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**Research article**

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**Revision of the amphiamerican genus *Mysidium* Dana, 1852  
(Crustacea: Mysida: Mysidae), with descriptions of two new species  
and the establishment of two new subgenera**

Karl J. WITTMANN<sup>1,\*</sup> & Peter WIRTZ<sup>2</sup>

<sup>1</sup>Department of Environmental Health, Medical University of Vienna,  
Kinderspitalgasse 15, A-1090 Vienna, Austria.

<sup>2</sup>Centro de Ciências do Mar, Universidade do Algarve, Campus de Gambelas,  
PT-8005-139, Faro, Portugal.

\*Corresponding author: [karl.wittmann@meduniwien.ac.at](mailto:karl.wittmann@meduniwien.ac.at)

<sup>2</sup>Email: [peterwirtz2004@yahoo.com](mailto:peterwirtz2004@yahoo.com)

<sup>1</sup>[urn:lsid:zoobank.org:author:C90E7BC4-A27A-4B41-93F3-6224D17795FF](https://zoobank.org/author/C90E7BC4-A27A-4B41-93F3-6224D17795FF)

<sup>2</sup>[urn:lsid:zoobank.org:author:A9870EB6-74E9-43C7-931E-A23AF2E981DA](https://zoobank.org/author/A9870EB6-74E9-43C7-931E-A23AF2E981DA)

**Abstract.** Revised definitions are given for the genus *Mysidium* Dana, 1852, and its eight previously known species, based on material from Curaçao, Bonaire and SE-Brazil, along with the evaluation of published data. Type material of *Diamysis columbiae* Zimmer, 1915, *M. cubanense* Băcescu & Ortiz, 1984 and *M. rubroculatum* Băcescu & Ortiz, 1984 is examined. A lectotype is designated for *D. columbiae* Zimmer, 1915, a senior synonym of *Mysidium columbiae* (Zimmer, 1915). Two new species are described, *M. triangulare* Wittmann sp. nov. from Curaçao and *M. antillarum* Wittmann sp. nov. from Curaçao and Bonaire. Known ranges are extended by first records of *M. cubanense* from Curaçao and Bonaire and of *M. integrum* W.M. Tattersall, 1951 from SE Brazil. Three morphologically different groups are established at the subgeneric level: (1) the nominotypical subgenus *Mysidium* Dana, 1852 with *M. gracile* (Dana, 1852), *M. integrum*, *M. cubanense*, *M. rubroculatum* and *M. triangulare* sp. nov. from the West Atlantic plus *M. rickettsi* Harrison & Bowman, 1987 from the East Pacific; (2) *Occimysidium* Wittmann subgen. nov. represented only by *M. pumae* Ortiz, Hendrickx & Winfield, 2017 from the Pacific coast of Mexico; and finally (3) *Orientalmysidium* Wittmann subgen. nov. comprising *M. columbiae* and *M. antillarum* sp. nov. from the West Atlantic. The poorly known *M. iliffei* Băcescu, 1991 is not assigned to any subgenus. A key to the resulting three subgenera and ten nominal species of the genus *Mysidium* is given.

**Keywords.** Taxonomy, first description, key to species, range extensions, subtropical to tropical West Atlantic.

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## Introduction

Species of the genus *Mysidium* Dana, 1852, constitute the most frequent shrimp-like, swarming crustaceans with an adult body size of 3–9 mm, inhabiting mangrove and shallow coral-reef habitats of the Gulf of

Mexico, Caribbean and elsewhere in near-shore marine habitats between Bermuda and Rio de Janeiro (Steven 1961; Goodbody 1965; Emery 1968; Modlin 1987, 1990, 1993). Six species have so far been described from the subtropical to tropical coasts of the West Atlantic (Dana 1852; Zimmer 1915a; W.M. Tattersall 1951; Băcescu & Ortiz 1984; Băcescu 1991) and two additional species from the Pacific coast of Mexico (Harrison & Bowman 1987; Ortiz *et al.* 2017a). The importance of this genus is underlined by the many studies on its physiology (Bainbridge & Waterman 1957, 1958; Waterman 1960; Buskey 2000), behaviour (Steven 1961; Jander 1962; McFarland & Kotchian 1982; Hahn & Itzkowitz 1986; Modlin 1987, 1990; Buskey 1998; Twining *et al.* 2000), morphogenesis (Duman-Scheel & Patel 1999; Duman-Scheel *et al.* 2002), marsupial development (Davis 1966; Whittington 2004), population dynamics (Goodbody 1965; Modlin 1993; Prieto *et al.* 2009), trophic ecology (McFarland & Kotchian 1982; Ambler *et al.* 1994; Bullard & Hay 2002), biodiversity (Price & Heard 2009), biogeography (Escobar-Briones & Soto 1991) and taxonomy (Dana 1852; Zimmer 1915a; W.M. Tattersall 1951; Brattegard 1969, 1970, 1975; Băcescu & Ortiz 1984; Harrison & Bowman 1987; Modlin 1990, 1993; Băcescu 1991; Price & Heard 2009; Ortiz *et al.* 2012, 2017b; Miyashita & Calliari 2014; Ortiz & Lalana 2018).

Due to the large numbers and sizes of swarms in near-shore habitats, together with their exclusively amphiamerican distribution range, it is unsurprising that these crustaceans constituted the first mysid genus described as endemic to America (Dana 1850). The original generic definition given by Dana for the junior homonym *Mysidia* in 1850, renamed by him as *Mysidium* in retrospective formulation (see Discussion) in 1852, was very brief as was usual for that period. Many more details became available by subsequent descriptions and supplementary definitions of the genus by Czerniavsky (1887) and Ortiz *et al.* (2017b). Detailed species descriptions were provided by Dana (1852), Zimmer (1915a), W.M. Tattersall (1951), Harrison & Bowman (1987) and Ortiz *et al.* (2017a, 2017b). The first descriptions of *M. cubanense* Băcescu & Ortiz, 1984, *M. rubroculatum* Băcescu & Ortiz, 1984 and *M. iliffei* Băcescu, 1991 were also rather brief, complicating the separation of *M. cubanense* and *M. rubroculatum* from *M. gracile* (Dana, 1852) and *M. integrum* W.M. Tattersall, 1951. In diagnoses and key to species, Ortiz *et al.* (2017a, 2017b) and Ortiz & Lalana (2018) introduced numbers of setae on the endopod of the fourth male pleopod as supplementary measures of discrimination. Nonetheless, the diagnostic resolution is lowered, but not suspended, by the below documented inter-individual variability of these numbers. Based on the study of types and of additional material from a wide distribution range, the present contribution improves the discriminatory performance by determining additional discriminatory features and by applying a consistent, clear-cut scheme of characters at the genus, subgenus and species level. This led to the detection of new species together with the establishment of new subgenera.

## Material and methods

### Abbreviations

MINGA	=	Grigore Antipa, National Museum of Natural History, Bucharest
NHMW	=	Naturhistorisches Museum Wien
ZMH	=	Zoologisches Museum Hamburg
bl	=	body length
N1 to N4	=	nauplioid larvae at substage N1 freshly hatched from the egg membrane, up to N4 for those shortly before the molt leading to the postnauplioid stage
#	=	sample number in Table 1

### Material

A total of 13 samples were taken with hand net by snorkeling and scuba diving by one of us (Peter Wirtz) in littoral and sublittoral marine waters of Curaçao, Bonaire and SE-Brazil (Table 1). Additional material was obtained upon request from museum collections: the Zoological Museum of Hamburg kindly provided the types of *Diamysis columbiae* Zimmer, 1915. The Grigore Antipa, National

**Table 1.** Sampling data of species of *Mysidium* Dana, 1852 in euhaline coastal waters of Curaçao, Bonaire and SE-Brazil.

Sample no.	Locality	Coordinates	Depth (m)	Sample details	Date (time)	Species encountered
C1	Curaçao, close to Piscadera Baai, in front of Caribbean Marine Biological Institute	12.1222° N 68.9690° W	0.2	Swarm above rubble formed by dead branches of <i>Acropora</i> sp.	18 Aug. 1997 (day)	<i>M. antillarum</i>
C2	Curaçao, harbour at entrance of Piscadera Baai	12.1288° N 68.9695° W	0.5–2	Swarm around pier	18 Aug. 1997 (day)	<i>M. antillarum</i>
C3	Curaçao, 1 km west of Piscadera Baai	12.1285° N 68.9792° W	4–12	Swarms around blocks of corals	20 Aug. 1997 (day)	<i>M. cubanense</i> <i>M. triangulare</i> <i>M. columbiae</i>
C4	Curaçao, as in C1	as in C1	0–0.5	Swept with hand net in front of diver's torch close to sea floor	21 Aug. 1997 (night)	<i>M. cubanense</i> <i>M. antillarum</i>
C5	Curaçao, Reef Sint Marie	12.2119° N 69.0867° W	7	Swarms between corals	22 Aug. 1997 (day)	<i>M. cubanense</i> <i>M. columbiae</i>
C6	Curaçao, Reef Sint Marie	12.2122° N 69.0850° W	0–0.5	Swarms around pier and off pier, immediately below surface	23 Aug. 1997 (day)	<i>M. integrum</i> <i>M. antillarum</i>
C7	Curaçao, Vaersenbaai	12.1606° N 69.0056° W	25–35	Swarms between corals	23 Aug. 1997 (day)	<i>M. gracile</i> <i>M. integrum</i> <i>M. antillarum</i>
C8	Curaçao, Playa Lagun	12.3181° N 69.1511° W	4–6	Pooled sample from large swarm between corals (4 m), loose aggregation above sand (6 m), and mysids scattered above sand inside small cave (5 m)	28 Aug. 1997 (day)	<i>M. cubanense</i> <i>M. triangulare</i> <i>M. antillarum</i>
C9	Curaçao, Playa Kalki	12.3756° N 69.1581° W	0.05	Swarms above algae in the breaker zone	30 Aug. 1997 (day)	<i>M. integrum</i>
C10	Curaçao, Playa Santu Preto	12.3033° N 69.1489° W	1	Large swarms freely swimming in front of and in the entrance area of cave	31 Aug. 1997 (day)	<i>M. integrum</i> <i>M. triangulare</i> <i>M. antillarum</i>
B11	Bonaire, Bachelor's Beach	12.1260° N 68.2877° W	3–26	Pooled sample from the sea floor	7 June 2004 (day)	<i>M. gracile</i> <i>M. cubanense</i> <i>M. columbiae</i> <i>M. antillarum</i>
B12	Bonaire, in front of dive base Dive Inn	12.1460° N 68.2767° W	9	Swept with hand net in front of diver's torch close to sea floor	10 June 2004 (night)	<i>M. gracile</i> <i>M. columbiae</i>
F13	Brazil, off Cabo Frio, Ilha dos Papageios	22.8974° S 41.9834° W	4–12	Pooled sample from very large mysid swarms	6 Feb. 2003 (day)	<i>M. gracile</i> <i>M. integrum</i>

Museum of Natural History, Bucharest, provided types of *Mysidium cubanense* Băcescu & Ortiz, 1984, and *M. rubroculatum* Băcescu & Ortiz, 1984. Types of newly described species are deposited at MINGA, NHMW and ZMH.

### Laboratory methods

Preparation, measurements and examination of materials as in Wittmann (2008). Body length (bl) measured according to Tattersall & Tattersall (1951) from the anterior margin of the carapace to the posterior margin of the telson, excluding the spines. Note in the present context that Băcescu & Ortiz (1984) measured according to Băcescu (1954) from the tip of the antennal scale to the end of the exopod of uropods without setae. Length measurements of somites, appendages and segments do not include

setae, laminae, spines, claws, etc. The length of the antennular trunk and its segments is measured along the dorsal midline. Size ratios within and between angular and oblique objects were calculated as linearized within a single observation plane; this is especially important for estimating the relative size of eyes. 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). Juveniles and immatures are not represented in material lists below.

### **Terminology**

Essentially as in Wittmann *et al.* (2014). In the present context, note that thorn-like projections with a basal suture are termed ‘spines’, those without suture are ‘teeth’ or ‘denticles’; slender projections in dense series without suture are ‘laminae’; slender, flexible projections with basal suture are ‘setae’, particularly if barbed or pinnate. The maxillula is obscurely three-segmented with inner lobe (endite) according to the interpretation by Tattersall & Tattersall (1951). Terminology of gross structures of the foregut follows Kobusch (1998); modified spines of the foregut according to Wittmann & Griffiths (2018), in addition, ‘apically pronged, serrated’ spines (Fig. 13G) are now distinguished. Marsupial stages are distinguished according to Wittmann (1981) and Wittmann *et al.* (2014). Post-marsupial stages are distinguished according to Wittmann *et al.* (2016). Drawings of sex-specific features are labeled by ♀- or ♂-symbols, respectively, in Figs 1–13. The absence of such labels implies missing or unapparent gender-specific differences.

### **Taxonomy**

At subfamily to tribe levels adopted from Wittmann *et al.* (2014) with additions by Wittmann *et al.* (2016). Diagnoses and keys to species by Ortiz *et al.* (2017a, 2017b) provided a valuable starting point for the present revision of the genus *Mysidium*.

## **Results**

### ***Taxonomy and large-scale distribution***

Order Mysida Boas, 1883  
Family Mysidae Haworth, 1825  
Subfamily Mysinae Haworth, 1825

Tribe **Anisomysini** Wittmann, Ariani & Lagardère, 2014

### **Diagnosis**

The diagnosis of this tribe is slightly modified from Wittmann *et al.* (2014) due to certain spine-like cuticle structures of the telson being now interpreted as laminae (see ‘Methods’ and species descriptions below):

Antennal scale setose all around (exceptionally with blunt spine on outer margin) and with short apical segment; carpopropodus of thoracic endopod 6 with 1–3 segments; two pairs of well-developed oostegites, rudimentary oostegite on thoracic endopod 6; pleopods rudimentary in both sexes, except male pleopod 4 and to a minor extent also pleopod 3; third male pleopod uniramous, unsegmented, mostly rudimentary as in females or reduced to small endopod fused with sympod; exopod of fourth male pleopod with total of 1–2 modified setae (1–2 on apical segment, 0–1 on subapical segment); uropods without spines; telson shorter than ultimate pleonite, terminally entire or with apical cleft, lateral margins bare or furnished with spines or laminae; spines (if present) on lateral margins arranged in continuous series, not arranged in groups of large spines with smaller spines in between; telson always devoid of setae.

Genus *Mysidium* Dana, 1852

*Mysidia* Dana, 1850: 130 (junior homonym, see Discussion).

*Mysidium* Dana, 1852: 638, 653 (published in synonymy, see Discussion).

*Themisto* – Dana 1850: 130 (quoted as homonym).

*Macromysis* – Dana 1852: 638, 652, 653 (subjective junior synonym, see Discussion); 1853: 1435; 1855: pl. 43, fig. 5. — Czerniavsky 1887: 85 (in synonymy). — Tattersall & Tattersall 1951: 376 (in synonymy).

*Mysidium* – Czerniavsky 1882: 16, 50 (in key); 1887: 85 (diagnosis, synonymy). — W.M. Tattersall 1951: 223 (synonymy, key to species). — Brattegard 1969: 89 (key to species). — Mauchline 1980: 36 (in key). — Băcescu & Ortiz 1984: 22 (key to species). — Harrison & Bowman 1987: 678. — Fukuoka 2006: fig. 1. — Petrescu & Wittmann 2009: 64. — Ortiz et al. 2012: 985; 2017b: 72. — Wittmann et al. 2014: 339. — Ortiz & Lalana 2018: 67.

*Mysidia* – Czerniavsky 1887: 85 (in synonymy). — Gerstaecker & Ortmann 1901: 665 (in citation). — Zimmer 1915b: 211, 215; 1918: 24. — Illig 1930: 599 (in list).

*Diamysis* – Zimmer 1915a: 214 (invalid subsequent assignment).

### Type species

*Macromysis gracilis* Dana, 1852, currently acknowledged in revised combination as *Mysidium gracile* (Dana, 1852).

### Diagnosis

Compiled with the reservation that not every one of the following characters is known in *Mysidium iliffei* Băcescu, 1991 (see Discussion):

Anisomysini with eyes normal, eyestalks and cornea well developed. Antennular trunk terminally with the usual two flagella in both sexes, no accessory flagellum developed. Appendix masculina large, setose. Antennal scale lanceolate, without spines, but setose all around, with small terminal segment. Mandibles normal, palp three-segmented, cutting edges with well-developed pars incisiva, lacinia mobilis and pars molaris. Distal segment of maxillary palp with setae, but without denticles. Thoracopods essentially normal, endopods with 2- or three-segmented carpopropodus. All pleopods of females and pleopods 1–3, 5 of males are vestigial, setose, uniramous, unsegmented. Male pleopod 3 larger than pleopods 1–2, 5. Male pleopod 4 even longer, modified, with distinct sympod, unsegmented endopod and 3- or 4-segmented, slender exopod. Terminal two segments of exopod each bearing a large modified seta, remaining segments usually without setae, at most with one small seta on the basal segment. Uropods setose all around, without spines; exopods longer than endopods. Telson longer than broad, with entire or incised terminal margin; with spines and laminae on distal half.

### Etymology

Derivation and gender of *Mysidia* and *Mysidium* not stated by Dana (1850, 1852). Neutral gender of *Mysidium* implicitly fixed by Czerniavsky (1887: 85) upon proposing the revised combination *Mysidium gracile* (Dana, 1852).

### Subgenera included

*Mysidium* Dana, 1852, nominotypical subgen., east and west coasts of America

*Orientomysidium* Wittmann subgen. nov., east coast of America

*Occimysidium* Wittmann subgen. nov., west coast of America



### Species included

West Atlantic (32° N to 24° S):

- Mysidium* (*Mysidium*) *gracile* (Dana, 1852)  
*Mysidium* (*Mysidium*) *integrum* W.M. Tattersall, 1951  
*Mysidium* (*Mysidium*) *cubanense* Băcescu & Ortiz, 1984  
*Mysidium* (*Mysidium*) *rubroculatum* Băcescu & Ortiz, 1984  
*Mysidium* (*Mysidium*) *triangulare* Wittmann sp. nov.  
*Mysidium* (*Orientomysidium*) *columbiae* (Zimmer, 1915) comb. nov.  
*Mysidium* (*Orientomysidium*) *antillarum* Wittmann sp. nov.  
*Mysidium* *iliffei* Băcescu, 1991

East Pacific (21–25° N):

- Mysidium* (*Mysidium*) *rickettsi* Harrison & Bowman, 1987  
*Mysidium* (*Occimysidium*) *pumae* Ortiz, Hendrickx & Winfield, 2017 comb. nov.

***Mysidium*** Dana, 1852, nominotypical subgenus

### Diagnosis

Subdivision of the genus *Mysidium* Dana, 1852, characterized by three-segmented carpopropodus of third thoracic endopod. Merus of this endopod with non-serrated setae exclusively, with the reservation that this feature is unknown in *M. rickettsi* Harrison & Bowman, 1987. Third male pleopod with medial widening at 40–60% distance from basis. Sympod of fourth male pleopod without setae on rostral face. Its exopod four-segmented; the two proximal segments without setae; the two distal segments each with one unbranched modified seta. Telson entire, or at most with a rounded, shallow indentation.

### Distribution

Littoral and sublittoral waters of Atlantic and Pacific coasts of subtropical to tropical America (32° N to 24° S), including Caribbean, Gulf of Mexico and Gulf of California.

***Mysidium* (*Mysidium*) *gracile*** (Dana, 1852)

Fig. 1

*Macromysis gracilis* Dana, 1852: 653–655 (senior synonym in combination with generic, subjective junior synonym).

*Macromysis gracilis* – Dana 1855: pl. 43, fig. 5a–m. — Smith 1873: 41 (in list). — Illig 1930: 599 (in synonymy).

*Mysidium gracile* – Czerniavsky 1887: 85–87 (revised combination). — W.M. Tattersall 1951: 222–223. — Costa 1964: 8. — Brattegard 1969: 80; 1970: 127; 1974b: 102; 1975: 112. — Almeida Prado 1974: 53. — Quintero & Zoppi de Roa 1977: fig. 3. — Mauchline 1980: 338 (in list). — Băcescu & Ortiz 1984: 22 (in key). — Zoppi de Roa *et al.* 1989: fig. 2C. — Murano 1999: fig. 6.89. — Twining *et al.* 2000: 1845. — Price *et al.* 2002: 45. — Price & Heard 2004: 155; 2009: 938 (in list). — Ortiz *et al.* 2017a: table 1; 2017b: fig. 5. — Sorbe *et al.* 2007: table I. — Miyashita & Calliari 2014: 9, table 1. — Wittmann *et al.* 2014: 298. — Esteves-Astudillo *et al.* 2017: fig. 5. — Ortiz & Lalana 2018: 72.

*Mysidia gracilis* – Zimmer 1915b: 215 (subsequent combination with generic junior homonym); 1918: 24, figs 33–34.

*Mysidia gracile* – Illig 1930: 500 (as before, gender variant, in key).

**Type material**

Not examined.

**Other material examined**

BONAIRE • 7 ♀♀ ad. bl 4.4–5.2 mm, 21 ♂♂ ad. bl 3.4–5.1 mm, 1 subad.; #B11; ZMH K-55262 • 1 ♂ ad. bl 4.6 mm; #B12; MINGA MYS 439.

CURAÇAO • 1 ♂ ad. bl 5.6 mm, 6 subad.; #C7; MINGA MYS 434.

SE-BRAZIL • 19 ♀♀ ad. bl 4.8–6.3 mm, 15 ♂♂ ad. bl 5.2–6.6 mm, 13 subad.; #F13; NHMW 26482.

**Type locality**

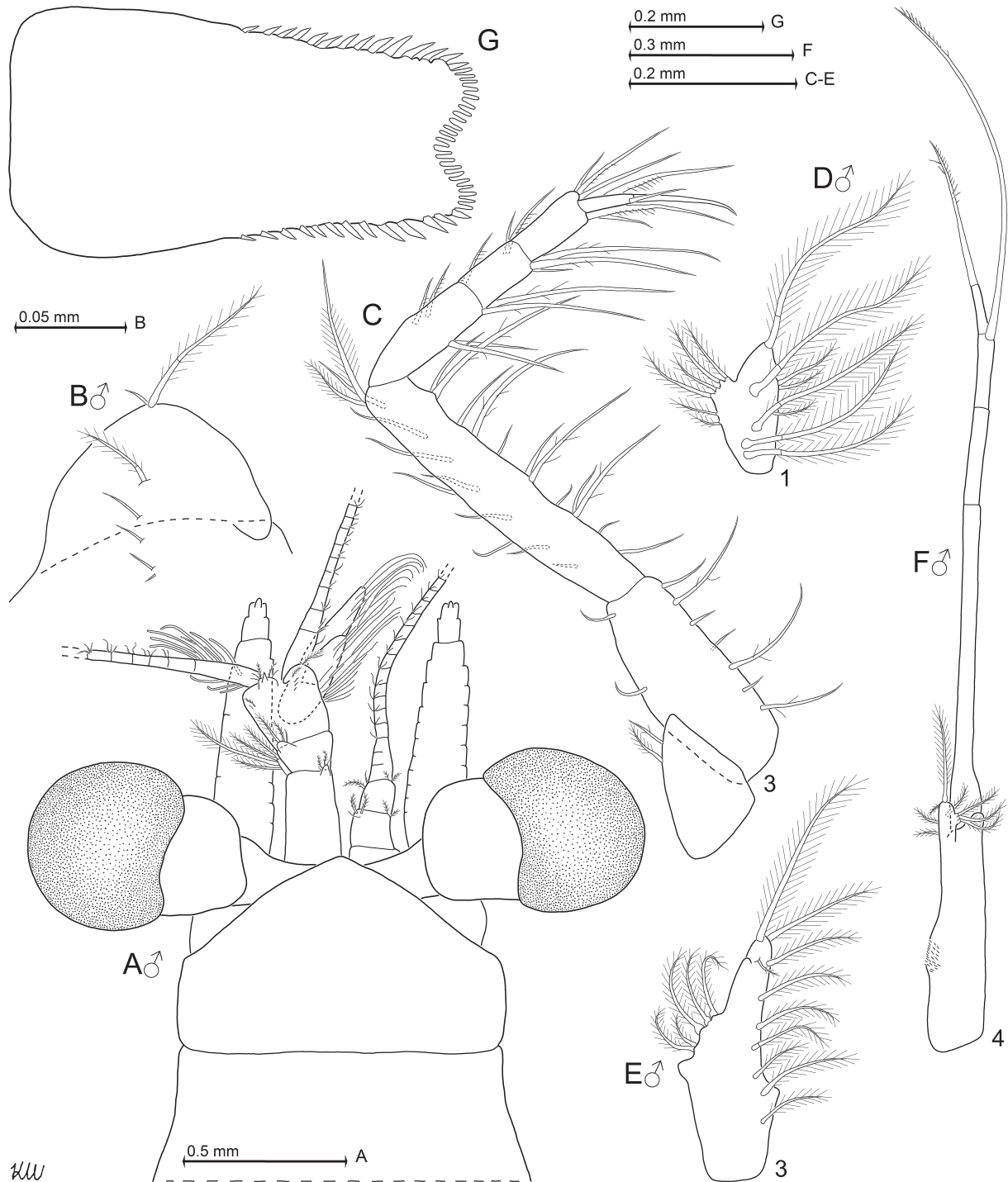
(Sub)tropical SW-Atlantic, harbour of Rio de Janeiro (Dana 1852), about 22.90° S, 43.17° W. The present sample off Cabo Frio is at about 145 km east along the shoreline from this harbour.

**Revised definition**

All features as diagnosed for the genus and its subgenus *Mysidium* Dana, 1852. Cornea globose in lateral view, calotte-shaped in dorsal view, with diameter 1.7–3.2 times as long as terminal segment of antennular trunk. Eyestalks smooth. Rostrum short, triangular, apically rounded to obtusely pointed, not extending beyond basis of eyestalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediodistal extension (Fig. 1A–B); plumose seta at anterior margin of this extension showing 0.9–1.4 times extension length; longitudinal series of 6–8 shorter (partly minute) setae all over this extension plus a short proximal stretch. Appendix masculina bilobate, 1.6–2.7 times as long as terminal segment of antennular trunk. Length of antennal scale 4–6 times maximum width; scale clearly reaching beyond antennular trunk. Median segment of mandibular palp with setae on both margins. About evenly rounded hump on the outer face of the distal segment of the maxillula. Carpopropodus of first to eighth thoracic endopods with 2, 2, 3, 3, 3, 3, 3–2, and 2–3 segments, respectively. Basal segment occupies half total length of carpopropodus of endopod 3. Pleopod 1 rod-like to indistinctly bilobate in both sexes. Sympod of pleopod 4 with endite missing or reduced to weak medial hump. Basal segment occupies 56–69% total length of exopod. Endopod reduced to lobe with 12–18% sympod length; apically with one long seta and more proximally additional 4–7 shorter, barbed setae. Endopod of uropods 0.6–0.8 times length of exopod. Telson subrectangular, length 1.4–2.0 times maximum width near basis; lateral margins slightly tapering or parallel. Proximal 46–64% of lateral margins smooth, distal portion of each margin with dense, continuous series of 11–15 acute spines. Terminal margin concave, densely furnished with 15–21 apically blunt laminae.

**Descriptive notes**

Adult females of present material with 4.4–6.3 mm (n = 26) body length, males 3.4–6.6 mm (n = 38). Antennular trunk extends –5% up to +23% its length beyond (artificially aligned) eyes (Fig. 1A). Antennal scale 1.3–1.8 times trunk. Sympod of antenna produced into spiniform extension on outer distal corner. Thoracic endopod 8 (when stretched) reaching backwards at most to the middle of pleonite 4 and forwards to mandibles; its carpopropodus 83–94% length of merus or 29–53% of telson. Pleonites 1–5 are 0.5–0.7, 0.6–0.8, 0.6–0.8, 0.5–0.7 or 0.5–0.8 times as long as pleonite 6, respectively. Sizes increase from pleopods 1 to 4, while pleopod 5 ranges between pleopods 1 and 2 in both sexes; amplitude of this variation much stronger in males than females. Pleopod 1 (Fig. 1D) stouter compared to remaining pleopods. Pleopods 2–5 of females and 2, 5 of males are essentially rod-like. Pleopods 1–3 with a ventro-laterally directed fan of plumose setae in both sexes. Setae forming the fan of pleopod 1 larger compared to those of pleopods 2–5 in females and 2, 3, 5 in males. Male pleopod 4 (Fig. 1F) very long, exopod reaching at most to basal third of telson; its subapical seta up to the apex of telson. Endopod with apical



**Fig. 1.** *Mysidium gracile* (Dana, 1852), off Cabo Frio in Brazil, non-types. **A–B.** ♂, 5.6 mm body length. **C, G.** ♂, 5.3 mm. **D–F.** ♂, 5.2 mm. **A.** Cephalic region, right antennula and setae of antennal scale omitted. **B.** Mediodistal extension of right antennular trunk, dorsal. **C.** Third thoracic endopod, caudal. **D–E.** Pleopods 1 and 3, rostral. **F.** Pleopod 4, caudal. **G.** Telson.



seta 2.2–4.6 times endopod length. Sympod with field of scales on its medial hump, or in analogous position upon missing hump. Scutellum paracaudale triangular with acute apex; upper margin weakly convex, lower margin concave or S-shaped. Uropodal endopod 1.0–1.4 times, exopod 1.3–1.9 times as long as pleonite 6. Exopod extends 0.2–0.4 times its length beyond endopod, or 0.5–0.7 times beyond telson; endopod 0.2–0.6 times its length beyond telson. Telson (Fig. 1G) length 0.4–0.6 times uropodal exopod, 0.5–0.7 times endopod and 0.7–0.8 times pleonite 6. Statoliths composed of fluorite. Structure of foregut and nauplioid larvae essentially as in *M. triangulare* sp. nov. (Fig. 8A–F, N–M).

### Distribution and habitat

Widely distributed, mainly in sublittoral, also in littoral waters of the West Atlantic in the range of 32° N to 24° S (Bermuda to coast near São Sebastião, Brazil), including the Caribbean (Price & Heard 2004; Ortiz *et al.* 2017b). Masses were recorded from the surface zone of a sandy beach in Venezuela (Esteves-Astudillo *et al.* 2017). Distribution mostly euhaline, also found in the metahaline reach of a lagoon by Zoppi de Roa *et al.* (1989). The species forms swarms close to the bottom in a variety of coral reef habitats (Emery 1968; Brattegard 1969). Swarms may hover near the sea urchin *Diadema antillarum* Philippi, 1845, where they withdraw to the safety of the interspaces between the spines when threatened (Randall *et al.* 1964). They may also crowd in the nest caves of pomacentrid fish when a predator approaches (Emery 1968). The swarms disperse during the night and the individuals show homing behaviour by regrouping at the same location in the morning (Twining *et al.* 2000). Present records from Curaçao, Bonaire, and SE-Brazil; in swarms hovering during the daytime over the sea floor at a depth of 3–35 m, also found between corals.

### *Mysidium (Mysidium) integrum* W.M. Tattersall, 1951

Fig. 2

*Mysidium integrum* W.M. Tattersall, 1951: 223–226, fig. 96.

*Mysidium integrum* – Banner 1954: 447. — Brattegard 1969: 82; 1970: 128; 1973: 50; 1974a: 69; 1974b: 112, table 1; 1975: 112. — Mauchline 1980: 338 (in list). — Băcescu & Ortiz 1984: 22 (in key). — Modlin 1984: 282; 1987: 115. — Price *et al.* 1986: table 1; 2002: 46. — Harrison & Bowman 1987: 678 (in comparison). — Zoppi de Roa *et al.* 1989: 31. — Escobar Briones & Soto 1991: table 1. — Schlacher *et al.* 1992: table 1. — Ariani *et al.* 1993: table 1. — Wittmann *et al.* 1993: fig. 3H. — Price & Heard 2004: 155; 2009: 938 (in list). — Sorbe *et al.* 2007: table I. — Wittmann *et al.* 2014: fig. 54.27E. — Ortiz *et al.* 2017a: 113; 2017b: 72. — Ortiz & Lalana 2018: 81.

non *Mysidium integrum* — Zoppi de Roa *et al.* 1989: fig. 3.

### Type material

Not examined.

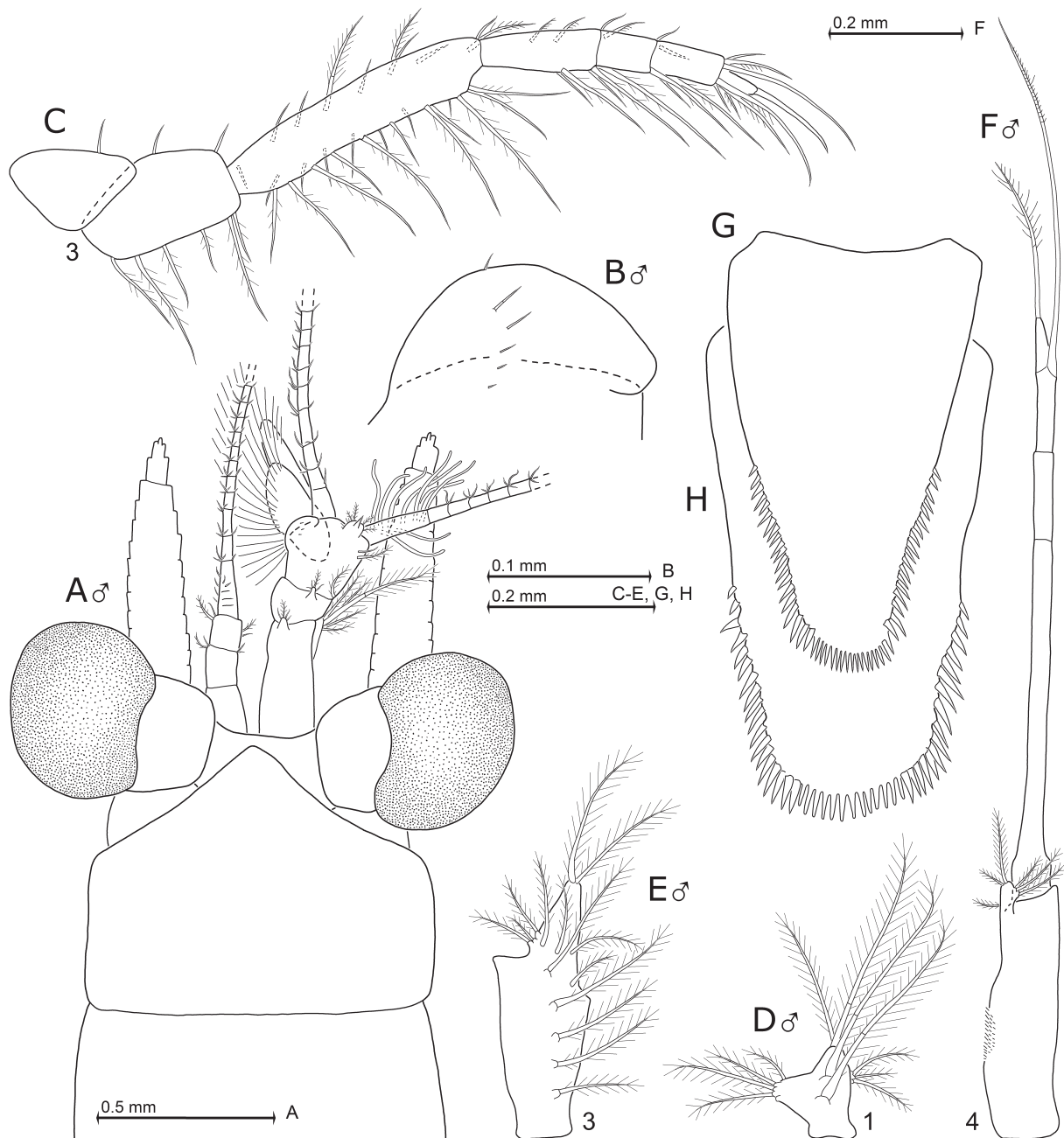
### Other material examined

CURAÇAO • 18 ♀♀ ad. bl 4.9–6.3 mm, 27 ♂♂ ad. 4.1–5.5 mm, 15 subad.; #C6; NHMW 26481 • 6 subad. bl 2.8–4.1 mm; #C7; MINGA MYS 437 • 51 ♀♀ ad. bl 3.8–5.9 mm, 32 ♂♂ ad. bl 4.0–5.1 mm, 5 subad.; #C9; MINGA MYS 437 • 88 ♀♀ ad. bl 3.8–5.9 mm, 25 ♂♂ ad. bl 3.2–5.2 mm, 20 subad.; #C10; ZMH K-55261.

SE-BRAZIL • 6 ♀♀ ad. bl 4.8–6.0 mm, 33 ♂♂ ad. bl 4.3–6.1 mm, 6 subad.; #F13; ZMH K-55265.

**Type locality**

Tropical NW-Atlantic, Cruz Bay, St. John, Virgin Islands (W.M. Tattersall 1951). Coordinates estimated by present authors as 18.3322° N, 64.7967° W.



**Fig. 2.** *Mysidium integrum* W.M. Tattersall, 1951, from Curaçao (A–G) and off Cabo Frio in Brazil (H), non-types. **A.** ♂, 5.1 mm body length. **B.** ♂, 5.3 mm. **C–G.** ♂, 4.6 mm. **H.** ♂, 6.8 mm. **A.** Cephalic region; left antennula and setae of antennal scale omitted. **B.** Mediodistal extension of right antennular trunk, dorsal view. **C.** Third thoracic endopod, caudal view. **D–E.** Pleopods 1 and 3, rostral view. **F.** Pleopod 4, caudal view. **G–H.** Telson variants. Sample affiliation: Curaçao #C3 (A, C–G), #C9 (B); Brazil #F13 (H)

**Revised definition**

All features diagnosed above for genus and subgenus *Mysidium* Dana, 1852. Cornea globose in lateral view; calotte-shaped in dorsal view, with diameter 1.6–2.4 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum broadly triangular, apically bluntly pointed to well rounded, not extending beyond basis of eystalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediolateral extension (Fig. 2A–B); longitudinal series of 4–6 setae all over this extension plus a short proximal stretch. The largest seta 0.3–0.5 times extension length. Appendix masculina bilobate, all along inner margins fringed by large setae; its length 1.1–2.5 times terminal segment of antennular trunk. Length of antennal scale 4–5 times maximum width; scale reaching well beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Weak, about evenly rounded hump on outer face of distal segment of the maxillula. Carpopropodus of first to eighth thoracic endopods with 2, 2, 3, 3, 3, 3–2, 3–2, and 2–3 segments, respectively. Basal segment occupies half total length of carpopropodus of endopod 3. Pleopod 1 representing a stout, bilobate plate in both sexes. Sympod of male pleopod 4 with endite reduced to weak medial hump or missing. Basal segment of exopod measures 49–63% total length. Endopod reduced to setose lobe with 11–24% sympod length; apically with 1–2 setae and more proximally additional 4–6 barbed setae, total of 5–7 setae. Endopod of uropods 0.7 times as long as exopod. Telson spatulate, caudally gradually narrowing; length 1.5–1.8 times maximum width near basis; latero-terminal corners rounded; terminal margin traverse to convex. Proximal 52–62% of lateral margins smooth, distal portion of each margin with dense, continuous series of 13–25 acute spines. This series extending up to the latero-terminal corner. Terminal margin lined by 12–20 densely set, acute (Fig. 2G) or blunt (Fig. 2H) laminae. These laminae more slender compared to the neighboring latero-terminal spines.

**Descriptive notes**

Adult females of present material with 3.8–6.3 mm (n = 163) body length, males 3.2–6.1 mm (n = 117). Antennular trunk extends 9–57% its length beyond (artificially aligned) eyes (Fig. 2A). Antennal scale 1.3–1.5 times as long as trunk. Sympod of antenna produced into spiniform extension on outer distal corner. Thoracic endopod 8 (when stretched) reaching backwards at most to middle of pleonite 4 and forwards to mandibles; its carpopropodus 69–84% as long as merus or 38–53% times telson length. Pleonites 1–5 are 0.6–0.8, 0.6–0.7, 0.6–0.7, 0.5–0.6 or 0.6–0.7 times as long as pleonite 6, respectively. Sizes increase from pleopods 1 to 4, while pleopod 5 ranges between 1 and 2 in both sexes; amplitude of this variation much stronger in males than females. Pleopod 1 (Fig. 2D) stouter compared to the remaining pleopods. Pleopods 2–5 of females and 2, 5 of males are essentially rod-like. Pleopods 1–3 with a ventro-laterally directed fan of plumose setae in both sexes. Setae forming the fan of pleopod 1 are larger compared to those of pleopods 2–5 in females and 2, 3, 5 in males. Male pleopod 4 (Fig. 2F) reaching at most to basal third of telson, its subapical seta up to basal third of uropodal exopod. Sympod with field of scales on its medial hump, or in analogous position upon missing hump. Endopod with its larger apical seta 1.8–3.1 times endopod length. Scutellum paracaudale triangular with acute apex; upper margin convex to concave, lower margin straight to slightly convex or S-shaped. Uropodal endopod 1.1–1.2 times, exopod 1.6–1.8 times as long as pleonite 6. Exopod extends 0.2–0.4 times its length beyond endopod, or 0.6–0.7 times beyond telson; endopod 0.5–0.6 times its length beyond telson. Telson (Fig. 2G–H) length 0.4–0.5 times uropodal exopod, 0.5–0.7 times endopod or 0.7–0.8 times pleonite 6. Statoliths composed of fluorite. Structure of foregut and nauplioid larvae essentially as in *M. triangulare* sp. nov. (Fig. 8A–F, M–N).

**Distribution and habitat**

Reported from euhaline coastal waters of Bermuda, Bahamas, Caribbean and Gulf of Mexico (Brattegard 1970, 1973; Ortiz *et al.* 2017b). The present record from the Brazilian coast off Cabo Frio represents

a strong extension of the known distribution to the south, yielding a total range from 32° N to 23° S along the coasts of the West Atlantic. According to Zoppi de Roa & Alonso (1997) these mysids form swarms close to the bottom of diverse coral reef and mangrove habitats, also found among spines of the sea urchin *Diadema antillarum*. The present data from Curaçao and SE-Brazil were recorded during the daytime at a depth of 0–35 m, on swarms mostly hovering around, between or above rock and coral blocks, also from the entrance area of a cave. Most surprising was sample C9 (Table 1) from the water edge where the mysids showed a striking green body color upon swarming above algae at a depth of only 5 cm.

*Mysidium (Mysidium) cubanense* Băcescu & Ortiz, 1984

Fig. 3

*Mysidium cubanense* Băcescu & Ortiz, 1984: 18–20, fig. 2A–K.

*Mysidium cubanense* – Harrison & Bowman 1987: 678 (in comparison). — Ortiz & Lalana 1988: 14 (in list); 1997: 187; 2018: 67. — Băcescu 1991: 3–6. — Escobar-Briones & Soto 1991: table 1. — Ortiz 2001: 100 (in list). — Ortiz *et al.* 2006: 3; 2017a: 113; 2017b: 72–74. — Petrescu & Wittmann 2009: 54. — Price & Heard 2009: 938 (in list).

*Mysidium cubanensis* — Harrison & Bowman 1987: 674, 678 (gender inconsistency).

**Type material examined**

**Holotype**

CUBA • adult ♂, partly dissected, bl 4.5 mm; in front of Marine Research Center, Habana, at the entrance of a small underwater cave; 23.1334° N, 82.3334° W; 13 m; 13 May 1983; Manolo Ortiz leg.; Mihai Băcescu det.; MINGA 49346/601a.

**Other material examined**

CURAÇAO • 104 ♀♀ ad. bl 3.9–5.5 mm, 70 ♂♂ ad. bl 3.4–5.2 mm, 32 subad.; #C3; NHMW 26478 • 2 ♀♀ ad. bl 3.6–4.1 mm; #C4; ZMH K-55257 • 383 ♀♀ ad. bl 4.2–5.8 mm, 96 ♂♂ ad. bl 3.1–5.9 mm, 15 subad.; #C5; MINGA MYS 432 • 15 ♀♀ ad. bl 3.7–5.8 mm, 3 ♂♂ ad. bl 3.0–4.7 mm, 10 subad.; #C8; ZMH K-55259.

BONAIRE • 20 ♀♀ ad. bl 3.2–4.4 mm, 5 ♂♂ ad. bl 3.3–4.0 mm, 10 subad.; #B11; MINGA MYS 438.

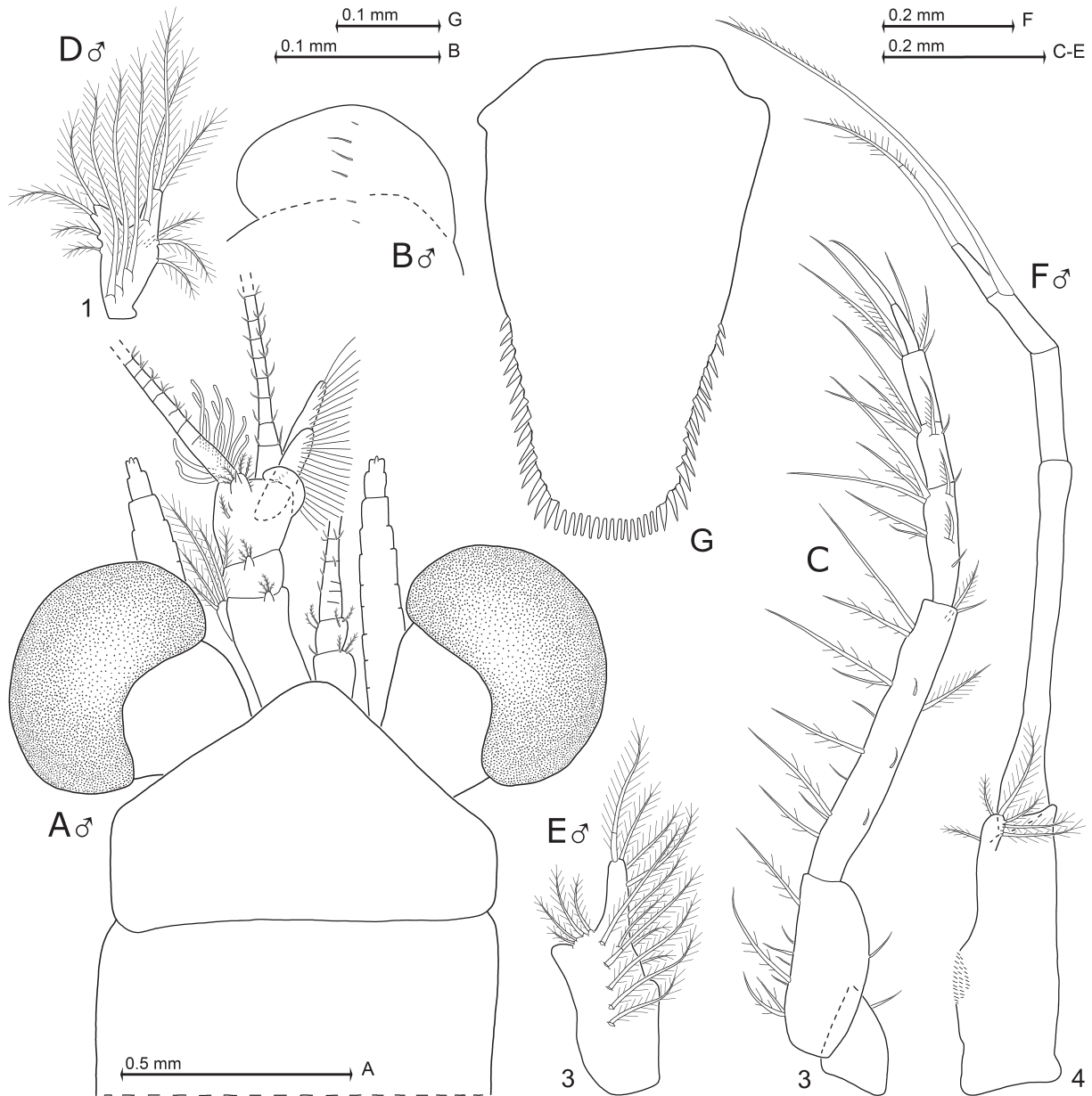
**Type locality**

Miramar, La Habana, Cuba (Băcescu & Ortiz 1984), 23.1334° N, 82.3334° W.

**Revised definition**

All features diagnosed above for genus and subgenus *Mysidium* Dana, 1852. Cornea large, globose to ellipsoidal in lateral view, calotte-shaped to crescent-like in dorsal view, with ‘diameter’ 2.6–4.1 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum (sub)triangular, apically bluntly pointed to well rounded, not extending beyond basis of eystalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediobasal extension (Fig. 3A–B); longitudinal series of 4–6 setae extending all over this extension plus a short proximal stretch. The largest seta 0.2–0.4 times extension length. Appendix masculina bilobate, all along inner margins fringed by large setae; its length 1.1–2.3 times terminal segment of antennular trunk. Length of antennal scale 4–6 times maximum width; scale reaching beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Large, about evenly rounded hump on outer face of distal segment of maxillula. Carpopropodus with two segments

in thoracic endopods 1–2, 8, versus three segments in endopods 3–7. Basal segment occupies half total length of carpopropodus of endopod 3. Pleopod 1 bilobate in both sexes. Sympod of male pleopod 4 with endite reduced to weak medial hump or missing. Basal segment of exopod occupies 54–61% total length. Endopod reduced to lobe with 14–18% sympod length; apically with one long seta and more proximally additional 4–6 shorter, barbed setae. Endopod of uropods 0.6–0.8 times as long as exopod. Telson subrectangular to trapezoid; length 1.6–2.1 times maximum width near basis; its lateral margins slightly concave to almost straight; latero-terminal corners rounded; terminal margin traverse to convex.



**Fig. 3.** *Mysidium cubanense* Băcescu & Ortiz, 1984, from Cuba (A), Curaçao (B–F) and Bonaire (G). A. Holotype, ♂, 5.1 mm body length. B–F. Non-type, ♂, 5.0 mm. G. Non-type, ♂, 4.0 mm. A. Cephalic region, right antenna and setae of antennal scale omitted. B. Mediodistal extension of left antennular trunk, dorsal view. C. Third thoracic endopod, rostral view. D–E. Pleopods 1 and 3, rostral view. F. Pleopod 4, caudal view. G. Telson. Sample affiliation: Cuba - type locality (A); Curaçao #C3 (B–F); Bonaire #B11 (G).



Proximal 48–73% of lateral margins smooth, distal portion of each margin with dense, continuous series of 7–16 acute spines. This series extending up to the rounded, latero-terminal corner. Terminal margin lined by 12–20 densely set, apically blunt or weakly pointed laminae.

### Descriptive notes

Adult females of present material with 3.2–5.8 mm (n = 524) body length, males 3.0–5.9 mm (n = 174). Antennular trunk extends 0–20% its length beyond (artificially aligned) eyes (Fig. 3A). Antennal scale 1.1–1.4 times as long as trunk. Sympod of antenna produced into spiniform extension on outer distal corner. Thoracic endopod 8 (when stretched) reaching backwards at most to end of pleonite 4 and forwards to mandibles; its carpopropodus 60–83% as long as merus or 26–45% times as long as telson. Pleonites 1–5 are 0.5–0.6, 0.5–0.6, 0.5–0.7, 0.5–0.7 or 0.5–0.7 times as long as pleonite 6, respectively. Sizes increase from pleopods 1 to 4, while pleopod 5 ranges between 1 and 2 in both sexes; amplitude of this variation much stronger in males than females. Pleopods 1 and 3 stouter compared to remaining pleopods. Pleopods 2–5 of females and 2, 5 of males are essentially rod-like. Pleopods 1–3 with a ventro-laterally directed fan of plumose setae in both sexes. Setae forming the fan of pleopod 1 (Fig. 3D) larger than those of pleopods 2–5 in females and 2, 3, 5 in males. Male pleopod 4 (Fig. 3F) reaching at most to distal  $\frac{4}{5}$  of pleonite 6; its subapical seta up to end of telson. Endopod with apical seta 1.4–2.8 times endopod length. Sympod with field of scales on its weak medial hump, or in analogous position upon missing hump. Scutellum paracaudale triangular with acute apex; upper margin convex or S-shaped, lower margin straight to slightly convex or S-shaped. Uropodal endopod 1.1 times, exopod 1.4–1.6 times as long as pleonite 6. Exopod extends 0.3–0.4 times its length beyond endopod, or 0.4–0.6 times its length beyond telson; endopod 0.3–0.4 times its length beyond telson. Telson (Fig. 3G) length 0.5–0.6 times as long as uropodal exopod, 0.6–0.7 times endopod and 0.7–0.8 times pleonite 6. Statoliths composed of fluorite. Structure of foregut and nauplioid larvae essentially as in *M. triangulare* sp. nov. (Fig. 8A–F, M–N).

### Distribution

Euhaline coastal waters in the Gulf of Mexico, Bahamas, Cuba, Jamaica, Caribbean (Ortiz *et al.* 2017b). The present records are the first for Bonaire and Curaçao, thus extending the known latitudinal range southward to 12–23° N. Most samples are from swarms between corals.

### *Mysidium (Mysidium) rubroculatum* Băcescu & Ortiz, 1984

Fig. 4

*Mysidium rubroculatum* Băcescu & Ortiz, 1984: 20–21, fig. 1F–P.

*Mysidium rubroculatum* – Harrison & Bowman 1987: 674 (in comparison). — Ortiz & Lalana 1988: 14 (in list); 2018: 73. — Escobar-Briones & Soto 1991: table 1. — Ortiz 2001: 100 (in list). — Petrescu & Wittmann 2009: 64. — Price & Heard 2009: 939 (in list). — Ortiz *et al.* 2017a: 113; 2017b: 79–81.

### Type material examined

#### Paratypes

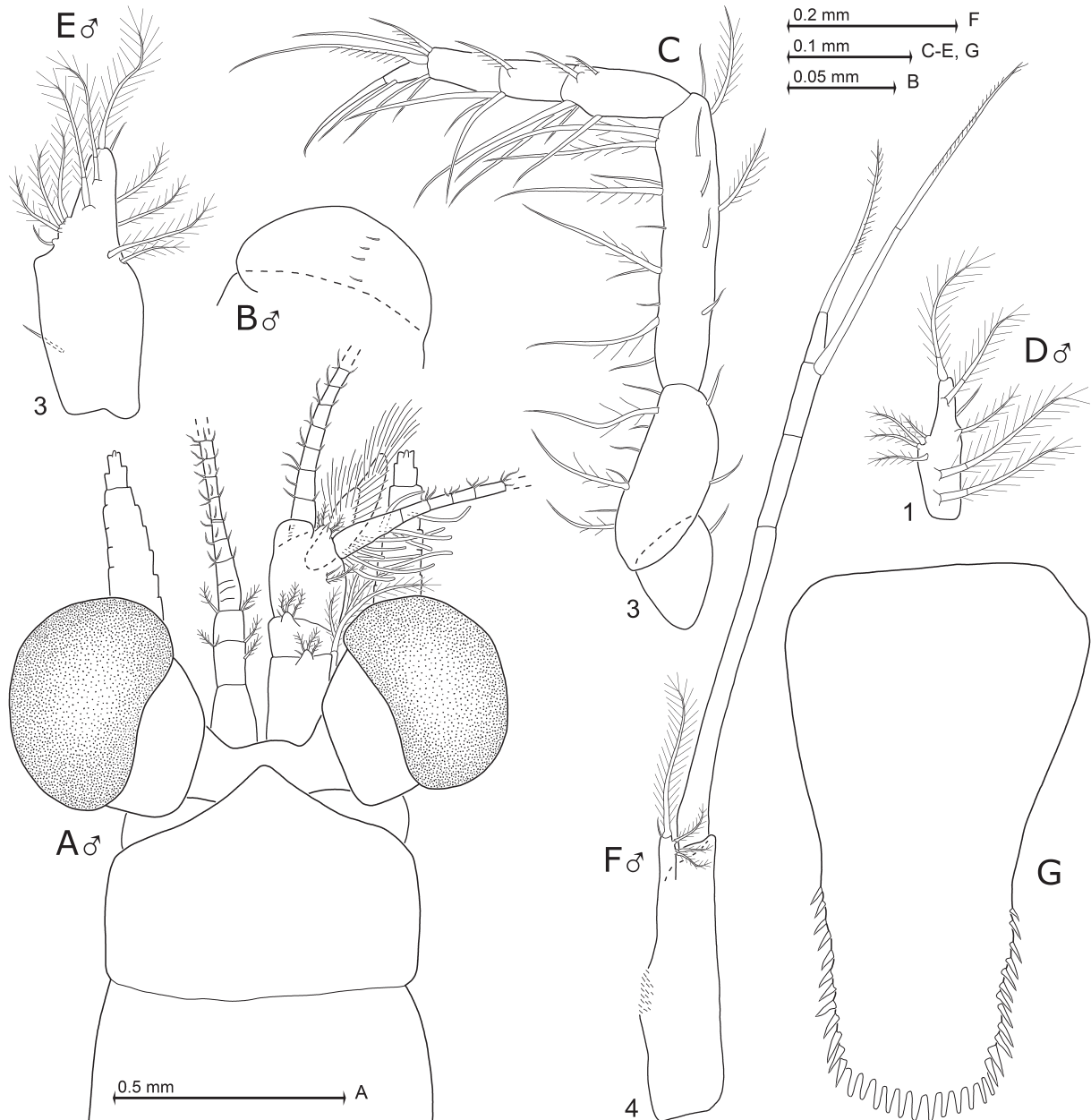
CUBA • 10 ♀♀ ad. bl 3.7–4.8 mm, 7 ♂♂ ad. bl 3.5–3.8 mm, 2 ♂♂ subad.; 10 m; Sep. 1983; Manolo Ortiz leg.; Mihai Băcescu det.; MINGA 49342/600.

### Type locality

Miramar, La Habana, Cuba (Băcescu & Ortiz 1984), 23.1334° N, 82.3334° W.

**Revised definition**

All features diagnosed above for genus and subgenus *Mysidium* Dana, 1852. Cornea globose in lateral view, calotte-shaped in dorsal view, with diameter 1.9–2.9 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum (sub)triangular, with rounded to acute apex, rostrum not extending beyond basis of eyestalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediiodistal extension (Fig. 4A–B) bearing a longitudinal series of 4–5 setae. The largest seta 0.1–0.3 times extension length. Appendix masculina bilobate, along inner margins fringed by large setae; its length 1.3–2.0 times terminal segment



**Fig. 4.** *Mysidium rubroculatum* Băcescu & Ortiz, 1984, from Cuba, paratypes. **A.** ♂, 3.6 mm body length. **B–G.** ♂, 3.8 mm. **A.** Cephalic region, left antennula and setae of antennal scale omitted. **B.** Mediiodistal extension of left antennular trunk, dorsal view. **C.** Third thoracic endopod, rostral view. **D–E.** Pleopods 1 and 3, rostral view. **F.** Pleopod 4, caudal view. **G.** Telson.

of antennular trunk. Length of antennal scale 4–5 times maximum width; scale reaching well beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Large, moderately unevenly rounded hump on outer face of distal segment of the maxillula. Carpopropodus with two segments in thoracic endopods 1–2, 8, versus three segments in endopods 3–7. Basal segment occupies half total length of carpopropodus of endopod 3. Pleopod 1 minute, rod-like (Fig. 4D) in both sexes, not considering the weak median widening at its vestigial endopodal portion. Sympod of male pleopod 4 with endite reduced to a weak medial hump or missing. Exopod with basal segment occupying 52–63% total length. Endopod reduced to lobe with 13–17% sympod length; apically with a long seta plus a minute seta and more proximally 2–4 additional small barbed setae. Endopod of uropods 0.7–0.8 times as long as exopod. Telson subrectangular, caudally narrowing by 30–54%; length 1.5–1.8 times maximum width near basis; lateral margins slightly concave to almost straight; latero-terminal corners rounded; terminal margin slightly convex to traverse. Proximal 50–60% of lateral margins smooth, distal portion of each margin with dense, continuous series of 8–12 acute spines. This series extending up to the rounded, latero-terminal corner. Terminal margin lined by 11–18 strong, apically blunt laminae; these last stouter compared to the neighboring latero-terminal spines.

### Descriptive notes

Antennular trunk extends 0–30% its length beyond (artificially aligned) eyes (Fig. 4A). First to third segments occupy 40–43%, 16–20% or 39–44% total length, respectively. Appendix masculina 0.5–0.7 times total trunk length. Antennal scale 1.2–1.4 times antennular trunk, its terminal segment occupying 12–19% total length and bearing five plumose setae. Sympod of antenna produced into spiniform extension on outer distal corner. Thoracic endopod 8 (when stretched) reaching backwards at most to the middle of pleonite 4 and forwards to maxillula; its carpopropodus 62–69% as long as merus or 0.3–0.5 times telson length. Pleonites 1–5 are 0.7–0.8, 0.6–0.8, 0.6–0.8, 0.5–0.6 or 0.5–0.6 times the length of pleonite 6, respectively. Both sexes with pleopods 1–3 bearing a ventro-laterally directed fan of plumose setae. Setae of pleopod 1 (Fig. 4D) on average longer than those of pleopods 2, 3, 5 (Fig. 4E). Male pleopod 4 (Fig. 4F) reaching at most to middle of telson; its subapical seta up to  $\frac{2}{3}$  as long as endopod of uropod. Endopod of male pleopod 4 with its apical seta 2.1–3.6 times endopod length. Sympod with field of scales on its medial hump, or in analogous position upon missing hump. Scutellum paracaudale triangular with acute apex; upper and lower margins weakly convex to concave. Uropodal endopod 1.0–1.5 times, exopod 1.3–1.8 times as long as pleonite 6. Exopod extends 0.2–0.3 times its length beyond endopod, or 0.5–0.7 times beyond telson; endopod 0.4–0.7 times its length beyond telson. Telson (Fig. 4G) 0.4–0.5 times as long as exopod of uropods, 0.4–0.6 times endopod or 0.7–0.8 times pleonite 6. Statoliths composed of fluorite. Structure of foregut and nauplioid larvae essentially as in *M. triangulare* sp. nov. (Fig. 8A–F, M–N).

### Distribution

Marine coastal waters of the Gulf of Mexico, Cuba (Ortiz *et al.* 2017b), 22–23° N.

*Mysidium (Mysidium) triangulare* Wittmann sp. nov.

[urn:lsid:zoobank.org:act:B0EB7822-4D13-4D05-8C40-2A7F01297301](https://zoobank.org/act:B0EB7822-4D13-4D05-8C40-2A7F01297301)

Figs 5–8

### Etymology

The species name is a Latin adjective with neutral ending, referring to the triangular terminal portion of the telson.

### Type material examined

**Holotype** (by present designation)

CURAÇAO • ♂ ad. bl 5.2 mm; sublittoral marine waters of Curaçao, Playa Lagun; 12.3181° N, 69.1511° S. #C8; NHMW 26487.

**Paratypes** (by present designation)

CURAÇAO • 57 ♂♂ ad. bl 3.8–5.7 mm, 44 ♀♀ ad. bl 4.8–5.9 mm, 8 subad.; same locality data as for holotype; #C8; MINGA MYS 436, NHMW 26488, ZMH K-55260.

**Other material examined**

CURAÇAO • 2 ♀♀ ad. bl 5.3–5.5 mm, 3 ♂♂ ad. bl 4.0–4.2 mm; #C3; MINGA MYS 430 • 1 ♀ subad. bl 3.5 mm; associated with swarm of *M. integrum* freely swimming in the entrance area of cave; #C10.

**Definition**

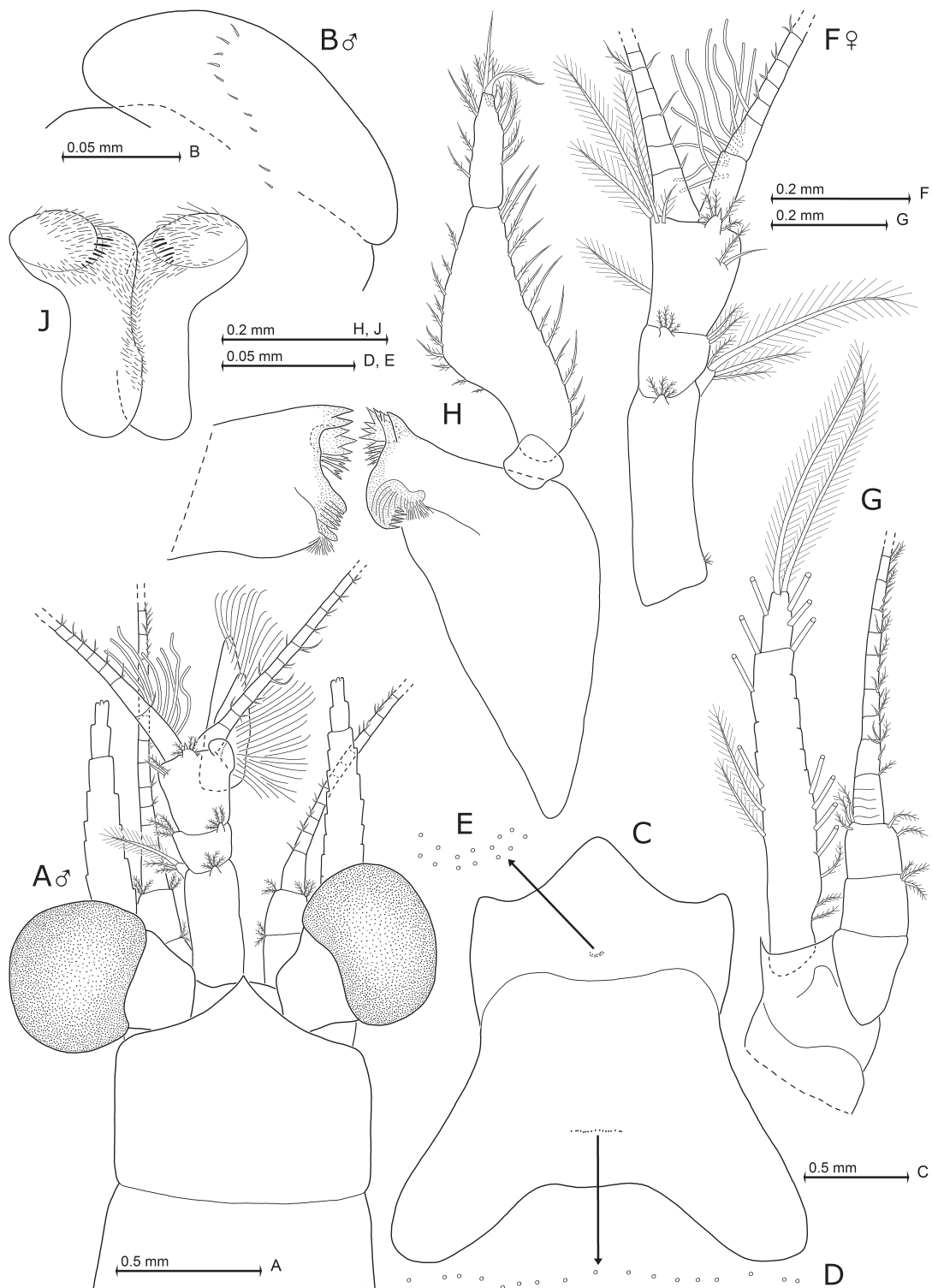
All features diagnosed above for genus and subgenus *Mysidium* Dana, 1852. Cornea globose in lateral view; calotte-shaped in dorsal view, with diameter 1.7–2.5 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum triangular, apically pointed to well rounded, not extending beyond basis of eystalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediolateral extension (Fig. 5A–B); longitudinal series of 6–10 setae extending all over this extension plus a short proximal stretch. The largest seta 0.1–0.3 times extension length. Appendix masculina bilobate, densely setose; its length 1.5–2.0 times terminal segment of antennular trunk. Length of antennal scale 5–7 times maximum width, scale reaching far beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Almost evenly rounded hump on outer face of distal segment of maxillula. Carpopropodus two-segmented in thoracic endopods 1–2, 8, or three-segmented in endopods 3–7, except that endopods 6, 7 may be two-segmented in some females. Basal segment occupies 0.4–0.5 times total length of carpopropodus of endopod 3. Pleopod 1 representing a stout, bilobate plate in both sexes. Sympod of male pleopod 4 with endite reduced to a weak medial hump or missing. Exopod with basal segment occupying 56–63% total length. Endopod reduced to lobe with 10–16% sympod length; lobe apically with one long, barbed seta and more proximally with additional 4–6 shorter, barbed setae. Endopod of uropods 0.6–0.8 times as long as exopod. Telson spatulate, length 1.9–2.1 times maximum width near basis; median portion with concave lateral margins, terminal portion triangular with rounded tip. Proximal 52–64% of lateral margins smooth; distal portion of each margin with continuous series of 5–11 acute spines, this series extending up to the corner with the triangular apical portion. Margin of the triangular portion densely furnished with a total of 21–24 strong, apically blunt laminae.

**Description**

**BODY SIZE.** Adult females 4.8–5.9 mm (n = 46), males 3.8–5.7 mm (n = 61).

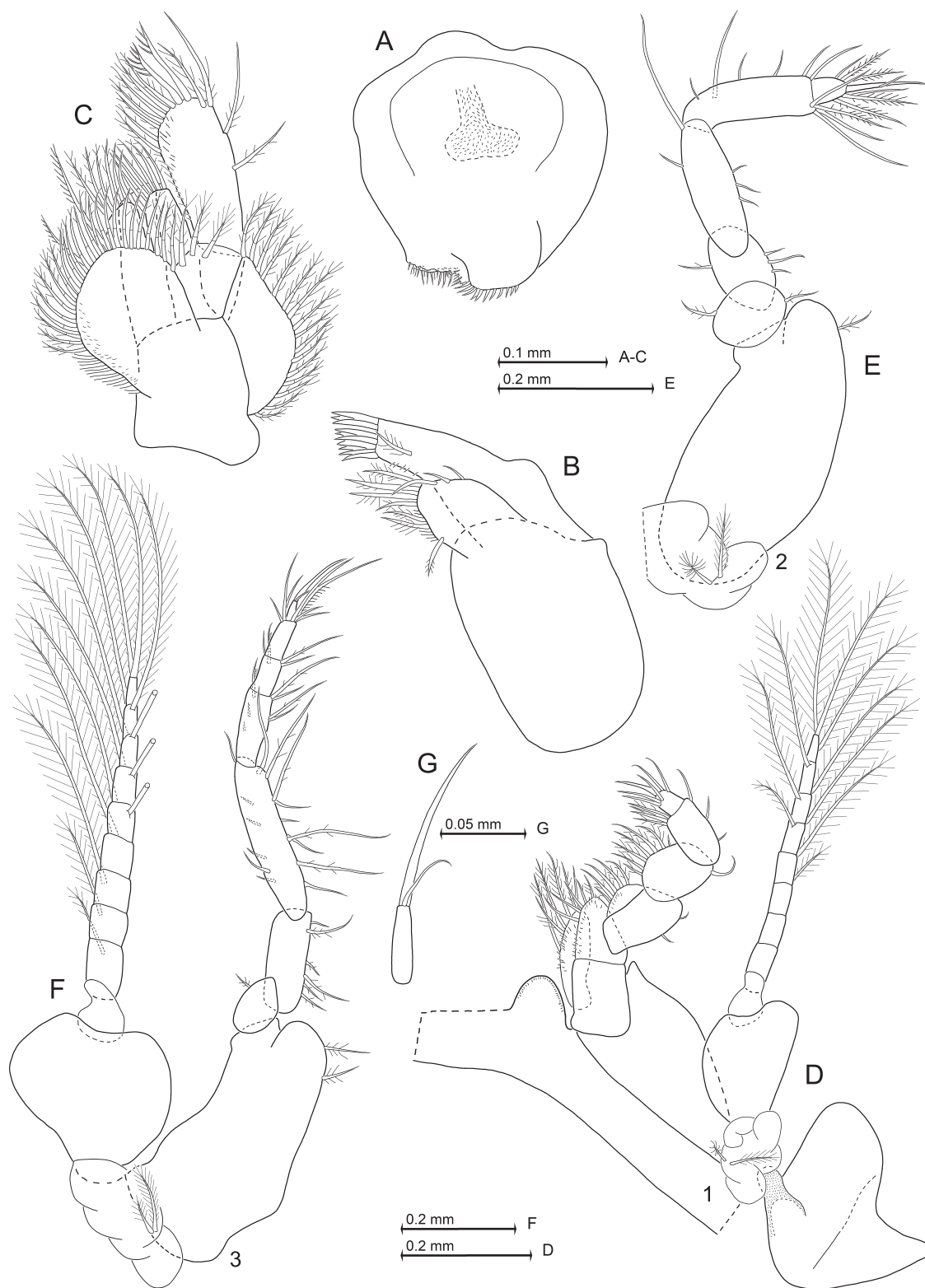
**ANTENNAL APPENDAGES** (Fig. 5A–B, F–G). Antennular trunk extends 10–50% its length beyond (artificially aligned) eyes. First to third segments occupy 46–57%, 15–18% or 28–36% total trunk length, respectively. Trunk dorsally with forward directed small, setose lobes near terminal margin of each segment: two lobes from basal, one from median, and one from terminal segment (not counting the mediolateral extension of anterior margin in males). Appendix masculina 0.4–0.5 times total trunk length, antennal scale 1.1–1.5 times trunk. Sympod of antenna produced into spiniform extension on outer distal corner. Antennal scale with terminal segment occupying 13–24% total length and bearing five plumose setae.

**MOUTH PARTS** (Figs 5H, J, 6A–C). Mandibular palp without spines; terminal segment with strong, modified, bent seta at apex, and barbed setae along inner and outer margins. Median segment of palp with angular, medially directed dilatation, both its margins setose. Proximal segment normal, with smooth margins. Distal segment of maxillula terminally with strong spines, subterminally with one barbed seta; tip of endite of maxillula with apically modified setae (armed with stiff barbs) plus several shorter setae with normal, fine barbs. Maxilla with well-developed exopod, moderately large, two-segmented palp,



**Fig. 5.** *Mysidium triangulare* Wittmann sp. nov., from Curaçao, holotype (A) and paratypes (B–J). **A.** ♂, 5.2 mm body length. **B.** ♂, 5.4 mm. **C–E.** ♂, 5.0 mm. **F, H.** ♀, 5.9 mm. **G.** ♂, 5.5 mm. **J.** ♀, 5.1 mm. **A.** Cephalic region; right antennula and setae of antennular scale omitted. **B.** Mediodistal extension of left antennular trunk, dorsal. **C.** Carapace expanded on slide. **D–E.** Details of panel (C) showing cardial (D) and cervical (E) pore groups, pore diameters not to scale. **F.** Right antennula of female, dorsal view. **G.** Right antenna, ventral view. **H.** Right mandible with left masticatory process, rostral view. **J.** Labium, rostral view.





**Fig. 6.** *Mysidium triangulare* Wittmann sp. nov., from Curaçao, paratypes. **A.** ♀, 5.1 mm body length. **B, D.** ♀, 5.9 mm. **C.** ♂, 5.4 mm. **E–G.** ♂, 5.5 mm. **A.** Labrum, ventral view. **B.** Maxillula, rostral view. **C.** Maxilla, rostral view. **D.** First thoracopod (caudal view) with part of sternite 1 (ventral view). **E.** Second thoracic sympod with endopod, caudal view. **F.** Third thoracopod, caudal view. **G.** Detail of panel (F) showing dactylus with nail.

and three apically setose endites. Exopod with maximum width in median portions; its outer margin all along with series of plumose setae. Basal segment of palp with three barbed setae. Apical segment about two times as long as basal segment. Length of apical segment 2.0–2.5 times maximum width, densely setose on terminal margin but lined by small hairs along more than basal half of inner margin. Apex of palp with two strong, modified setae bearing strong, spine-like barbs along distal third of their inner margin.

FOREGUT (Fig. 8A–F). Essentially as in *M. antillarum* sp. nov. (Fig. 11A–E). As main differences from that species, *M. triangulare* sp. nov. shows less strongly serrated, apically pronged, large spines: on each lateral half there are two spines (Fig. 8E) on posterior part of lateralialia; and a longer one (Fig. 8F) on dorso-lateral infolding; the latter inserting in more median position than in *M. antillarum* sp. nov.

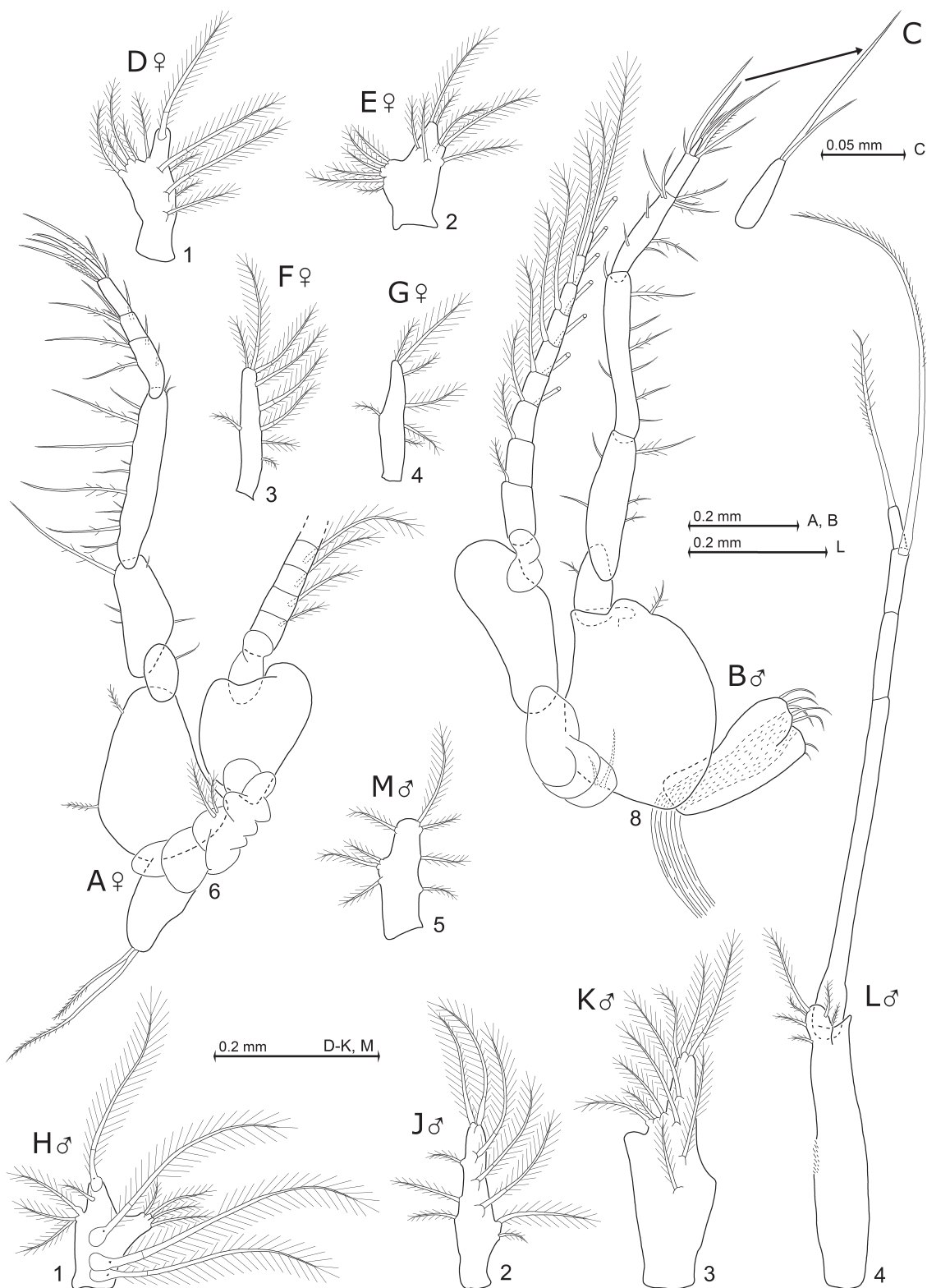
THORAX OF BOTH SEXES (Figs 5C–D, 6D–G, 7A–C). Carapace (Fig. 5C–E) posteriorly emarginate, with well-rounded latero-terminal lobes; cervical sulcus strong; roughly V-shaped group of 11–14 pores (Fig. 5E) in front of cervical sulcus, transverse linear series of 13–18 pores (Fig. 5D) in cardinal position (above heart). Sternites smooth; a plumose seta accompanied by a shorter barbed seta on the joint between each sternite and the corresponding thoracopods (Fig. 6D). Sizes of endopods and exopods increase from thoracopod 1 to 4 or 5 and decrease from 5 to 8. Basal plate of exopods 1–7 with large, well rounded latero-distal expansion (Figs 6D, F, 7A–B). Flagellum 8-segmented in exopod 1 versus 9-segmented in exopods 2–7. First endopod (Fig. 6D) with well developed, setose endites from basis, ischium, merus. First thoracic epipod bilobate, with smooth margins, without seta. Endopods 1–2 with large dactylus and strong claw (Fig. 6D–E). Dactylus of thoracic endopod 2 with 3–6 modified and several smooth setae, no spine-like setae; modified setae each with two dense rows of strong, acute barbs along their median to subterminal portions. Endopods 3–7 with less stout, well developed dactylus bearing a long, needle-like claw (Fig. 6G); endopod 8 with seta-like claw (Fig. 7C). Endopod 8 (when stretched) reaching backwards at most to end of pleonite 3 and forwards to maxillula; its carpopropodus measures 0.4–0.5 times telson length.

THORACOPODS OF FEMALES (Figs 7A, 8G). Basal plate of exopod 8 with short to indistinct latero-distal expansion; its flagellum only 8-segmented. Oostegites of thoracopods 7–8 densely fringed with setae, together forming a large brood chamber. Thoracopod 6 (Fig. 7A) with rudimentary oostegite bearing 1–2 long setae at apex. These setae spinulose at least along their apical third. More such setae present in proximal portions of oostegite from thoracopod 7 (Fig. 8G).

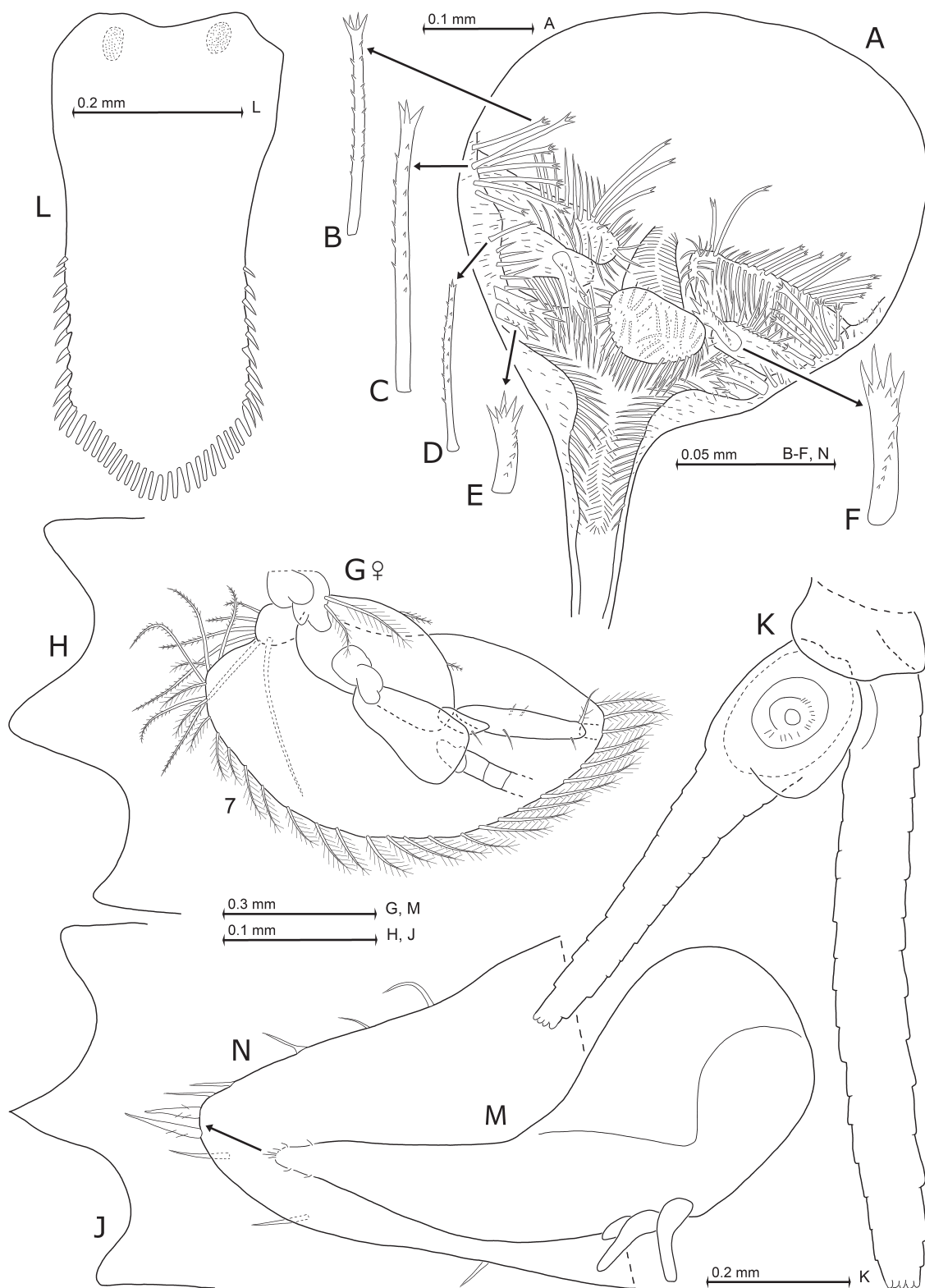
THORACOPODS OF MALES AND PENIS (Fig. 7B–C). Basal plate of exopod 8 with yet distinct latero-distal expansion; its flagellum 9-segmented. Penes pear-shaped, apically widening; 0.9–1.0 times as long as merus of endopod 8. Penes apically bilobate, with row of 4–5 smooth, bent setae flanking the ejaculatory opening. Two additional, smaller, straight setae subapically on margin opposite to bent setae.

PLEON (Figs 7D–M, 8H–L). Pleonites 1–5 are 0.6–0.7, 0.7–0.8, 0.7–0.9, 0.8–0.9 or 0.7–0.9 times as long as pleonite 6, respectively. Scutellum paracaudale (Fig. 8H, J) triangular, apically pointed to narrowly rounded; margins weakly concave to convex. Uropodal endopod (Fig. 8K) 1.0–1.3 times, exopod 1.4–1.7 times as long as pleonite 6. Length of exopod 7–9 times maximum width. Exopod extends 0.2–0.3 times its length beyond endopod or 0.5–0.6 times beyond telson; endopod 0.3–0.5 times its length beyond telson. Telson (Fig. 8L) 0.5–0.6 times as long as exopod of uropods, 0.7–0.8 times endopod or 0.8–0.9 times pleonite 6.

PLEOPODS OF FEMALES (Fig. 7D–G). Pleopods 1–5 subequal in length. Pleopods 1–2 reduced to small bilobate plates, pleopods 3–5 to small, setose rods. Pleopods 1–4 with a ventro-laterally directed fan of plumose setae. Pleopod 1 with clearly the largest setae, although not as large as in males.



**Fig. 7.** *Mysidium triangulare* Wittmann sp. nov., from Curaçao, paratypes. **A, D.** ♀, 5.4 mm body length. **B–C, K–L.** ♂, 5.5 mm. **E–G.** ♀, 5.1 mm. **H, J, M.** ♂ 5.4 mm. **A.** Sixth thoracopod with rudimentary oostegite, caudal view. **B.** Eighth thoracopod with penis, rostral view. **C.** Detail of panel (B) showing dactylus with nail. **D–G.** Series of female pleopods 1–4, rostral view. **H–K, M.** Series of male pleopods 1–3, 5, rostral view. **L.** Male pleopod 4, caudal view.



**Fig. 8.** *Mysidium triangulare* Wittmann sp. nov., from Curaçao, paratypes. **A–F.** ♀, 5.9 mm body length. **G, J.** ♀, 5.1 mm. **H, K–L.** ♂, 5.5 mm. **A.** Foregut; dorsal wall omitted. **B–F.** Details of panel (A) showing modified spines. **G.** Basal half of thoracopod 7 with right oostegite, lateral view. **H, J.** Variants of scutellum paracaudale, lateral view. **K.** Uropods, ventral view; setae omitted. **L.** Telson. **M.** Nauplioid larva at substage N2, lateral view. **N.** Detail showing tip of abdomen in another nauplioid specimen.

PLEOPODS OF MALES (Fig. 7H–M). Length increases from pleopod 1 to 4. Pleopod 5 is about the same length as pleopod 1, but less stout. Pleopods 1–3 with a ventro-laterally directed fan of plumose setae; pleopod 1 with the largest setae of that kind. Fourth pleopod reaching to terminal 50–80% of pleonite 6; its subapical seta reaching up to apex of telson. Its four-segmented exopod with basal segment longest, second segment longer than third, third segment longer than fourth. Subterminal segment of exopod with a very long seta bearing dense series of minute bristles along its distal half; short terminal segment with comparatively large but shorter seta at tip, this seta with characteristic set of barbs (Fig. 7L) along its distal half. Endopod with apical seta 2.0–2.8 times endopod length. Sympod with field of scales on its medial widening, or in analogous position upon missing widening.

STATOLITHS. Composed of fluorite; shape ellipsoidal to spherical in dorsal view (Fig. 8K); discoidal in lateral view, maximum diameter 89–107  $\mu\text{m}$ , thickness 45–54  $\mu\text{m}$ , measured in 10 adults. Tegmen moderately, though always distinctly convex; fundus weakly concave. Sagittal section very similar to that figured by Wittmann *et al.* (1993: fig. 6P) for *Heteromysis formosa* S.I. Smith, 1873. Statolith formula  $2 + 3 + 1 + (8-13) = 14-19$ .

NAUPLIOID LARVAE (Fig. 8M–N). Smooth cuticle all around, except for a pair of minute furcal processes and a number of minute setae on the blunt end of the abdomen.

### Distribution and habitat

So far only known from euhaline, sublittoral waters of Curaçao (12° N), where the mysids occur in swarms hovering during daytime around and between corals.

### *Mysidium (Mysidium) rickettsi* Harrison & Bowman, 1987

*Mysidium rickettsi* Harrison & Bowman, 1987: 674–678, figs 1–3.

*Mysidium rickettsi* – Ferrari 2001: table 1 (in taxa list). — Ortiz 2001: 100. — Escobar-Briones 2002: 304. — Price 2004: 65 (in checklist). — Price *et al.* 2009: 232. — Gómez-Gutiérrez *et al.* 2014: 1027, table 3. — Ortiz *et al.* 2017a: table 1; 2017b: 78. — Ortiz & Lalana 2018: 80.

*Mysidium reckettsi* – Gómez-Gutiérrez *et al.* 2014: 1009 (invalid spelling variant).

*Mysidium ricketsi* – Gómez-Gutiérrez *et al.* 2014: 1024 (invalid spelling variant).

### Material examined

None.

### Type locality

Gulf of California, Punta Marcial, 25.5167° N, 111.0167° W (Harrison & Bowman 1987).

### Revised definition

Adapted to the scheme in Table 2 by using published data (Harrison & Bowman 1987; Ortiz *et al.* 2017b) on adults of both sexes: all features diagnosed above for genus and subgenus *Mysidium* Dana, 1852, with the reservation that the detailed structure of the setae on the merus of thoracic endopod 3 is unknown. Cornea calotte-shaped in dorsal view, its diameter 2.1 times as long as terminal segment of antennular trunk. Eyestalks smooth. Rostrum round-triangular, not extending beyond eyestalks. Appendix masculina obscurely bilobate, all along inner margins fringed by large setae; its length 1.5 times terminal segment of antennular trunk. Length of antennal scale four times maximum width; scale reaching well beyond antennular trunk. Median segment of mandibular palp with setae all along inner margin, whereas setae lacking on outer margin. Carpopropodus with two segments in thoracic endopods 1–2, 7–8, versus three segments in endopods 3–6. Basal segment is 0.6 times total length of carpopropodus of endopod 3. Male pleopod 1 stout, allusively bilobate. Sympod of male pleopod 4 without endite. Its exopod with basal



**Table 2.** Diagnostic characters of the species of *Mysidium* Dana, 1852.

	<i>M. gracile</i>	<i>M. integrum</i>	<i>M. cubanense</i>	<i>M. rubroculatum</i>	<i>M. triangulare</i>	<i>M. rickettsi</i> <sup>1,2</sup>	<i>M. pumae</i> <sup>2</sup>	<i>M. columbiae</i>	<i>M. antillarum</i>	<i>M. itiffei</i> <sup>3</sup>
Cornea diameter is (x)–times length of terminal segment of antennular trunk in dorsal view	1.7–3.2	1.6–2.4	2.6–4.1	1.9–2.9	1.7–2.5	2.1	1.5	1.5–2.0	1.4–1.7	1.5
Total numbers of setae on and close to medio-terminal extension of male antennular trunk (Fig. 1B)	7–9	4–6	4–6	4–5	6–10	?	?	2–4	2–3	?
Its largest seta is (x)–times length of mediobasal extension of male antennular trunk	0.9–1.4	0.3–0.5	0.2–0.4	0.1–0.3	0.1–0.3	?	?	0.1–0.2	0.1	?
Appendix masculina is (x)–times length of terminal segment of antennular trunk	1.6–2.7	1.1–2.5	1.1–2.3	1.3–2.0	1.5–2.0	1.5	2.0–2.2	2.0–3.3	2.2–3.9	?
Antennular scale extends beyond antennular trunk	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Antennular scale length is (x)–times maximum width	4–6	4–5	4–6	4–5	5–7	4	6	7–8	7–11	6
Median segment of mandibular palp with setae on outer margin	yes	yes	yes	yes	yes	no	yes	yes	yes	?
About evenly rounded (1), moderately unevenly rounded (2) or distally angular (3) hump on outer face of terminal segment of maxillula	1	1	1	2	1	?	?	3	3	?
Carpopropodus of third thoracic endopod (n)–segmented	3	3	3	3	3	3	2	3	3	3
Basal segment is (x)–times total length of carpopropodus of third thoracic endopod	0.5	0.5	0.5	0.5	0.4–0.5	0.6	0.8	0.5	0.5	0.4
Numbers of serrated setae along merus of third thoracic endopod	0	0	0	0	0	?	0	2–6	2–7	?
First pleopod rod-like (1) versus bilobate (2)	1–2	2	2	1	2	1–2	1	1	1	?
Medial margin of third male pleopod with widening (1) versus projecting endite (2)	1	1	1	1	1	1	2	2	2	?
Sympod of fourth male pleopod: without endite (0), with endite reduced to indistinct projection or widening (1), with strong endite (2)	0–1	0–1	0–1	0–1	0–1	0	0	2	0–1	?
Sympod of fourth male pleopod with (n) setae on rostral face	0	0	0	0	0	0	0	3–6	3–7	?
Exopod of fourth male pleopod (n)–segmented	4	4	4	4	4	4	4	3	3	?
Basal segment is (x)–times total length of exopod of fourth male pleopod	0.6–0.7	0.5–0.6	0.5–0.6	0.5–0.6	0.6	0.6	0.5	0.6–0.7	0.7	?
Penultimate segment of exopod of fourth male pleopod with entire (1) versus bifid (2) modified seta	1	1	1	1	1	1	2	1	1	?
Endopod of fourth male pleopod is (x)–times length of sympod	0.1–0.2	0.1–0.2	0.1–0.2	0.1–0.2	0.1–0.2	≈ 0.1	≈ 0.2	0.3–0.5	0.3–0.4	?

**Table 2** (continued).

	<i>M. gracile</i>	<i>M. integrum</i>	<i>M. cubanense</i>	<i>M. rubroculatum</i>	<i>M. triangulare</i>	<i>M. rickettsi</i> <sup>1,2</sup>	<i>M. pumae</i> <sup>2</sup>	<i>M. columbiae</i>	<i>M. antillarum</i>	<i>M. iliffi</i> <sup>3</sup>
Endopod of fourth male pleopod with (n) setae	5–8	5–7	5–7	4–6	5–7	7	5	7–10	5–12	?
Lateral margins of telson with spines (1) or laminae (2)	1	1	1	1	1	1	2	1	1	2
Numbers of spines or laminae on each lateral margin of telson	11–15	13–25	7–16	8–12	5–11	≈ 19	20–22	8–12	12–17	≈ 9–11
Telson with distinct apical cleft separating two broadly rounded, apical lobes (0) versus telson with shallow terminal indentation (1), traverse terminal margin (2), convex terminal margin (3), or ending in a triangular projection (4)	1	2–3	2–3	3–2	4	3	3	0	0	0
Terminal margin of telson with series of acutely pointed (1) versus blunt (2) laminae or spines	2	1–2	2–1	2	2	1–2	1	2	1	1
Numbers of laminae or spines on terminal margin of telson	15–21	12–20	12–20	11–18	21–24	≈ 24	23–25	22–30	19–23	≈ 17–22

Original data and from <sup>1)</sup> Harrison & Bowman 1987; <sup>2)</sup> Ortiz *et al.* 2017a, 2017b; <sup>3)</sup> Băcescu 1991; <sup>1,2,3)</sup> data partly derived from figures.

segment occupying 58% total length. Endopod reduced to lobe with ≈ 11% sympod length; apically with one long seta and more proximally six additional, smaller setae. Uropodal endopod 0.6–0.7 times as long as exopod. Telson linguiform, tapering posteriorly, length 1.9 times maximum width near basis; lateral margins slightly convex, almost straight; terminal margin clearly convex, well rounded. Proximal half of lateral margins smooth, distal half with dense series of 30–37 short, blunt or pointed spines on each side; lateral margins each with about 19 spines, terminal margin with about 24 spines.

### Distribution and habitat

East Pacific coast of Mexico: Gulf of California, Islas Tres Marias, 21–26° N. Occurring in shallow, coastal marine waters where it forms dense epibenthic swarms (Gómez-Gutiérrez *et al.* 2014). Also collected with night light at surface and from fish stomachs (Harrison & Bowman 1987; Ortiz *et al.* 2017b).

### *Occimysidium* Wittmann subgen. nov.

[urn:lsid:zoobank.org:act:EE9F05D3-29B5-4B95-BC0D-2A6756AAECE5](https://zoobank.org/act:EE9F05D3-29B5-4B95-BC0D-2A6756AAECE5)

### Type species

*Mysidium pumae* Ortiz, Hendrickx & Winfield, 2017, by monotypy.

### Etymology

Noun in nominative singular with neutral ending, formed by amalgamation of the Latin noun ‘*occidens*’ with the generic name *Mysidium*, referring to the occurrence on the west coast of America.

### Diagnosis

Subdivision of the genus *Mysidium* Dana, 1852, characterized by two-segmented carpopropodus of third thoracic endopod; merus of this endopod without serrated setae. Third male pleopod with distinct

endite at about  $\frac{2}{3}$  distance from basis of medial margin. Sympod of fourth male pleopod without setae on rostral face. Its exopod four-segmented; basal segment with 0–1 seta, second segment without seta, subterminal segment with bifid modified seta, terminal segment with undivided modified seta. Telson entire (not incised).

#### **Distribution**

As for type species.

*Mysidium (Occimysidium) pumae* Ortiz, Hendrickx & Winfield, 2017 comb. nov.

*Mysidium pumae* Ortiz *et al.*, 2017a: 114–117, table 1, figs 1–4.

*Mysidium pumae* – Ortiz *et al.* 2017b: 77. — Ortiz & Lalana 2018: 80.

#### **Material examined**

None.

#### **Type locality**

Pacific coast of Mexico, Mazatlán Harbor, 23.1814° N, 106.4242° W (Ortiz *et al.* 2017a).

#### **Revised definition**

Adapted to the scheme in Table 2 by using published data (Ortiz *et al.* 2017a, 2017b) on adults of both sexes: all features diagnosed above for the genus *Mysidium* Dana, 1852, and its new subgenus *Occimysidium*. Cornea crescent-like in dorsal view, with ‘diameter’ 1.5 times as long as terminal segment of antennular trunk. Eyestalks smooth. Rostrum triangular, apically bluntly pointed, not extending beyond eyestalks. Appendix masculina with separate inner and distal tufts of setae; its length 2.0–2.2 times terminal segment of antennular trunk. Length of antennal scale six times maximum width; scale reaching well beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Carpopropodus of first to eighth thoracic endopods 2, 2, 2, 3, 3, 3, 2, and two-segmented, respectively. Basal segment occupies 0.8 times total length of carpopropodus of endopod 3. Pleopods 1–2, 5 rod-like, not considering the reduced endopodal portion (pseudobranchial lobe); male pleopod 3 with an additional, small endite. Length of male pleopods increases in order of pleopods 1, (subequal 2, 3, 5), 4. Sympod of male pleopod 4 without endite. Exopod with basal segment occupying 54% total length. Endopod reduced to lobe with  $\approx$  22% sympod length; apically with one long seta and more proximally four additional shorter setae. Uropodal endopod 0.7 times as long as exopod. Telson spatulate, caudally gradually narrowing; length 2.3 times maximum width near basis; terminal margin convex, evenly rounded. Proximal 51–52% of lateral margins smooth, distal portion of each margin with continuous series of 20–22 acute laminae. Terminal margin lined by 23–25 more densely set, acute laminae. These latter laminae more slender than the neighboring latero-terminal laminae.

#### **Distribution**

So far known only from type locality.

*Orientomysidium* Wittmann subgen. nov.

[urn:lsid:zoobank.org:act:E269F7A6-0187-4AD0-9D64-24C700D5126D](https://zoobank.org/urn:lsid:zoobank.org:act:E269F7A6-0187-4AD0-9D64-24C700D5126D)

#### **Type species**

*Diamysis columbiae* Zimmer, 1915, by present designation. This taxon acknowledged in revised combination as *Mysidium (Orientomysidium) columbiae* (Zimmer 1915).

**Etymology**

Noun in nominative singular with neutral ending, formed by amalgamation of the Latin adjective ‘*orientale*’ with the generic name *Mysidium*, referring to the occurrence on the east coast of America.

**Diagnosis**

Subdivision of the genus *Mysidium* Dana, 1852, characterized by three-segmented carpopropodus of third thoracic endopod; merus of this endopod with serrated setae. Third male pleopod with strong endite at about 50–60% distance from basis of medial margin. Sympod of fourth male pleopod with series of setae on rostral face. Its exopod three-segmented; proximal segment without seta; the two distal segments each with one unbranched modified seta. Telson with terminal cleft.

**Distribution**

Littoral and sublittoral waters at Atlantic coasts of tropical America (24° N to 8° S), including Gulf of Mexico and Caribbean.

***Mysidium (Orientomysidium) columbiae* (Zimmer, 1915) subgen. et comb. nov.**

Figs 9, 13E–J

*Diamysis columbiae* Zimmer, 1915a: 172–174, figs 23–29 (senior synonym in outdated generic combination).

*Diamysis columbiae* – Zimmer 1915b: 215 (in synonymy). — Illig 1930: 599 (in synonymy). — Prieto *et al.* 2009 (in synonymy).

*Mysidia columbiae* – Zimmer 1915b: 215, fig. 18 (combination with generic junior homonym); 1918: 26. — Illig 1930: 599 (in key). — W.M. Tattersall 1951: 222 (in homonymy).

*Mysidium columbiae* – W.M. Tattersall 1951: 222, 223 (revised combination). — Davis 1966: figs 1–5. — Brattegard 1969: 86, fig. 27B; 1974a: 69; 1974b: 102, table 1; 1975: 112. — Mauchline 1972: table 3; 1973: tables 2, 4; 1980: 338 (in list). — Băcescu & Ortiz 1984: 22 (in key). — Harrison & Bowman 1987: 678 (in comparison). — Modlin 1987: 115; 1990: figs 1, 3; 1993: 25. — Ortiz & Lalana 1988: 14 (in list); 2018: fig. 10A. — Zoppi de Roa *et al.* 1989: fig. 2B. — Markham *et al.* 1990: 411. — Băcescu 1991: 3, fig. 1J. — Escobar-Briones & Soto 1991: table 1. — Ariani *et al.* 1993: table 1. — Ortiz 2001: 100 (in list). — Price *et al.* 2002: 44. — Price & Heard 2004: 154. — Sorbe *et al.* 2007: table I. — Prieto *et al.* 2009: 33. — Miyashita & Calliari 2014: 9. — Wittmann *et al.* 2014: 350. — Ortiz *et al.* 2017a: table 1; 2017b: fig. 3A. — Esteves-Astudillo *et al.* 2017: 62.

*Mysidium colombiae* – Harrison & Bowman 1987: 674, 678 (invalid spelling variant). — Price & Heard 2004: fig. 3I; 2009: 938 (in list).

non *Mysidium columbiae* – Brattegard 1969: fig. 27E.

**Type material examined**

The three vials are from the same sample labelled “Cartagena Kolumbien G. Gagzo leg. 18. IX. 1905 ded. 7. XI. 1906”, this material is brittle and delicate, limiting examination. The two specimens from vial 14074 with body parts and appendages sticking together. The respective missing appendages suggest that the lectotype has been partly dissected and figured by Zimmer (1915a: figs 23–29).

**Lectotype** (by present designation)

COLOMBIA • ♂ ad. bl 4.4 mm; registered at the ZMH as “*Diamysis columbiae* Zimmer, lectotype by present designation”; 10.37° N, 75.52° W; ZMH K-14073a

### Paralectotypes

COLOMBIA • 1 ♀ ad. bl 4.8 mm carrying two postnauplioid larvae; ZMH K-14073b • 1 ♂ ad. bl 4.6 mm, 1 ♀ ad. bl 5.0 mm; ZMH K-14074.

### Other material examined

CURAÇAO • 26 ♀♀ ad bl. 4.4–7.0 mm, 19 ♂♂ ad. bl 3.3–7.4 mm, 11 subad.; #C3; MINGA MYS 431 • 13 ♀♀ ad. bl 5.9–7.0 mm, 7 ♂♂ ad. bl 5.8–7.8 mm, 8 subad.; #C5; NHMW 26479.

BONAIRE • 24 ♀♀ ad. bl 4.6–5.3 mm, 22 ♂♂ ad. bl 3.9–6.9 mm, 61 subad.; #B11; ZMH K-55263 • 13 ♀♀ ad. bl 5.0–7.9 mm, 26 ♂♂ ad. bl 5.7–6.5 mm, 7 subad.; #B12; NHMW 26480.

### Type locality

Cartagena at the Caribbean coast of Colombia (Zimmer 1915a). Coordinates estimated by present authors are about 10.37° N, 75.52° W.

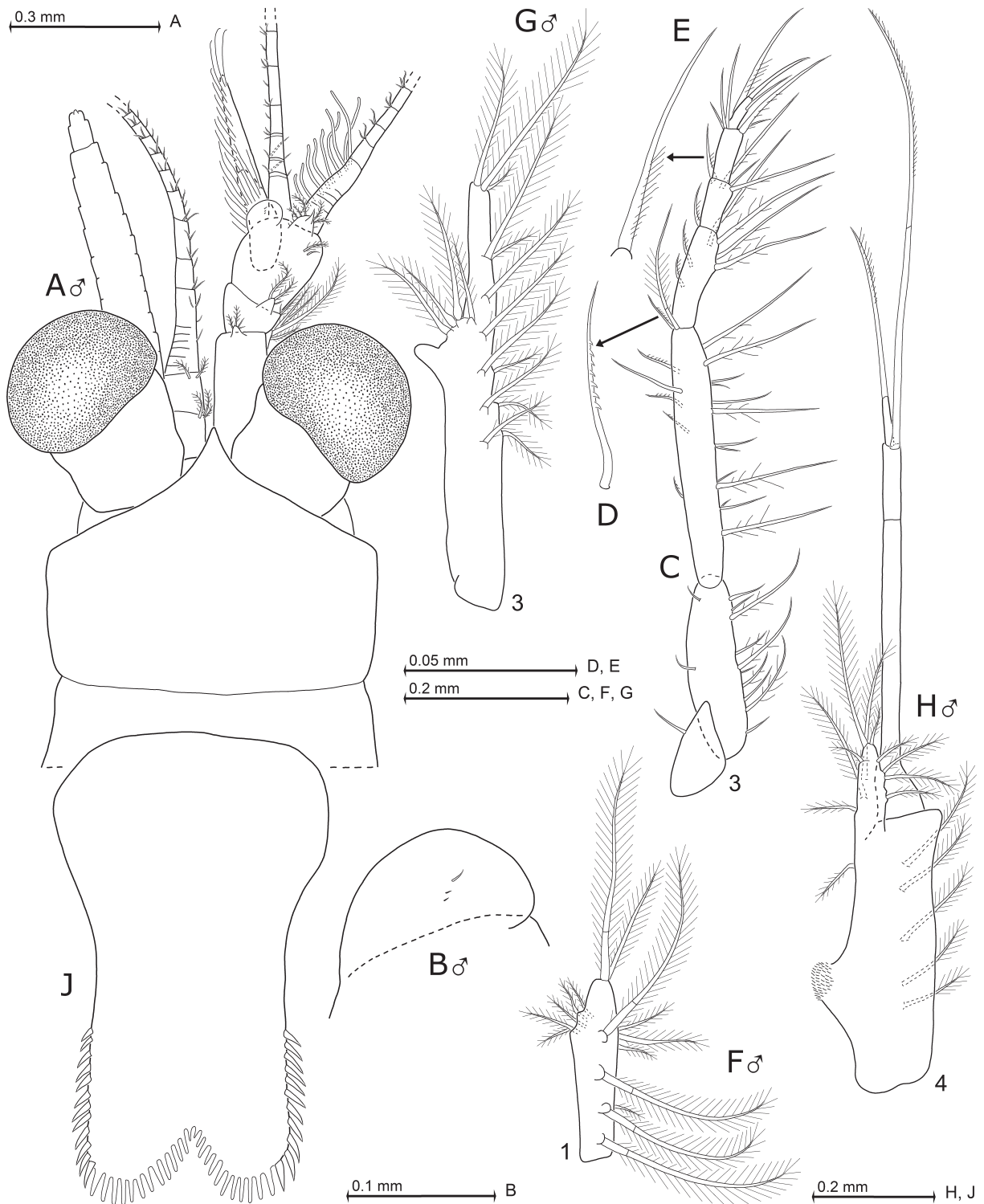
### Revised definition

All features diagnosed above for the genus *Mysidium* Dana, 1852, and its new subgenus *Orientalomysidium*. Cornea globose in lateral view; calotte-shaped in dorsal view, with diameter 1.5–2.0 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum triangular, with concave lateral margins, apically bluntly to acutely pointed, not or weakly extending beyond basis of eystalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediolateral extension (Fig. 9A–B) bearing 2–4 setae. The largest seta 0.1–0.2 times extension length. Appendix masculina bilobate, 2.0–3.3 times as long as terminal segment of antennular trunk; all along with brush of long setae. Length of antennal scale 7–8 times maximum width; scale reaching far beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Distally angular hump on outer face of terminal segment of the maxillula. Carpopropodus of thoracic endopods 1–8 with 2, 2, 3, 3–2, 2–3, 2–3, 2–3 or 2–3 segments, respectively. Series of 2–6 serrated setae (Fig. 9D) along merus of third thoracic endopod. Basal segment occupies half total length of carpopropodus of endopod 3. Pleopod 1 rod-like in both sexes, not considering the weak (sub) median widening at its vestigial endopodal portion (Fig. 9F). Sympod of male pleopod 4 with strong endite at  $\frac{2}{5}$  sympod length from basis and with longitudinal series of 3–6 plumose setae on rostral face. Exopod with basal segment occupying 64–72% total length. Endopod reduced to lobe with 27–48% sympod length; with 7–10 barbed setae of various sizes. Endopod of uropods 0.6–0.7 times as long as exopod. Telson subrectangular, length 1.4–1.8 times maximum width near basis. Its lateral margins convex along proximal third; proximal 61–73% of lateral margins smooth, distal portion of each margin with continuous series of 8–12 acute spines. Cleft penetrating 13–15% telson length; cleft separating two broadly rounded, apical lobes; cleft and terminal portion of lobes densely lined in continuous series by a total of 22–30 stout, blunt laminae.

### Description of type (Fig. 9A)

All available features fit within the diagnosis. Antennular trunk extends 25–47% its length beyond (artificially aligned) eyes. Sympod of antenna produced into spiniform extension on outer distal corner. Apical segment of maxillary palp about two times as long as basal segment. Carapace posteriorly emarginate, with well-rounded latero-terminal lobes; cervical sulcus strong. Dactylus of thoracic endopods 1–2 with moderately long, strong claw; dactylus 3–7 with long, needle-like claw; dactylus 8 with short seta-like claw. Sympod of fourth male pleopod with 3–4 plumose setae (this range wider in non-types examined) on rostral face plus 1–2 small, barbed setae on inner margin. Pleonites 1–5 are 0.5–0.8, 0.5–0.8, 0.6–0.8, 0.6–0.8 or 0.8–1.1 times the length of pleonite 6, respectively. Scutellum paracaudale triangular with blunt to acute apex; both margins weakly concave to weakly convex.





**Fig. 9.** *Mysidium columbiae* (Zimmer, 1915), lectotype from Cartagena in Colombia (A) and non-types from Curaçao (B–J). **A.** ♂, 4.4 mm body length. **B, F–J.** ♂, 6.1 mm. **C–E.** ♀, 5.5 mm. **A.** Cephalic region; left antennula and setae of antennal scale omitted. **B.** Mediosternal extension of right antennular trunk, dorsal view. **C.** Third thoracic endopod, caudal view. **D–E.** Details of panel (C) showing modified setae. **F–G.** Pleopods 1 and 3, rostral view. **H.** Pleopod 4, caudal view. **J.** Telson. Sample affiliation: Colombia - type locality (A), Curaçao #C3 (B–J).

Uropodal endopod 0.9–1.1 times, exopod 1.2–1.5 times as long as pleonite 6. Exopod extends 0.3–0.4 times its length beyond endopod, or 0.7–0.8 times beyond telson; endopod 0.4–0.6 times its length beyond telson. Telson with 0.5–0.7 times as long as exopod of uropods, 0.5–0.9 times endopod or 0.6–0.9 times pleonite 6.

#### Notes on additional material (Figs 9B–J, 13E–J)

Adult females of present material with 4.4–7.9 mm (n = 76) body length, males 3.3–7.8 mm (n = 74). Numbers of serrated setae (Fig. 9C–D) along the merus of thoracic endopod 3 increase with increasing body size; also numbers of endopods with any setae of that type increase with body size, i.e., pertaining only to thoracopod 3 in smaller individuals and successively to thoracopods 4–7 as individuals become larger. Endopod 8 (when stretched) reaching backwards at most to the end of pleonite 4 and forwards to mandibles; its carpopropodus measures 0.4–0.5 times telson length. Male pleopod 4 comparatively short; exopod reaching at most to basal third of pleonite 6, its subapical seta up to terminal third. Endopod of male pleopod 4 (Fig. 9H) with the most distal seta 1.4–4.4 times endopod length. Sympod with field of scales on its endite. Statoliths composed of fluorite.

Foregut (Fig. 13E–G) closely similar to that of *M. antillarum* sp. nov. (Fig. 11A–E). As main differences from this species, *M. columbiae* shows different structure and variable numbers of large spines: on each lateral half there are 2–4 apically pronged spines on posterior part of lateralia, the teeth of these spines with dense sets of secondary denticles (Fig. 13F); and there are 1–2 larger, apically pronged, serrated spines on dorso-lateral infolding, the latter spines flatter, more clavate, and with more slender teeth on basal  $\frac{2}{3}$  (Fig. 13G).

#### Notes on individual development

Nauplioid larvae (Fig. 13H) with smooth cuticle all around, except for a pair of minute furcal processes and a number of minute setae on the blunt end of the abdomen (Fig. 13J). Davis (1966: fig. 4) already reported apical, furcal ‘spines’ in nauplioids of *M. columbiae* from Jamaica. In non-types of the present material, the differentiation of male sexual characteristics is visible in early subadults as small rudiments of penis and appendix masculina and of a bifid fourth pleopod. At this stage the exopod of pleopod 4 is less than  $\frac{3}{2}$  as long as endopod and the endite of the sympod is missing or indistinct. In the course of further development a distinct endite (representing an important diagnostic character) becomes visible as soon as the exopod exceeds two times the length of the endopod.

#### Distribution and habitat

From 24° N to 8° S in coastal waters of Bahamas, Caribbean, southern Gulf of Mexico, and Brazil (Price & Heard 2004; Miyashita & Calliari 2014). The present samples from Curaçao and Bonaire fit within this geographic range. The present material was encountered at a depth of 3–26 m, during daytime in swarms hovering around and between corals. During the night dispersed over the sea floor.

*Mysidium (Orientomysidium) antillarum* Wittmann sp. nov.

[urn:lsid:zoobank.org:act:7CCD97DD-6848-46AF-B806-82D93D3FF3BA](https://zoobank.org/act:7CCD97DD-6848-46AF-B806-82D93D3FF3BA)

Figs 10–12, 13A–D

#### Etymology

The species name is a Latinized Spanish noun in the genitive plural, referring to the occurrence at islands of the Antilles.

#### Type material examined (by present designation)

##### Holotype

CURAÇAO • ♂ ad. bl 7.3 mm; shallow marine waters of Curaçao, Reef Sint Marie; 12.2122° N, 69.0850° W; #C6; NHMW 26484.

**Paratypes**

CURAÇAO • 48 ♀♀ ad. bl 6.2–8.0 mm, 37 ♂♂ ad. bl 5.1–7.5 mm, 11 subad.; same locality data as for holotype; #C6; MINGA MYS 433, NHMW 26485, ZMH K-55258.

**Other material examined**

CURAÇAO • 13 ♀♀ ad. bl 6.3–7.5 mm, 11 ♂♂ ad. bl 5.8–7.7 mm; #C1; MINGA MYS 429 • 20 ♀♀ ad. bl 6.2–8.2 mm, 6 ♂♂ ad. bl 4.9–6.3 mm, 11 subad.; #C2; ZMH K-55256 • 18 ♀♀ ad. bl 6.5–7.8 mm, 39 ♂♂ ad. bl 5.4–7.7 mm, 48 subad.; #C4; NHMW 26483 • 3 ♀♀ ad. bl 6.1–6.6 mm, 3 ♂♂ ad. bl 6.0–6.3 mm, 109 subad.; #C7; MINGA MYS 435 • 1 ♀ subad. bl 4.5 mm; #C8 • 24 ♀♀ ad. bl 6.3–8.1 mm, 17 ♂♂ ad. bl 6.1–6.8 mm, 7 subad.; #C10; NHMW 26486.

BONAIRE • 65 ♀♀ ad. bl 5.8–8.0 mm, 83 ♂♂ ad. bl 5.8–7.6 mm, 9 subad.; #B11; ZMH K-55264.

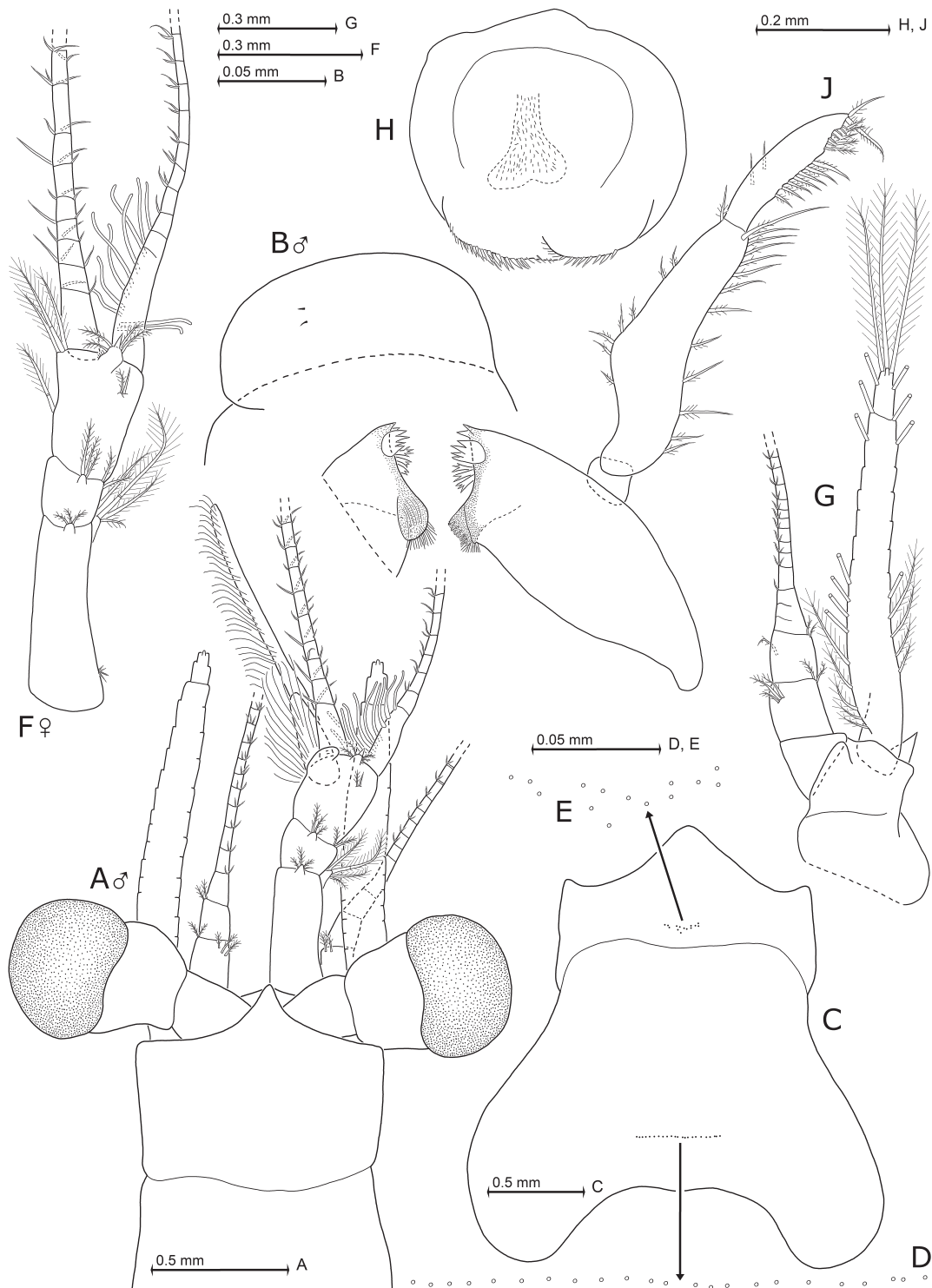
**Definition**

All features diagnosed above for the genus *Mysidium* Dana, 1852, and its new subgenus *Orientomysidium*. Cornea globose in lateral view, calotte-shaped in dorsal view, with diameter 1.4–1.7 times as long as terminal segment of antennular trunk. Eystalks smooth. Rostrum triangular, apically rounded or pointed, not extending beyond basis of eystalks. Antero-lateral edges of carapace rounded. Only males with anterior margin of antennular trunk dorsally with rounded, shield-like, mediolateral extension (Fig. 10A–B) bearing 2–3 setae. The largest seta 0.1 times extension length. Appendix masculina 2.2–3.9 times terminal segment of antennular trunk; its shorter, dorsal lobe with brush of long setae, its longer ventral lobe with less dense set of shorter setae. Length of antennal scale 7–11 times maximum width, scale clearly reaching beyond antennular trunk. Median segment of mandibular palp with setae on both margins. Distally angular hump on outer face of terminal segment of maxillula. Carpopropodus of thoracic endopods 1–8 with 2, 2, 3, 3, 2–3, 2–3, 2–3 or 2 segments, respectively. Basal segment occupies half total length of carpopropodus of endopod 3. Series of 2–7 serrated setae (Fig. 12B) along merus of third thoracic endopod. Pleopod 1 rod-like in both sexes, not considering the weak (sub)median widening at its vestigial endopodal portion (Fig. 12D, G). Sympod of male pleopod 4 with longitudinal series of 3–7 plumose setae on rostral face; without or with an indistinct medial widening (endite) at 1/3 of sympod length from basis. Exopod with basal segment occupying 69–73% total length. Endopod reduced to a terminally rounded lobe with 29–41% sympod length; endopod with 5–12 mostly large, plumose setae of various sizes. Endopod of uropods 0.6–0.8 times as long as exopod. Telson subrectangular with apical cleft. Telson length 1.4–1.7 times maximum width near basis. Its lateral margins convex along proximal third and smooth along proximal 51–58%; distal portion of each margin with dense, continuous series of 12–17 acute spines. Subtriangular apical cleft penetrating 11–14% telson length; cleft separating two broadly rounded, apical lobes; cleft and terminal portion of lobes densely lined in continuous series by a total of 19–23 (sub)acutely pointed, stout laminae.

**Description**

SIZE. Adult females 5.8–8.2 mm (n = 191), males 4.9–7.7 mm (n = 197).

ANTENNAL APPENDAGES (Fig. 10A–B, F–G). Antennular trunk extends 35–56% its length beyond (artificially aligned) eyes. First to third segments occupy 47–52%, 14–18% or 30–37% total length of trunk, respectively. Trunk dorsally with forward-directed small, setose lobes near terminal margin of each segment: two lobes from the basal, one from the median, and one from the terminal segment (not counting the mediolateral extension of the anterior margin in males). Appendix masculina 0.7–1.4 times total trunk length, antennal scale 1.2–1.6 times trunk. Sympod of antenna (Fig. 10G) produced into spiniform extension on outer distal corner. Antennal scale with terminal segment occupying 10–14% total length and bearing five plumose setae.



**Fig. 10.** *Mysidium antillarum* Wittmann sp. nov., from Curaçao, holotype (A) and paratypes (B–J). A. ♂, 7.3 mm body length. B. ♂, 7.5 mm. C–E, H. ♀, 7.9 mm. F. ♀, 7.5 mm. G, J. ♂, 6.4 mm. A. Cephalic region; left antennula and setae of antennal scale omitted. B. Mediodistal extension of left antennular trunk, dorsal view. C. Carapace expanded on slide. D–E. Details of panel (C) showing cardial (D) and cervical (E) pore groups; pore diameters not to scale. F. Right antennula of female, dorsal view. G. Right antenna, dorsal view. H. Labrum, ventral view. J. Left mandible with right masticatory process, caudal view.

**MOUTH PARTS** (Figs 10H, J, 11F–H). Mandibular palp (Fig. 10J) without spines; terminal segment with strong, modified, bent seta at apex, and barbed setae along inner and outer margins. Median segment of palp with angular, medially directed dilatation, both its margins setose. Proximal segment normal, with smooth margins. Distal segment of maxillula (Fig. 11G) terminally with strong spines, subterminally with one barbed seta; tip of endite of maxillula with apically modified setae (armed with stiff barbs) plus several setae with normal, fine barbs. Maxilla (Fig. 11H) with well-developed exopod, moderately large, two-segmented palp and three apically setose endites. Exopod with maximum width in submedian portions; its outer margin all along with continuous series of plumose setae. Basal segment of palp with three barbed setae. Apical segment about two times as long as basal segment. Length of apical segment 1.9–2.5 times maximum width. Apical segment densely setose on terminal margin but lined by small hairs along more than basal half of inner margin; apex with two strong, modified setae bearing strong, spine-like barbs along distal third of their inner margin.

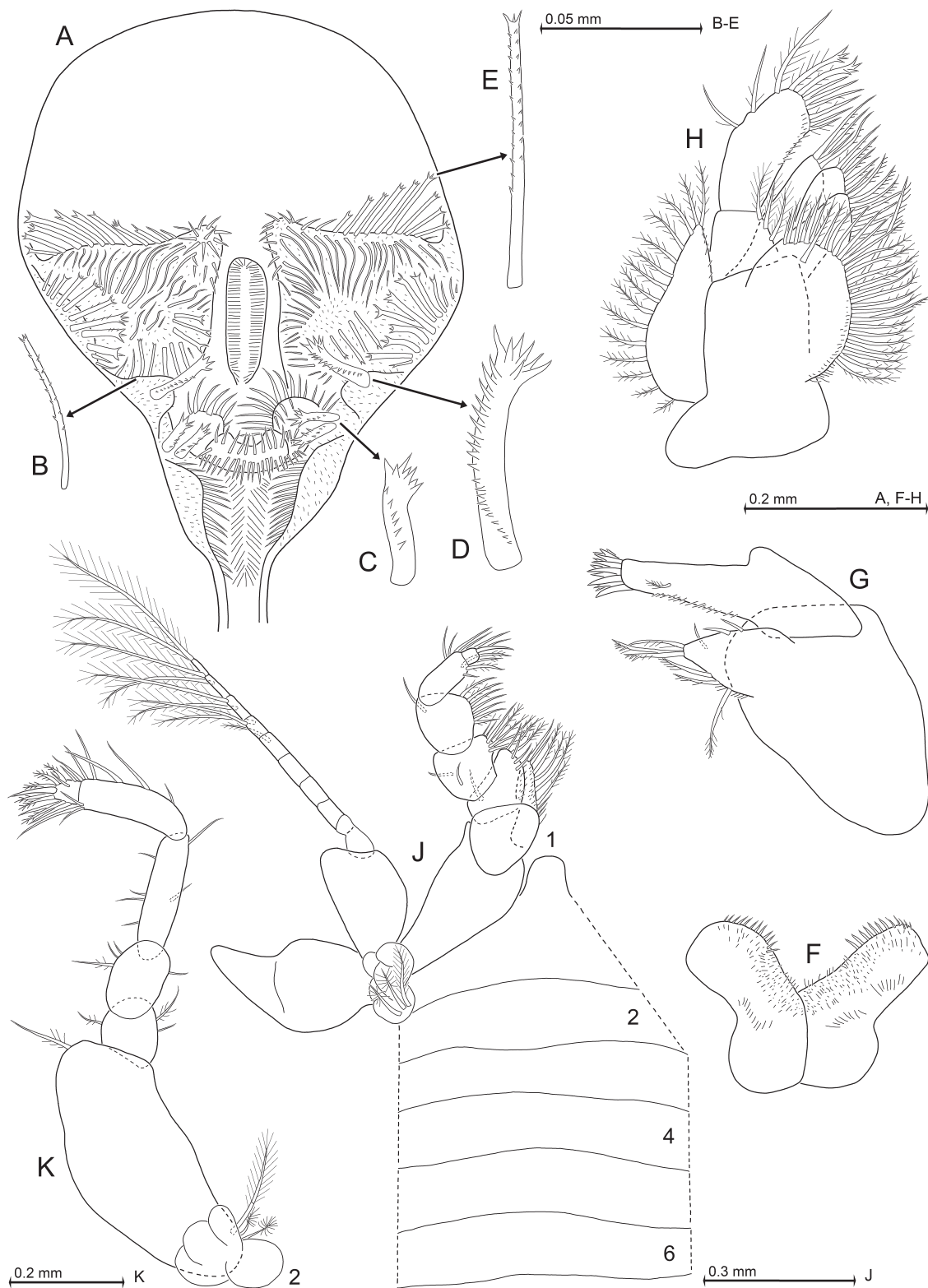
**FOREGUT** (Fig. 11A–E). Setae, but no spines, close to inlet of oesophagus. Primary cardiac filter formed ventrally by dense combs of stiff setae behind this inlet. Lateralialia and superomedianum densely covered by spines and/or setae. Apically coronate plus apically, weakly (Fig. 11B) to strongly (Fig. 11E) pronged, slender spines on anterior and median parts of lateralialia. These spines with numerous minute denticles along distal 60–80% of their shaft. Two powerful, stout, apically pronged, serrated spines (Fig. 11C) on posterior part of lateralialia; one additional, longer, more strongly serrated spine (Fig. 11D) of that type on the dorso-lateral infolding; yielding a total of six such powerful spines. Secondary filter formed by dense rows of setae in pyloric part of foregut.

**THORAX OF BOTH SEXES** (Figs 10C–D, 11J–K, 12A–C, 13A). Carapace (Fig. 10C) posteriorly emarginate, with well-rounded latero-terminal lobes; cervical sulcus strong; roughly V-shaped group of 10–16 pores (Fig. 10E) in front of cervical sulcus, transverse linear series of 16–23 pores (Fig. 10D) in cardinal position (above heart). Sternites (Fig. 11J) smooth; a plumose seta accompanied by 1–2 shorter barbed setae on the joint between each sternite and its thoracopod. Endopod and exopod sizes increase from thoracopods 1 to 5 and decrease from 5 to 8. Basal plate of exopods with large, well-rounded latero-distal expansion in exopods 1–7. Flagellum 8-segmented in exopods 1 and 8, versus 9-segmented in remaining exopods. First thoracic epipod bilobate, with smooth margins, without seta. First endopod (Fig. 11J) with well-developed, setose endites from basis, ischium, merus. Endopods 1–2 with large dactylus and strong claw. Dactylus of endopod 2 with 4–6 modified and several smooth setae, no spine-like setae; modified setae each with two dense rows of strong, acute barbs along their median to subterminal portions. Numbers of serrated setae (Fig. 12B) along the merus of thoracic endopod 3 increase with increasing body size; also numbers of endopods with any setae of that type increase with body size, i.e., pertaining only to thoracopod 3 in smaller individuals and successively to thoracopods 4–8 as individuals become larger. Endopods 3–7 with less stout, well-developed dactylus bearing a long, needle-like claw; endopod 8 (Fig. 13A) with even smaller dactylus and short seta-like claw. Endopod 8 (when stretched) reaching backwards at most to middle of pleonite 4 and forwards to mandibles; its carpropodus measures 0.3–0.5 times telson length.

**THORACOPODS OF FEMALES** (Fig. 12C). Basal plate of exopod 8 with short to indistinct latero-distal expansion. The oostegites from thoracopods 7–8 densely fringed with setae, together forming a large brood chamber. Thoracopod 6 with rudimentary oostegite bearing 2–4 setae at apex. These setae spinulose at least along their apical third. More such setae present in proximal portions of the oostegite from thoracopod 7.

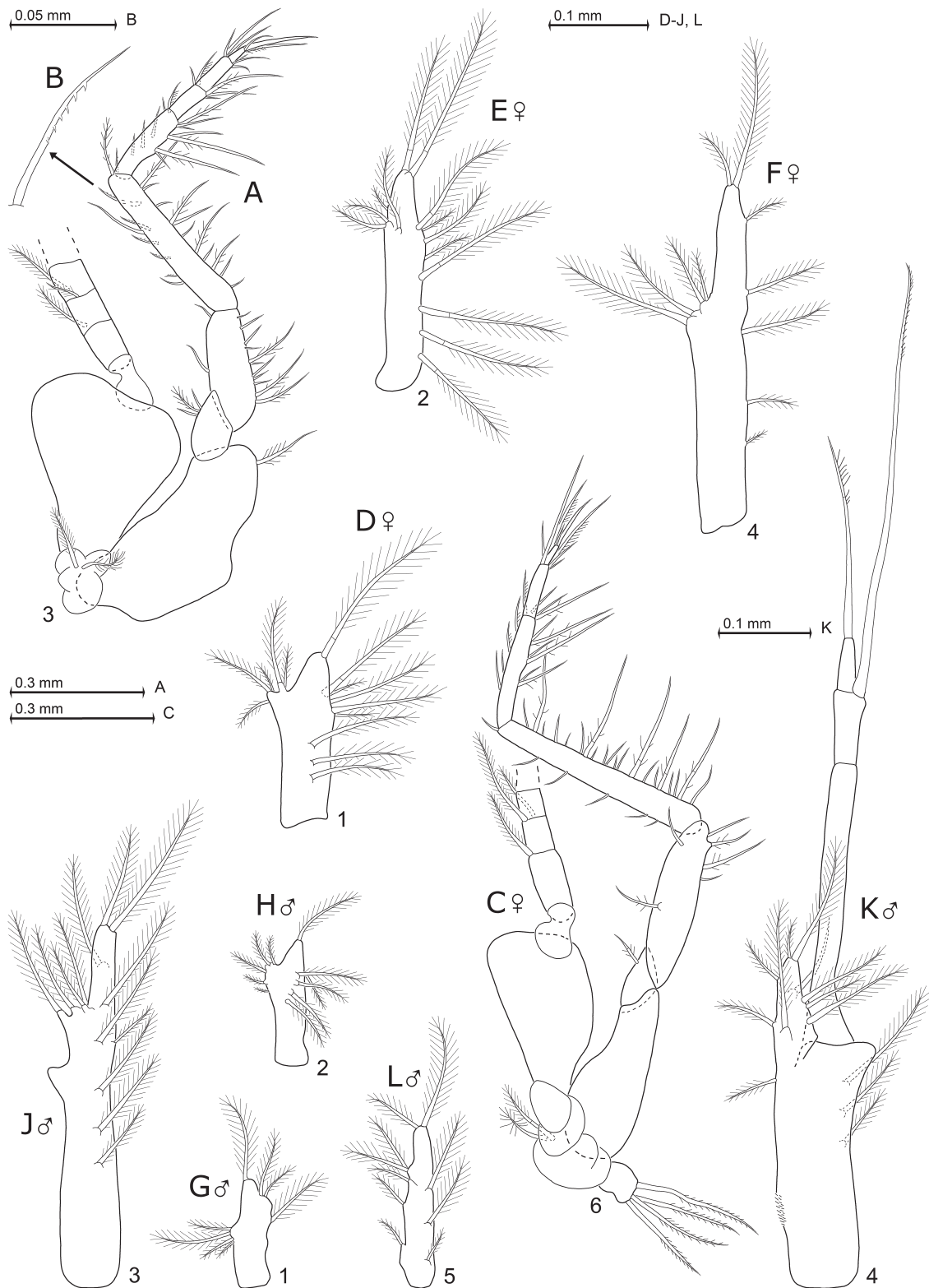
**THORACOPODS OF MALES AND PENIS** (Fig. 13A). Basal plate of exopod 8 with distinct latero-distal expansion. Penes tubular, 0.7–0.9 times as long as merus of endopod 8. Penes apically bilobate, with row of 5–9





**Fig. 11.** *Mysidium antillarum* Wittmann sp. nov., from Curaçao, paratypes. **A–E, G, J.** ♀, 7.9 mm body length. **F, K.** ♂, 7.5 mm. **H.** ♀, 7.5 mm. **A.** Foregut; dorsal wall and some spines of superomedianum omitted. **B–E.** Details of panel (A) showing modified spines. **F.** Labium, caudal view. **G.** Maxillula, rostral view. **H.** Maxilla, rostral view. **J.** First thoracopod (caudal view) with sternites 1–6 (ventral view). **K.** Second thoracic sympod with endopod, rostral view.

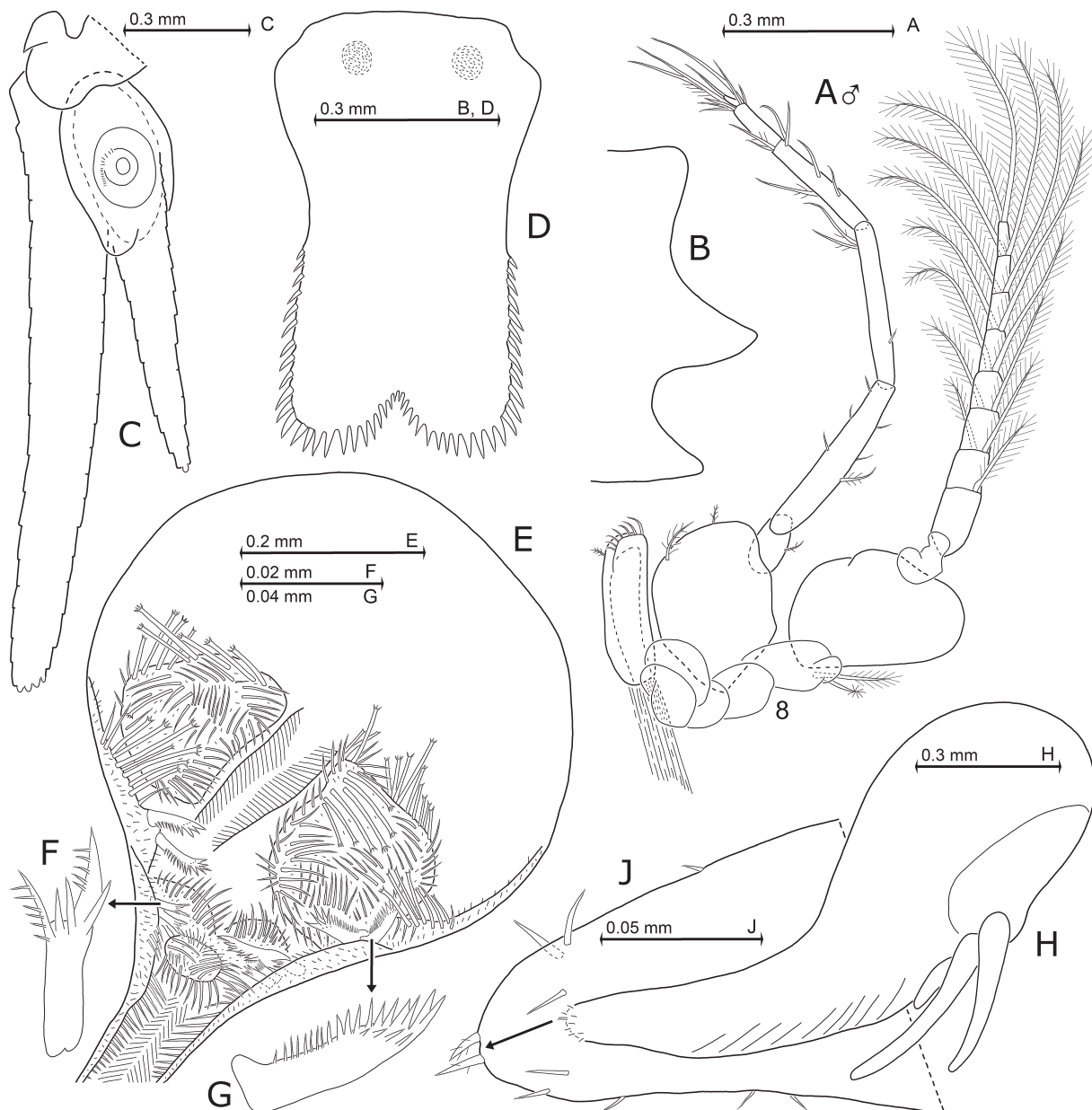




**Fig. 12.** *Mysidium antillarum* Wittmann sp. nov., from Curaçao, paratypes. **A–B.** ♂, 7.5 mm body length. **C.** ♀, 7.9 mm. **D–F.** ♀, 7.5 mm. **G, J–K.** ♂, 5.5 mm. **H, L.** ♂, 5.0 mm. **A.** Third thoracopod, caudal. **B.** Detail of panel (A) showing modified seta from merus. **C.** Sixth thoracopod with rudimentary oostegite, rostral view. **D–F.** Series of female pleopods 1, 2, 4, rostral view. **G–J, L.** Series of male pleopods 1–3, 5, rostral view. **K.** Male pleopod 4, caudal view.

smooth, bent setae flanking the ejaculatory opening. One or two additional, smaller setae subapically on margin opposite bent setae.

PLEON (Figs 12D–L, 13B–D). Pleonites 1–5 are 0.5–0.6, 0.6, 0.6, 0.6 or 0.7 times the length of pleonite 6, respectively. Size increases from pleopods 1 to 4, with pleopod 5 ranging between 2 and 3 in both sexes. Pleopods 1–3 with a ventro-laterally directed fan of plumose setae. Setae of pleopod 1



**Fig. 13.** *Mysidium antillarum* Wittmann sp. nov., holotype (A), paratypes (B–D) and *M. columbiae* (Zimmer, 1915). (E–J), non-types, all from Curaçao. **A.** ♂, 6.4 mm body length. **B.** ♂, 7.3 mm. **C.** ♀, 7.9 mm. **D.** ♀, 7.5 mm. **E–G.** ♂, 6.1 mm. **A.** Eighth thoracopod with penis, rostral view. **B.** Scutellum paracaudale, lateral view. **C.** Uropods, ventral; setae omitted. **D.** Telson. **E.** Foregut; dorsal wall omitted. **F–G.** Details of panel (E) showing modified spines. **H.** Nauplioid larva at substage N3, lateral view. **J.** Detail showing tip of abdomen in another nauplioid specimen. Sample affiliation: Curaçao - type locality #C6 (A–D); Curaçao #C3 (E–G), #C5 (H–J).

(Fig. 12D, G) not larger than those of pleopods 2, 3, 5. Female pleopods 1–5 (Fig. 12D–F) and male pleopods 1–2, 5 (Fig. 12G–H, L) vestigial, rod-like, not considering the weak (sub)median widening, if any, at the vestigial endopodal portion. Male pleopod 3 (Fig. 12J) essentially rod-like as well, yet with hump-like endite at 60% pleopod length from basis. Male pleopod 4 reaching with its subapical seta to pleonite 6 or even up to apex of endopod of uropods. Its exopod with basal segment longest, second segment longer than third. Subterminal segment of exopod with a very long seta bearing dense series of minute bristles along its distal 20–53%; short terminal segment with shorter seta at tip, this seta with characteristic set of barbs (Fig. 12K) along its distal third. Endopod with its largest distal seta 1.2–2.0 times endopod length. Sympod with field of scales on its medial widening, or in analogous position upon missing widening. Scutellum paracaudale (Fig. 13B) subtriangular, apically pointed; upper margin concave, lower margin convex. Endopod of uropods (Fig. 13C) 1.0–1.3 times as long as pleonite 6, exopod 1.6–1.9 times pleonite 6. Length of exopod 8–10 times its maximum width. Exopod extends 0.3 times its length beyond endopod or 0.6–0.7 times beyond telson; endopod 0.4–0.6 times its length beyond telson. Telson (Fig. 13D) 0.4–0.5 times as long as exopod of uropods, 0.6–0.8 times endopod or 0.7–0.9 times pleonite 6.

**STATOLITHS.** Composed of fluorite; shape ellipsoidal to spherical in dorsal view (Fig. 13C), discoidal in lateral view, maximum diameter 126–188  $\mu\text{m}$ , thickness 62–97  $\mu\text{m}$ , measured in 10 adults. Tegmen moderately, though always distinctly convex; fundus weakly concave. Sagittal section very similar to that figured by Wittmann *et al.* (1993: Fig. 6P) for *Heteromysis formosa*. Statolith formula  $2 + 3 + (0-1) + (4-13) + (6-12) = 19-25$ .

**NAUPLIOID LARVAE.** As in *M. columbiae* (Fig. 13H, J).

### **Distribution and habitat**

In euhaline, sublittoral to littoral waters of Curaçao and Bonaire, both islands at 12° N. The new species forms swarms during the day, hovering closely above the sea floor at a depth of 0–26 m. Also found near shore boulders, around and off piers.

### ***Species not assigned to any subgenus***

#### ***Mysidium iliffei* Băcescu, 1991**

*Mysidium iliffei* Băcescu, 1991: 3–5.

*Mysidium illifei* – Băcescu 1991: fig. 1A–I (invalid spelling variant).

*Mysidium iliffei* – Ortiz *et al.* 2017a: table 1; 2017b: 76. — Ortiz & Lalana 2018: 80.

### **Material examined**

No material available, not assigned to any subspecies: see Discussion.

### **Type locality**

Băcescu (1991) indicated “Jamaica, St. D, 90.026 Sa Rba” as sampling site of the types.

### **Revised definition**

Adapted to the scheme in Table 2 by using published data (Băcescu 1991) on adult females and subadult males: *Mysidium* with cornea calotte-shaped in dorsal view; diameter 1.5 times as long as terminal segment of antennular trunk. Anterior margin of carapace rounded. First to third segments occupy 57%, 13% and 30% total length of antennular trunk, respectively. Length of antennal scale six times maximum width, scale not reaching beyond antennular trunk. Carpopropodus three-segmented in

thoracic endopod 3, and two-segmented in endopod 8. Basal segment occupies 0.4 times total length of carpopropodus of endopod 3. Uropodal endopod 0.8 times as long as exopod. Telson subrectangular with apical cleft. Telson length 1.6 times maximum width near basis. Its lateral margins slightly tapering and smooth along proximal 56–63%; distal portion of each margin with dense continuous series of about 9–11 acute laminae. Subtriangular apical cleft penetrating 11% telson length; cleft separating two broadly rounded, apical lobes; cleft and terminal portion of lobes densely lined in continuous series by about 17–22 acute laminae. Telson with a total of about 35–42 laminae.

### Distribution and habitat

Only known from type locality. Băcescu (1991) reported T. Iliffe as collector, so the positional data are interpreted by the present authors according to a copy of the sampling protocol submitted by courtesy of Tom Iliffe: Jamaica, Westmoreland Parish, Negril, Joseph’s Caves, station 90.026, sea cave with swarm of mysids congregated at the cave entrance, collected from water column and sand bottom at depths of 1–3 m, 26 June 1990, leg. Tom Iliffe. Coordinates estimated by the present authors are 18.2680° N, 78.3681° W at the entrance of this touristic cave. Băcescu (1991) reported *M. cubanense* to co-occur with *M. iliffei* at this station.

### Key to the subgenera and species of *Mysidium* Dana, 1852

- Anisomysini with well-developed eyes. Antennal scale lanceolate, without spines, but setose all around, with small terminal segment. Thoracopods essentially normal, endopods with 2- or three-segmented carpopropodus. All pleopods of females and pleopods 1–3, 5 of males reduced, uniramous, unsegmented. Fourth male pleopod longest, biramous with setose, unsegmented endopod and with 3- or 4-segmented exopod; subterminal and terminal segments of exopod each ending in large modified seta. Uropods with setose margins, without spines. Telson longer than broad, with entire or incised terminal margin; with spines and laminae only on distal half. Genus *Mysidium* Dana, 1852 (endemic in tropical to subtropical, mainly euhaline, also metahaline coastal waters of the East Pacific at 21–26° N and the West Atlantic from 32° N to 24° S, including Gulf of California, Gulf of Mexico and Caribbean) ..... 1
1. Telson linguiform to subrectangular, terminally not emarginated or at most with a rounded, shallow indentation; male pleopod 4 with four-segmented exopod ..... 4
    - Telson with distinct apical cleft separating two broadly rounded, apical lobes ..... 2
  2. Antennal scale not extending beyond antennular trunk ..... *Mysidium iliffei* Băcescu, 1991 (from entrance of a sea cave in Jamaica, 18° N; poorly known, therefore not assigned to any subgenus)
    - Antennal scale extending well beyond antennular trunk; male pleopod 4 with three-segmented exopod: *Orientomysidium* Wittmann subgen. nov. .... 3
  3. Sympod of male pleopod 4 with strong endite at  $\frac{2}{5}$  sympod length from basis; both sexes with blunt laminae on terminal margins of telson and its cleft .....
    - ..... *Mysidium (Orientomysidium) columbiae* (Zimmer, 1915) comb. nov. (Bahamas, Caribbean, southern Gulf of Mexico, coast of Brazil, 24° N to 8° S)
    - Endite of sympod of male pleopod 4 reduced to indistinct projection; both sexes with acute laminae on terminal margins of telson and its cleft .....
      - ..... *Mysidium (Orientomysidium) antillarum* Wittmann sp. nov. (Curaçao and Bonaire, 12–13° N)
  4. Thoracic endopod 3 with two-segmented carpopropodus; subterminal segment of exopod of male pleopod 4 with bifid, modified seta ..... *Occimysidium* Wittmann subgen. nov. (*Mysidium (Occimysidium) pumae* Ortiz, Hendrickx & Winfield, 2017, Gulf of California, 23° N)

- Thoracic endopod 3 with three-segmented carpopropodus; subterminal segment of exopod of male pleopod 4 with unbranched, modified seta: subgen. *Mysidium* Dana, 1852 ..... 5
- 5. Telson terminally with a shallow, rounded indentation ..... ***Mysidium (Mysidium) gracile*** (Dana, 1852) (Bermuda, Caribbean, Gulf of Mexico, coast of Brazil, 32° N to 24° S)
  - Telson terminally not emarginated ..... 6
- 6. Telson spatulate, its terminal portion triangular with rounded tip .....
  - ..... ***Mysidium (Mysidium) triangulare*** Wittmann sp. nov. (Curaçao, 12° N)
  - Telson with traverse or with convex, continuously rounded terminal margin ..... 7
- 7. Median segment of mandibular palp without setae on outer margin; basal segment of carpopropodus of thoracic endopod 3 measures 0.6 times total length of carpopropodus .....
  - Mysidium (Mysidium) rickettsi*** Harrison & Bowman, 1987 (Pacific coast of Mexico, 21–26° N)
  - Median segment of mandibular palp with setae on both margins; basal segment of carpopropodus of thoracic endopod 3 is half total length of carpopropodus ..... 8
- 8. Pleopod 1 rod-like in both sexes; unevenly rounded hump on outer face of distal segment of maxillula .....
  - Mysidium (Mysidium) rubroculatum*** Băcescu & Ortiz, 1984 (Gulf of Mexico, Cuba, 22–23° N)
  - Pleopod 1 bilobate in both sexes; about evenly rounded hump on outer face of distal segment of maxillula ..... 9
- 9. Cornea diameter < 2.5 times as long as terminal segment of antennular trunk .....
  - ..... ***Mysidium (Mysidium) integrum*** W.M. Tattersall, 1951 (Bermuda, Bahamas, Caribbean, Gulf of Mexico, coast of Brazil, 32° N to 23° S)
  - Cornea diameter > 2.5 times as long as terminal segment of antennular trunk ..... ***Mysidium (Mysidium) cubanense*** Băcescu & Ortiz, 1984 (Gulf of Mexico, Cuba, Bonaire, Curaçao, 12–23° N)

## Discussion

### Formal validity of the taxon *Mysidium* Dana, 1852

Dana (1850) fixed the name *Mysidia* without indication of gender; this taxon is today considered to be a junior homonym of the planthopper genus *Mysidia* Westwood, 1840. Dana (1852: 638, 653) replaced his *Mysidia* by assignment of the type species to *Macromysis* White, 1847, today considered a subjective junior synonym of the European mysid genus *Praunus* Leach, 1814. Upon citing his own contribution from 1850 in a total of two footnotes on the same pages, he retrospectively changed *Mysidia* to *Mysidium* (Dana 1852: 638, 653), from today's point of view publishing the new name in synonymy. One cannot exclude that he actually intended to correct the nominative plural to become the nominative singular according to the second declension of neutral Latin substantives, rather than fixing a nomen novum by retrospective, contradictory means. Regardless, Czerniavsky (1882: 16) and most subsequent authors accepted *Mysidium* Dana, 1852, as a valid taxon, thus making it available according to Article 11.6.1 of the nomenclatorial code (ICZN 1999).

### Differentiation within the genus *Mysidium* Dana, 1852

Most interspecific differences belong to an ensemble of the 25 morphological criteria listed in Table 2 as being sufficient for the distinction of all the here acknowledged species of the genus. The numbers of morphological differences per species pair are summarized in Table 3 as a derivative from Table 2. Not considering the poorly known *M. iliffei* Băcescu, 1991, three species groups are distinguished whereby the respective numbers of differences range from 1–6 for within-group differences and 9–15



**Table 3.** Number of documented morphological differences between and within the proposed subgenera of *Mysidium* Dana, 1852. Bold print marks differences between species pertaining to different subgenera.

	<i>M. gracile</i>	<i>M. integrum</i>	<i>M. cubanense</i>	<i>M. rubroculatum</i>	<i>M. triangulare</i>	<i>M. rickettsi</i>	<i>M. pumae</i>	<i>M. columbiae</i>	<i>M. antillarum</i>
<i>Mysidium (Mysidium) gracile</i>	—								
<i>Mysidium (Mysidium) integrum</i>	3	—							
<i>Mysidium (Mysidium) cubanense</i>	3	1	—						
<i>Mysidium (Mysidium) rubroculatum</i>	4	3	2	—					
<i>Mysidium (Mysidium) triangulare</i>	2	3	3	5	—				
<i>Mysidium (Mysidium) rickettsi</i>	6	3	5	5	5	—			
<i>Mysidium (Occimysidium) pumae</i>	<b>11</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>13</b>	—		
<i>Mysidium (Orientomysidium) columbiae</i>	<b>12</b>	<b>13</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>12</b>	<b>15</b>	—	
<i>Mysidium (Orientomysidium) antillarum</i>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>13</b>	<b>13</b>	<b>12</b>	2	—
<i>Mysidium iliffei</i>	5	7	6	7	5	8	6	5	5

for between-group differences. The great number of between-group differences strongly supports three different morphological entities, here established as the subgenera *Mysidium* Dana, 1852, *Occimysidium* subgen. nov. and *Orientomysidium* subgen. nov. The main differences between these taxa are emphasized in the above diagnoses of subgenera.

#### Differentiation within the nominotypical subgenus *Mysidium* Dana, 1852

Within this cluster of six very similar species, *M. gracile* is essentially distinguished by a weak, but distinct indentation of the terminal margin of the telson and by large setae on the mediobasal extension of the male antennular trunk, *M. cubanense* by the enormous eyes, *M. rickettsi* by the absence of setae on the outer margin of the median segment of the mandible in combination with a comparatively long basal segment of the carpopropodus of the third thoracic endopod, *M. integrum* by a traverse to weakly convex terminal margin of the telson in combination with a great number of spines on the lateral margins and *M. rubroculatum* by a more unevenly rounded hump on the outer face of the terminal segment of the maxillula and more rod-like first pleopod. Within its subgenus, *M. triangulare* sp. nov. is unique by a triangular apical portion of the telson, and shows on the average the greatest numbers of setae on the mediobasal extension of the male antennular trunk and of laminae on the terminal margin of the telson. Conversely, it shows the fewest spines on the lateral margins of the telson.

#### Differentiation of the new subgenus *Occimysidium*

In addition to the ensemble of diagnostic characters indicated above for this monotypic subgenus, its type species, *M. pumae*, differs from all species of the remaining subgenera by acute laminae rather than spines on the lateral margins of the telson; this feature, however, is shared with *M. iliffei*. The lateral telson margins in *M. pumae* bear more laminae than the laminae or spines in the remaining species

(exception: number of spines in *M. integrum*). The basal segment of the carpopropodus of the third thoracic endopod is longer in *M. pumae* than in the remaining species of the genus.

#### **Differentiation within the new subgenus *Orientomysidium***

Only *M. columbiae*, *M. antillarum* sp. nov. and *M. iliffei* show a telson with a distinct, subtriangular cleft, separating two rounded latero-apical lobes; cleft and terminal portions of the lobes are densely furnished with acute or blunt laminae, while the armature of the lateral margins differs more strongly between species. Additional exclusive features are shared by *M. columbiae* and *M. antillarum* sp. nov., but are unknown in *M. iliffei*: third and fifth male pleopods longer and more slender compared to that in the remaining species of the genus. Serrated setae (Figs 9D, 12B) are present on the merus of the third thoracic endopod in *M. columbiae* and *M. antillarum* sp. nov., but this detail is unknown in *M. iliffei* and *M. rickettsi*, and such modified setae are absent in the remaining six species of the genus. In addition, *M. columbiae* and *M. antillarum* sp. nov. share a strong endite (Figs 9G, 12J) on the third male pleopod with *M. pumae*, as opposed to the medial widening (Figs 1E, 2E, 3E, 4E, 7K) visible in *M. gracile*, *M. integrum*, *M. cubanense*, *M. rubroculatum*, and *M. triangulare* sp. nov. They also share on average fewer setae on the mediodistal extension of the antennular trunk compared to the latter five species (Figs 9B, 10B versus Figs 1B, 2B, 3B, 4B, 5B).

The sympod of the fourth male pleopod in *M. columbiae* differs from that in all remaining species of the genus by a strong endite at  $\frac{2}{5}$  distance from the basis (reservation: this feature is not clear in *M. iliffei*). In *M. antillarum* sp. nov. this endite is reduced to a low, sometimes indistinct projection. A very short endite was figured by Brattegard (1969: fig. 27E) for material from the Bahamas, reported by him as *M. columbiae*, now considered as potentially indicative of *M. antillarum* sp. nov. *Mysidium columbiae* shares this series of setae on the rostral face of this sympod only with *M. antillarum* sp. nov. Zimmer (1915a: fig. 28) did not illustrate most of these setae for *M. columbiae* because he drew the opposite face of the sympod. It remains unclear where the most proximal seta in his figure inserts. Series of such rostrally inserting setae were identified by us in the types and in all additional specimens examined in this respect. We therefore included these setae in the revised definition of *M. columbiae*. In addition to the different size of the endite of the sympod of male pleopod 4, both sexes of *M. antillarum* sp. nov. differ from *M. columbiae* by more acute laminae on the terminal margin of the telson including the cleft. Further differences the new species shows are typically a longer, more slender appendix masculina, more spines on the lateral margins of the telson, and fewer laminae on the terminal margin.

#### **Definition and availability of *Mysidium iliffei* Băcescu, 1991**

Among the characters described by Băcescu (1991), two striking ones are clearly out of the ranges of variation found in *M. columbiae* and *M. antillarum* sp. nov.: (1) antennal scale stouter and not extending beyond antennular trunk, and (2) lateral margins of telson with laminae rather than spines.

A potential third point is not clear for *M. iliffei*: Băcescu (1991) wrote “l'article basal du IV<sup>e</sup> pléopode ♂ n'a pas la dilatation si caractéristique de *M. columbiae*”. However, only “3 ♂ juv.” inspected together with “le IV<sup>e</sup> pléopode ♂ dépasse à peine le milieu du V<sup>e</sup> pléonite” suggest that he had treated ‘subadult’ males in the present terminology. Features of this pleopod given by Ortiz *et al.* (2017b) in the diagnosis of *M. iliffei* are based (Manuel Ortiz, pers. comm.) only on the unclear data given by Băcescu (1991). As shown in the above description of *M. columbiae*, the widening (endite) of the sympod of the fourth male pleopod is missing or unapparent in early subadults. Accordingly, the absence of an endite in subadults cannot be employed as being diagnostic of *M. iliffei* versus *M. columbiae*.

Attempts to obtain material of *M. iliffei* for study failed. Băcescu (1991) had indicated the Grigore Antipa Museum, Bucharest, as the deposition site of the types. However, the types are not in this collection according to the holdings listed by Petrescu & Wittmann (2009). An additional check in 2018 confirmed

that there is neither any entry in the inventory nor any corresponding material in the collection (Melanya Stan and Iorgu Petrescu, pers. comm.). An online request (platform ‘CRUST-L’, 8 Mar. 2018) to the crustaceology community yielded no conclusive information about a potential alternative deposition of the types and any other potential material of this taxon. No additional samples were published after the first description by Băcescu (1991). Accordingly, *M. iliffei* is currently not assigned to any subgenus due to insufficient knowledge and inaccessibility of material.

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