

## *Monstrotyphis anapaulae* n. sp. a remarkable new Typhinae (Gastropoda: Muricidae) from Mozambique

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**ABSTRACT.** A new species of *Monstrotyphis* Habe, 1961 is described from Mozambique and compared with *M. imperialis* (Keen & Campbell, 1964) and other related species from Oman, Australia and Japan.

### INTRODUCTION

The muricid subfamily Typhinae is divided into 19 genera and subgenera. Fourteen of those include Recent as well as some fossil species and five contain only fossil species (Houart 2018). The subgenus *Siphonochelus* (*Choreotyphis*) was forgotten in Houart (2018), however it was previously reinstated by Houart (2013).

*Monstrotyphis* Habe, 1961 was a monotypical genus until some species were moved from *Typhina*, in which they were originally or later classified, to *Monstrotyphis* (Houart 2002). With the new species described here, this genus now includes 14 species of which 13 are from the Indo-West Pacific and one from the western Atlantic.

Five Recent species of Typhinae occur off Mozambique: *Siphonochelus* (*S.*) *transcurrens* (von Martens, 1902), *S. (S.) nipponensis* Keen & Campbell, 1964, *S. (S.) rosadoi* Houart, 1999, *S. (S.) mozambicus* Houart, and the new species described here.

### Material and Methods

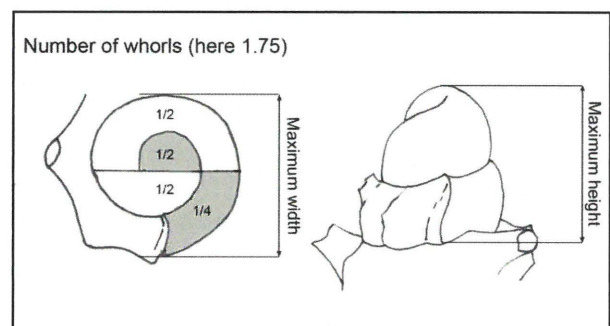
#### Material

The specimens were collected by the second author off southern Mozambique and during the INHACA expedition of MNHN/Universidade Eduardo Mondlane, Maputo, from November 23 to December 12, 2011 in the vicinity of the island of Inhaca (26°S, 33°E).

### Methods

The characters used to describe shell morphology address the general aspect of the shell, its shape, size, and colour, the shape of the spire including the number and features of the protoconch and teleoconch whorls, details of the suture and of the subsutural ramp, details of axial and spiral sculpture, the aperture and the siphonal canal.

The method used to determine diameter and height, and to count the number of protoconch whorls follows Bouchet & Kantor (2004) and is shown in Fig. 1. The description is based on the holotype. The bathymetric ranges given herein are the inner values of the recorded depths: the deepest minimum and the shallowest maximum of each recorded depth range.



**Fig. 1.** Method for determining diameter, height and counting the number of protoconch whorls (*Monstrotyphis anapaulae* n. sp., holotype MNHN-IM-2000-31729).

**Abbreviations****Repository**

CAS: California Academy of Sciences, San Francisco, U.S.A.

JR: Collection of Jose Rosado.

MNHN: Muséum national d'Histoire naturelle, Paris, France.

NSMT: National Museum of Nature and science, Tokyo, Japan.

RH: Collection of Roland Houart.

**Others**

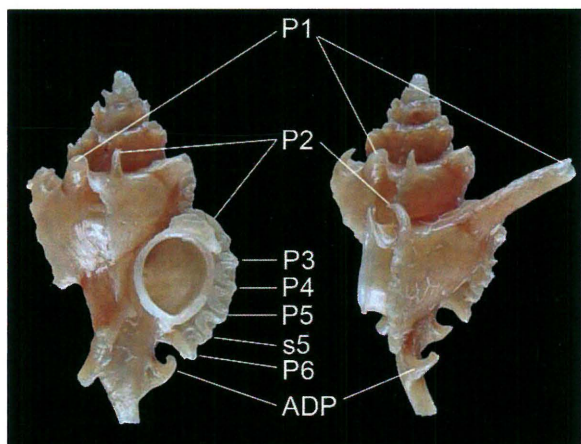
ad: adult;

dd: empty shell(s);

juv: juvenile;

lv: live collected specimen(s);

P1-P6: primary spiral cords on the convex part of the teleoconch whorl; s5: secondary cord of the convex part of the teleoconch whorl between P5 and P6; ABP: abapertural primary cord on the siphonal canal; MP: median primary cord on the siphonal canal; ADP: adapical spiral cord on the siphonal canal (Fig. 2).



**Fig. 2.** Spiral sculpture morphology. *Monstrotyphis anapaulae* n. sp. Holotype MNHN-IM-2000-31729

**SYSTEMATICS**

Family **Muricidae** Rafinesque, 1815

Subfamily **Typhinae** Cossmann, 1903

Genus **Monstrotyphis** Habe, 1961

Type species by original designation: *Typhis (Typhinellus) tosaensis* Azuma, 1960, Japan.

*Monstrotyphis anapaulae* n. sp.

Figs 1, 2, 3A-L

**Type material.** Holotype MNHN-IM-2000-31729, South Mozambique, Ponta Mucombo, dredged 180-190 m, lv, ad (12.3 mm).

Paratypes: Mozambique, INHACA, stn MD28, Inhaca Island, NE Ponta do Farol, 25°55' S, 33°07' E, 145 m,

1 lv, juv, MNHN-IM-2017-1261; South Mozambique, Ponta Mucombo, dredged 180-190 m, 1 dd, ad., 1 lv, ad, 1 lv, juv, JR; South Mozambique, Ponta Mucombo, dredged 180-210 m, 1 dd, ad, RH; South Mozambique, Ponta Mucombo, 26°12' S, 33°03' E, dredged 205-218 m, 1 lv, juv, RH.

**Type locality.** South Mozambique, Ponta Mucombo, 180-190 m.

**Distribution.** South Mozambique, 25°55' – 26°12' S, living at 145-205 m.

**Description of the holotype.** Shell of medium size for genus, 12.3 mm in length. Length/width ratio 1.7, broadly biconical, smooth, lightly built. Subsutural ramp narrow, weakly sloping.

Shell light brown; subsutural ramp and anal tube darker coloured; protoconch, abapertural part of axial lamellae and ventral part of siphonal canal lighter coloured. Aperture with whitish columellar lip and outer apertural lip, light tan within.

Spire high with 1.75 protoconch whorls and teleoconch of up to 4.15 whorls. Suture deeply impressed. Protoconch moderately large, rounded; width 800 µm, height 1200 µm; terminal lip high, narrow, weakly opisthocline.

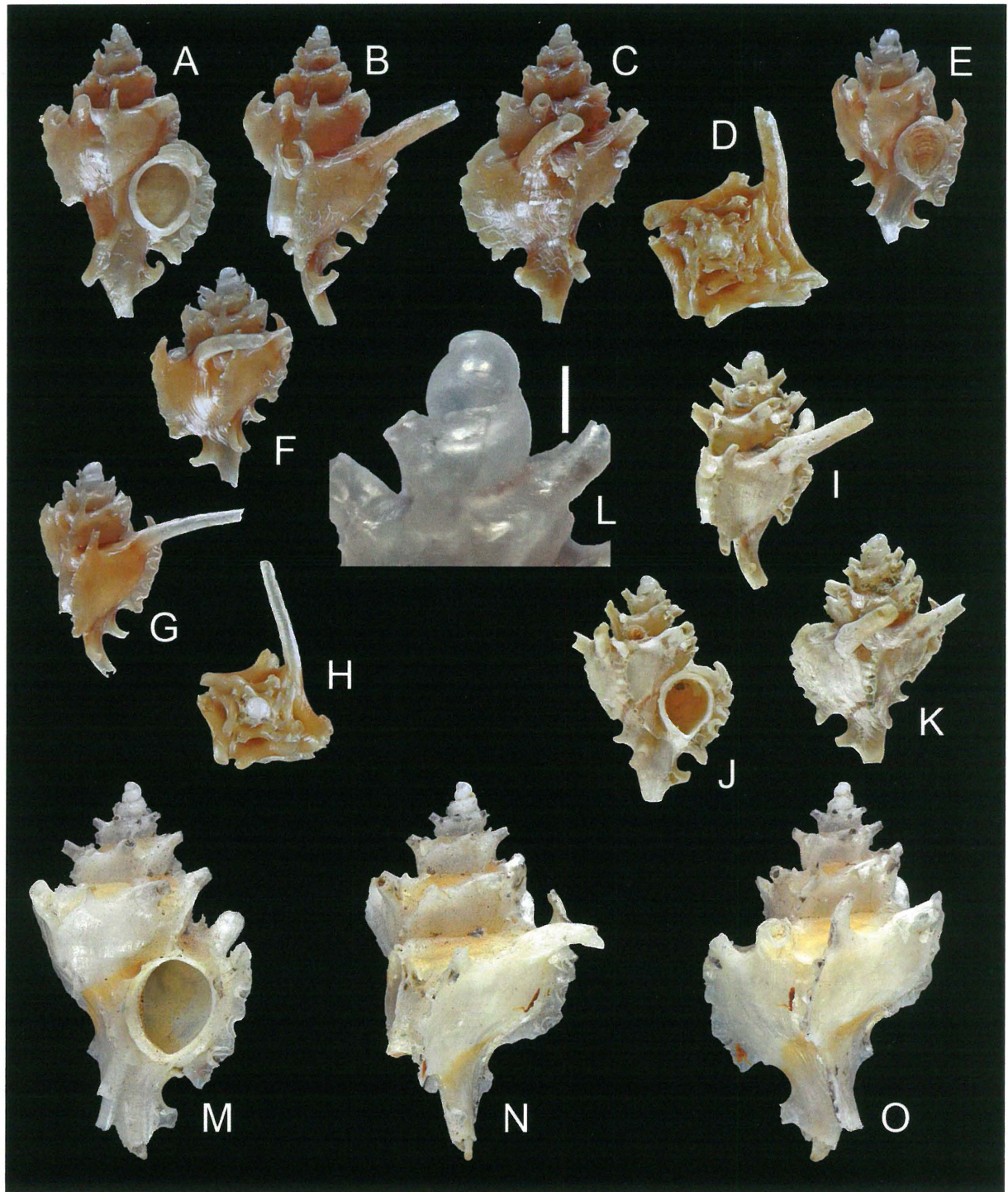
Axial sculpture of teleoconch whorls consisting of 4 low, narrow, webbed, serrated lamellae, abaperturally with 6 crenulations corresponding to P2, P3, P4, P5, s5 and P6 (Fig. 2), adaperturally smooth. P1 spiral cord corresponding to anal tube, P2 shoulder cord ending as short, adapical curved spinelet, P3-P6 and s5 indistinct on shell. Anal tubes rounded, originating near preceding varix, forming an angle of approximately 60° with axis of shell.

Aperture small, rounded, forming a continuous peristome. Columellar lip broadly expanded, erect, smooth. Outer lip erect, smooth within. Siphonal canal moderately long, narrow, weakly dorsally bent, ventrally sealed, with fairly long, narrow, acute, dorsally bent and adapically curved spinelet, corresponding to ADP.

Operculum rounded with concentric ridges and apical nucleus. Radula unknown.

**Remarks.** The shell morphology of the paratypes is almost identical to that of the holotype, although the last teleoconch whorl may be occasionally slightly broader, with a length/width ratio of 1.8 or 1.9. The ADP spine on the siphonal canal may also be longer and/or more strongly curved upwards.

*Monstrotyphis anapaulae* n. sp. is similar to the Japanese *M. imperialis* (Keen & Campbell, 1964) currently only known from the holotype (Fig. 3M-O) and from one paratype (Fig. 4), both trawled off Tosa (now Kochi Prefecture), 33°20' N, 133°40' E, in approximately 200 m depth. *M. anapaulae* n. sp. differs from *M. imperialis* in being comparatively smaller in size for a same number of teleoconch



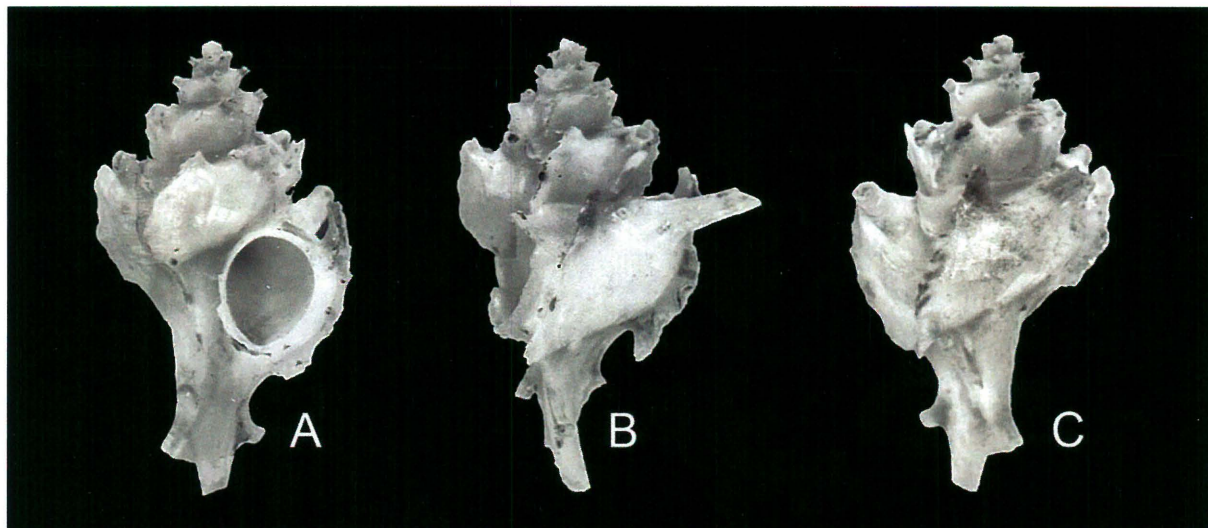
**Figure 3** (scale bar 500  $\mu\text{m}$ )

**A-L.** *Monstrotyphis anapaulae* Houart & Rosado, n. sp.

A-D. South Mozambique, Ponta Mucombo, dredged 180-190 m, holotype MNHN-IM-2000-31729, 12.3 mm;

E-H. South Mozambique, Ponta Mucombo, dredged 180-190 m, paratype JR, 7.2 mm; I-K. Mozambique, INHACA, stn MD28, Inhaca Island, NE Ponta do Farol, 25°55' S, 33°07' E, 145 m, paratype MNHN-IM-2017-1261, 7.1 mm; L. Protoconch, South Mozambique, Ponta Mucombo, 26°16' S, 33°03' E, dredged 205-218 m, juvenile paratype RH.

**M-O.** *Monstrotyphis imperialis* (Keen & Campbell, 1964), Japan, Shikoku, Kochi, Tosa Bay, 33°20' N, 133°40' E, 200 m, holotype Toba Aquarium, TT n° 1013, 16.5 mm, photo courtesy K. Hasegawa.

**Figure 4**

*Monstrotyphis imperialis* Keen & Campbell, 1964. Paratype CAS 06466. Japan, Shikoku, Kochi, Tosa Bay, 33°20' N, 133°40' E, 200 m, 15.5 mm.

whorls, in having weakly narrower teleoconch whorls, less oblique axial lamellae, almost orthocone in *M. anapaulae* as opposed to the strongly opisthocline lamellae comparatively to the axis of the shell in *M. imperialis*. The siphonal canal in *M. anapaulae* is also shorter and narrower and the distance between P6 and ADP is also remarkably shorter than in *M. imperialis*.

*Monstrotyphis imperialis* was confused with a New Caledonian species in Houart (1991), but this will be discussed in a forthcoming paper (in prep.). The species was not mentioned in Tsuchiya (2000, 2017) and was considered a synonym of *M. tosaensis* (Azuma, 1960) by Higo et al. (1999). However *M. tosaensis* strongly differs from *M. imperialis* by its high spire, its very long and narrow siphonal canal and a more spiny shell.

*Monstrotyphis anapaulae* n. sp. also resembles *M. yatesi* (Crosse & Fischer, 1865) (Fig. 5A-C) from South Australia, but differs in having a comparatively smaller size, narrower teleoconch whorls, narrower and strongly adapically curved ADP spine, and narrower, less sloping subsutural ramp.

It also differs from *Monstrotyphis montfortii* (A. Adams, 1863) (Fig. 5D-F) from Japan and the Philippines and *M. takashigei* Houart & Chino, 2016 (Fig. 5G-I) from Japan by its larger size and by its strongly adapically curved and sharp ADP spine while the siphonal canal is spineless in the other species or occasionally with a low, broad ADP in *M. montfortii*. *M. teramachii* (Keen & Campbell, 1964) (Fig. 5J-L) is larger and comparatively narrower with a longer and also spineless siphonal canal.

*Monstrotyphis anapaulae* n. sp. also differs from *M. goniodes* Houart, Gori & Rosado, 2017 (Fig. 5M-P), a recently described species from Oman, in having a rounded protoconch and a strongly curved, acute ADP spine, as opposed to a strongly keeled protoconch and

a siphonal canal with webbed ADP, MP and probably ABP in *M. goniodes*.

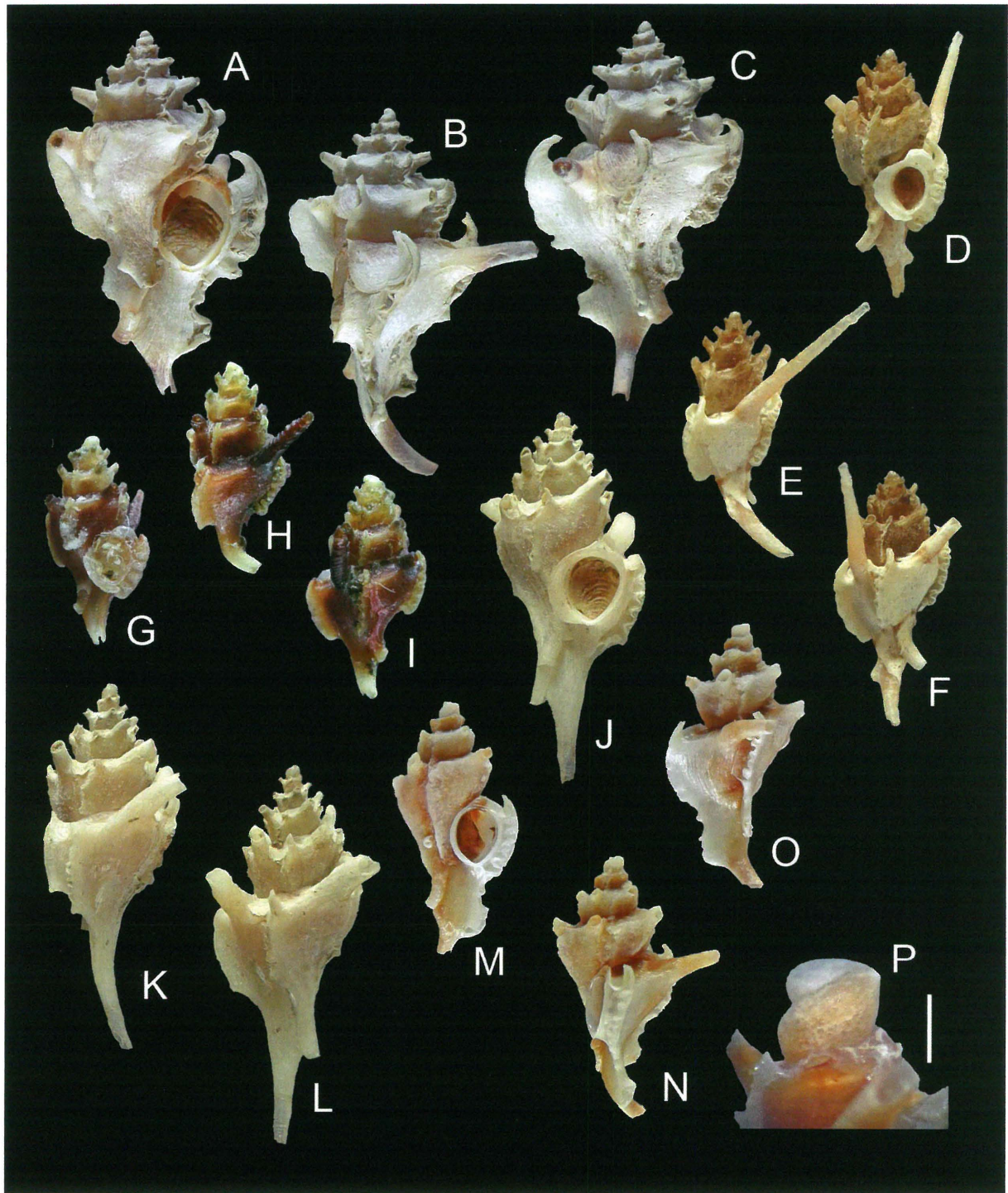
**Etymology.** Named after Ana Paula Pereira, wife of the second author. She has spared no effort to dredge in this area where the sea is generally rough with strong winds and she also sorted the shells.

#### ACKNOWLEDGEMENTS

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**Figure 5** (scale bar 500 µm)

**A-C.** *Monstrotyphis yatesi* (Crosse & Fischer, 1865), South Australia, Adelaide, Brighton Reef, 14 m, RH, 17.6 mm; **D-F.** *M. montfortii* (A. Adams, 1863), Cebu, Mactan Id, Punta Engano, tangle nets, 50-100 m, RH, 10.0 mm; **G-I.** *M. takashigei* Houart & Chino, 2016, Akino-hama, Izu-Oshima, Izu Islands, Japan, 55 m, holotype NSMT-Mo 78955, 6.4 mm; **J-L.** *M. teramachii* (Keen & Campbell, 1964), Off Tanake, Japan, trawled in 366-421 m, RH, 17.5 mm; **M-P.** *M. goniodes* Houart, Gori & Rosado, 2017, Oman, Dhofar, Mirbat, Deep Plateau, 16°56' N, 54°43' E, 32 m, holotype MNHN IM-2000-33186, 9.5 mm; P. Protoconch.

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