273–295.

Murray, J. 1895. A summary of the scientific results obtained at the sounding, dredging, and trawling stations of H.M.S. Challenger. Pt. 1, pp. i–vii, 1–796 and pt. 2, pp. i–xix, 797–1608, pls I–VI, appendix maps 1–14 in: Murray, J. (ed.). Report on the scientific results of the voyage of H.M.S. Challenger during the years 1872–76. London (Eyre and Spottiswoode).

Nouvel, H. 1942. Diagnoses préliminaires de Mysidacés nouveaux provenant des campagnes du Prince Albert 1er de Monaco. Bulletin de l'Institut Océanographique de Monaco 831: 1–12.

– – , Casanova, J.-P. & Lagardère, J.-P. 1999. 4. Ordre des Mysidacés (Mysidacea Boas, 1883). Pp. 39–86 in: Forest, J. (ed.). Traité de Zoologie. Tome VII Crustacés. Fasc. IIIA. Crustacés Péracarides. Mémoires de l'Institut Océanographique, Monaco 19.

Pillai, N. K. 1964. Report on the Mysidacea in the collections of the Central Marine Fisheries Research Institute, Mandapam Camp, South India, Part I. Journal of the Marine Biological Association of India 6: 1–41.
– – 1973. Mysidacea of the Indian Ocean. Pp. 1–125 in: I.O.B.C. Handbook, Vol. 4 (1972). Cochin, India (Indian Ocean Biological Centre).
San Vicente, C. 2016. An annotated check-list of lophogastrids (Crustacea: Lophogastrida) from the seas of the Iberian Peninsula. Zootaxa 4178 (4): 481–502.
– – 2017. Geographical and bathymetric distribution of mysids (Crustacea: Mysida) in the seas of the Iberian Peninsula. Zootaxa 4244: 151–194.
Sars, G. O. 1883. Preliminary notice on the Schizopoda of H.M.S. Challenger expedition. Forhandlinger i Videnskabs-Selskabet 7: 1–43.
– – 1885. Report on the Schizopoda collected by H.M.S. Challenger during the years 1873–1876. Pp. 1–228, pls I–XXXVIII in: Nartes, G. S. (ed.). Report on the scientific results of the voyage of H.M.S. Challenger during the years 1873–76, Vol. 13 (37). London (Longmans & Co.).
Tattersall, O. S. 1955. Mysidacea. Pp. 1–190 in: Discovery Reports, Vol. 28, Cambridge (Cambridge University Press).
Tattersall, W. M. 1939. The Euphausiacea and Mysidacea of the John Murray Expedition to the Indian Ocean. Pp. 203–246 in: John Murray Expedition 1933–1934. Scientific Reports Vol. 5, London (British Museum of Natural History).
– – 1951. A review of the Mysidacea of the United States National Museum. Bulletin of the United States National Museum 201: 1–292.
– – & Tattersall, O. S. 1951. The British Mysidacea. Pp. 1–460 in: Ray Society Monograph No. 136, London (The Ray Society).
Vereshchaka, A. L. 1990. Mysids from seamounts of Nazca and Sala-y-Gomez Ridges. Trudy Instituta Okeanologii Akademija Nauk SSSR 124: 118–128. [in Russian]
Waterman, T. H., Nunnemacher, R. F., Chace, F. A. Jr. & Clarke, G. L. 1939. Diurnal vertical migrations of deep-water plankton. Biological Bulletin 76: 256–279.
Willemoës-Suhm, R. von 1875. On some Atlantic Crustacea from the 'Challenger' expedition. Transactions of the Linnean Society of London, Zoology Ser. II, vol. I, part I (II): 23–59, pls VI–XIII.
Wittmann, K. J. 1992. Morphogeographic variations in the genus *Mesopodopsis* Czerniavsky with descriptions of three new species (Crustacea, Mysidacea). Hydrobiologia 241: 71–89.
– – 2008. Two new species of Heteromysini (Mysida, Mysidae) from the Island of Madeira (N.E. Atlantic), with notes on sea anemone and hermit crab commensalisms in the genus *Heteromysis* S. I. Smith, 1873. Crustaceana 81: 351–374.
– – , Ariani, A. P. & Lagardère, J.-P. 2014. Orders Lophogastrida Boas, 1883, Stygiomysida Tchindonova, 1981, and Mysida Boas, 1883 (also known collectively as Mysidacea). Pp. 189–396, colour plates on pp. 404–406 in: Vaupel Klein, J. C. von, Charmantier-Daures, M. & Schram, F. R. (eds). Treatise on zoology – anatomy, taxonomy, biology. The Crustacea. Revised and updated, as well as extended from the Traité de Zoologie, Vol. 4B. Leiden (Koninklijke Brill).
– – , Hernández, F. & de Vera, A. 2009. Pelagic mysids from the warm-temperate to subtropical NE Atlantic, with a redescription of *Leptomysis capensis* Illig, 1906 (Mysida, Mysidae). Vieraea: Folia Scientiarum Biologicarum Canariensium 37: 141–158.
– – , Hernández, F., Dürr, J., Tejera, E., González, J. A. & Jiménez, S. 2004. The epi- to bathypelagic Mysidacea (Peracarida) off the Selvagens, Canary, and Cape Verde Islands (NE Atlantic), with first description of the male of *Longithorax alicei* H. Nouvel, 1942. Crustaceana 76: 1257–1280.
– – , Schlacher, T. A. & Ariani, A. P. 1993. Structure of Recent and fossil mysid statoliths (Crustacea, Mysidacea). Journal of Morphology 215: 31–49.
WoRMS Editorial Board 2018. World Register of Marine Species. World Wide Web electronic publication at VLIZ. http://www.marinespecies.org [accessed 25-Nov-2018].
Zimmer, C. 1914. Die Schizopoden der deutschen Südpolar–Expedition 1901–1903. Pp. 377–445, pls XXIII–XXVI in: Drygalski, E. von (ed.). Deutsche Südpolar-Expedition 1901–1903, XV. Zoologie. Vol. 7, Berlin (Georg Reimer).
– – 1927. Mysidacea. Pp. 607–650 in: Kükenthal, W. (ed.). Handbuch der Zoologie, Vol. 3 (1). Berlin and Leipzig (W. de Gruyter).