

## Amazing diversity in cryptic nassariform Terebridae (Gastropoda: Conoidea), with the description of four new species

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**Abstract:** Nassariform members of the genus *Partecosta* are revised and 4 new species from Oman and Papua New Guinea are described.

**Introduction:** The generic placement of *Terebra marqueti* Aubry, 1994 has been doubtful ever since its description. Since Terryin (2007), it has been considered as belonging to the genus *Hastula*, an opinion maintained by Fedosov et al. (2020).

The study of the species described below and of a large number of both juvenile and adult specimens of *T. marqueti* leads us to conclude that it is more appropriately positioned in the genus *Partecosta* Dance & Eames, 1966 because of its similarities in shell morphology to recently discovered and hereby newly described species *Partecosta arabica* sp. nov., *Partecosta brunnea-nebulosa* sp. nov. from Oman and *Partecosta keppensi* sp. nov. from Papua New Guinea. A fourth species, *Partecosta olivacea* sp. nov. is likewise described as new to the genus *Partecosta* and another species from West Australia is briefly discussed.

### Abbreviations:

**CI:** Collection Conchology, Inc., Philippines.  
**FN:** Private collection Frank Nolf, Belgium.  
**JR:** Private collection José Rosado, Portugal.  
**KVL:** Private collection Kirsten Van Laethem, Belgium.  
**MK:** Private collection Marc Keppens, Belgium.  
**MNHN:** Muséum national d'Histoire naturelle, Paris,

France.

**NHMUK:** Natural History Museum of the United Kingdom, London, England.

**YT:** Private collection Yves Terryin, Belgium.

**RG:** Private collection Rosa Gargiulo, Italy.

**SG:** Private collection Sandro Gori, Italy.

**SH:** Private collection Steve Hubrecht, Belgium.

**UA:** Private collection Umberto Aubry, Italy.

**Systematics:** The systematics for the species described and discussed in the present paper follow the systematics as proposed in Fedosov et al. (2020); adapted with recent findings where necessary. For information on the types held in the NHMUK, we refer to Salvador & Pickering (2017).

Class **Gastropoda** Cuvier, 1797

Order **Neogastropoda** Wenz, 1938

Superfamily **Conoidea** Fleming, 1822

Family **Terebridae** Mörch, 1852

Subfamily **Pervicaciinae** Rudman, 1969

Genus ***Partecosta*** Dance & Eames, 1966

*Partecosta arabica* sp. nov.

Pl. 1, Fig. 9 & Pl. 2, Figs 10-18

Bratcher & Cernohorsky, 1987: pl. 33, fig.130b (as *Terebra nassoides* Hinds, 1844)

**Type material:** **Holotype:** MNHN-IM-2000-35028, leg. JR, 13.8 mm. **Paratypes 1-10:** YT, from type locality, 14.7-20.8 mm; **Paratypes 11-23:** JR, from type locality, 9.4-17.8 mm; **Paratypes 24-25:** SG, Oman, Masirah, low tide, both 15.7 mm; **Paratypes 26-27:** YT, Oman, Masirah Island, near Garin, 15.7-16.8 mm; **Paratype 28:** YT, Oman, Ras-al-Masr, in sand at low tide, 15.6 mm; **Paratype 29:** MK, idem, 17.7 mm; **Paratype 30:** YT, Oman, Masirah Island, dredged at 2 m, 18.1 mm; **Paratype 31:** YT, Oman, Masirah Island, low tide, 21.2 mm; **Paratypes 32-35:** RG, Oman, Masirah Island, 2-10

m, 10.2-12.0 mm; **Paratypes 36-37:** RG, N Oman, Muscat area, 1-5 m, 17.9-19.3 mm; **Paratype 38:** FN, Oman, Masirah Island, Garin, intertidally, 16.4 mm; **Paratype 39:** SH, Oman, Masirah Island, 17.8 mm; **Paratypes 40-43:** KVL, idem, 16.8-19.8 mm.

**Additional material:** JR, from type locality, 6 sps, 11.3-17.9 mm; YT, Oman, Ras-al-Masr, in sand at low tide, 7 sps, 13.2-17.8 mm; SH, UAE, Gulf of Oman, Dibba, 25°36.181'N-56°20.374'E, from shell grit, 1 sp.

**Type Locality:** Oman, Ras-al-Ruways, 2-6 m.

**Description (holotype):** Shell 13.8 mm in length. Outline of whorls almost straight. Base colour white, yellowish tinged between the axial ribs, and a dark brown collumellar area. Protoconch of about 2.0 whorls, with a small nucleus. No subsutural band demarcation except for the axial sculpture being coarser subsuturally. Axial sculpture of raised sharp-edged ribs, about a third of the width of the interspace, coarser subsuturally, almost forming teardrop-shaped nodules. Axial ribs continue below the periphery. Spiral sculpture overall absent except for numerous fine spiraling incisions on the first 5 teleoconch whorls, which completely fade later on. Columella straight, aperture elongate quadrate.

Animal unknown.

**Additional notes:** Largest specimen known 21.2 mm (paratype 31). Both the number of axial ribs, their width, the interspaces and the size of the flecks are variable among the studied specimens (see Pl. 2, Figs 10-18). The colour/pattern arrangement varies from completely white to darker tinged or yellowish tinged intercostally to a white base colour with 2 rows of either discrete dots to smeared flecks.

The species has even been confused with *Hastula nana* (Deshayes, 1859) because of the arrangement of the flecks in some specimens, and more notably with *Partecosta nassoides* (Hinds, 1844) as Cernohorsky & Bratcher (1987) erroneously figured the species as such in their revision of the family **Terebridae** (see pl. 33, fig. 130 b), and it was afterwards erroneously reported as such in various literary sources. Although the differences with *H. nana* (Pl. 1, Figs 1-2) are quite obvious, it was apparently less obvious for *P. nassoides* (Pl. 1, Figs 3-5 and Pl. 2, Figs 1-2 & 22).

The different characteristics for *P. nassoides* are the white and black-colored subsutural band, dark-tinged collumellar area and a dark brown to purple-coloured protoconch with about 2 whorls and a small nucleus and

a narrow apical angle. The protoconch of the latter is about a quarter less wide and less bulbous than in *P. arabica* sp. nov., virtually no spiral sculpture (except for fine spiral striae on the first teleoconch whorls) and the apical angle is smaller. A remarkable (beached) specimen of *P. nassoides* (Pl. 2, fig. 22) from S Yemen was studied: it has a smaller apical angle than usual, but it was otherwise found to have an identical morphology to the shell of *P. nassoides*.

**Distribution:** Mainly found around Masirah Island, Oman; but reported from various localities on the Yemen and Omani coast and Gulf of Oman. In shallow water from the intertidal area to 10 m. The species has not been reported from further north in the Red Sea, nor further east towards the Iranian and Pakistani coasts. Its presence in the Persian Gulf is unconfirmed.

**Derivatio nominis:** The species is named for the Arabian Peninsula.

*Partecosta brunneanbulosa* sp. nov.  
Pl. 1, Fig. 10 & Pl. 2, Figs 19-21

**Type material: Holotype:** MNHN-IM-2000-35029, leg. JR, 12.0 mm. **Paratypes: Paratypes 1-2:** JR, 11.9-12.2 mm; **Paratypes 3-4:** YT, 11.3-13.2 mm; **Paratypes 5-9:** SG, 12.8-14.1 mm. All paratypes from type locality.

**Type Locality:** S Oman, E Mirbat, 2-4 m.

**Description (holotype):** Shell 12.0 mm in length. Outline of whorls slightly concave. Base colour creamy white, brownish tinged between the axial ribs in the form of 1-2 irregular shaped flecks or flammules, and a dark brown collumellar area. Protoconch of about 2.0 whorls, with a small nucleus. No subsutural band demarcation except for the axial sculpture being coarser subsuturally. Axial sculpture consists of ribs, about a fourth of the width of the interspaces, coarser subsuturally, almost forming teardrop-shaped nodules. Axial ribs fade below the periphery. Spiral sculpture overall absent except for numerous almost obsolete spiraling incisions on the first 4 teleoconch whorls, which completely fade later on. Columella straight, aperture elongate quadrate.

Animal unknown.

**Additional notes:** Morphology of the shell is stable among the studied specimens, except for some variability of the apical angle (compare e.g. Pl. 2, Figs 19, 21 & 20). For comparison, see below.

**Distribution:** Only known from the type locality.

**Derivatio nominis:** The species is named in honour of its main colour pattern characteristic: brown clouds set between the interspaces of the axial ribs.

*Partecosta keppensi* sp. nov.  
Pl. 1, Fig. 11 & Pl. 2, Figs 23-31

**Type material: Holotype:** RBINS I.G. 34050 - MT. 3803, leg. MK, 18.9 mm. **Paratypes 1-10:** MK, 12.2-17.9 mm; **Paratypes 11-17:** YT, 11.4-14.6 mm. All paratypes from type locality.

**Type Locality:** Papua New Guinea, Manokwari, intertidally.

**Description (holotype):** Shell 18.9 mm in length. Outline of whorls slightly convex. Base colour white with irregularly shaped light brown to regularly spaced brown flecks or flamules, suprasuturally extending to about midwhorl. Protoconch of about 1.5 whorls, with a broad and large nucleus. No subsutural band demarcation except for the axial sculpture being coarser subsuturally. Axial sculpture of faintly raised straight ribs, half as wide as the interspaces, becoming coarser subsuturally. No spiral sculpture. Columella straight, aperture elongate quadrate.

Animal unknown.

**Additional notes:** Largest specimen known (holotype) measures 18.9 mm. Morphological features of the shell constant throughout the type series. Smaller-sized (juvenile/subadult) specimens have a slenderer aperture (see Pl. 2, Figs 24-28). The brown flecks become apparent on later or adult last whorl(s).

**Distribution:** Only known from the type locality.

**Derivatio nominis:** The species honours Belgian conchologist Mr. Marc Keppens, who brought the specimens to our attention.

*Partecosta olivacea* sp. nov.

Pl. 1, Fig. 8 & Pl. 2, Fig. 9

**Type material: Holotype:** MNHN-IM-2000-35030, leg. JR, 12.0 mm. **Paratype 1:** JR, 15.2 mm; **Paratype 2:** YT, 14.7 mm. Both paratypes from type locality.

**Type Locality:** Oman, Ras-al-Ruways, 2-6 m.

**Description (holotype):** Shell 12.0 mm in length. Outline of whorls straight to slightly convex. Base colour olive brown with a lighter-toned to whitish subsutural band with a fine darker-tinged spiral band just below. Protoconch of about 1.5 whorls, with a broad and large nucleus. No subsutural band demarcation except for the axial ribs being indented. Axial sculpture of faintly raised arcuate ribs, a third of the width of the interspace, continuing below the periphery. Spiral sculpture of numerous fine incisions (about 20 on the penultimate whorl), which continue over the slope of the ribs, rarely crossing over. Light brown columella straight, aperture elongate.

Animal unknown.

**Additional notes:** Morphology of the shell is stable throughout the studied specimens. The species has no comparison in the area.

**Distribution:** Only known from the type locality.

**Derivatio nominis:** The species is named in honour of its overall colour characteristic: olive brown.

**Comparison and discussion:** *P. arabica* sp. nov., *P. keppensi* sp. nov. and *P. marqueti* can mainly be distinguished from another based on the morphology of the protoconch and their geographic range.

*P. marqueti* is known from Zanzibar and adjacent coasts of Kenya, has a slenderer apical angle compared to *P. arabica* sp. nov. and a 20% wider protoconch.

*P. arabica* sp. nov. has the smallest protoconch of the 3 in terms of width and is easily set apart by the presence of spiral sculpture on the first teleoconch whorls and being mainly found around Masirah Island, but also known from Yemen to the N coast of Oman.

*P. keppensi* sp. nov., which is only known from the type locality, is most comparable to *P. marqueti*. It has a similar-shaped protoconch, but is about 20% larger, the

colour arrangement is comparable to *P. marqueti*, yet the axial ribbing in *P. keppensi* sp. nov. is fainter (to almost obsolete) than in *P. marqueti*.

*Partecosta brunneanebulosa* and *P. olivacea* morphologically have more affinity with *P. nassoides*.

*P. brunneanebulosa*, which is only known from the type locality, is easily set apart from the other 2 (and the abovementioned ones) by its unique pattern/colour arrangement. Moreover, it has a slenderer outline and protoconch with a small nucleus, which makes it easily identifiable among *P. arabica*, *P. keppensi* and *P. marqueti*. The protoconch is similarly shaped in *P. nassoides*, yet shorter/smaller in number of whorls.

*P. olivacea* is easily distinguished from the other two by its colour composition and in having spiral sculpture, the latter being limited to the first teleoconch whorl in *P. nassoides*. The protoconch is similarly shaped to that of *P. brunneanebulosa*, but is about a third wider.

As illustrated on Pl. 2, this group of species, here considered as belonging to *Partecosta*, including *P. marqueti*, which was previously considered to belong to *Hastula*, shows remarkable similarities. The distinction from one another is based on minor differences in morphology of the ribbing and colour/pattern arrangement. Still, all are separable from one another based on the differences in protoconch morphology and geographic range. *P. brunneanebulosa* and *P. arabica* were surprisingly not found sympatrically, confirmed by the extensive collecting efforts by the second and third author around Mirbat (Oman), the type locality of *P. brunneanebulosa*. This again confirms the unique biotope along the otherwise rather uniform coast of Oman (see *Hastulopsis mirbatensis* Terry & Rosado, 2016: 4). As the Mirbat and surrounding area sits along a strip of coast where the drop-off to deeper water is situated close to the shore, while the rest of the Omani coast is characterised by a shallow continental plateau (up to roughly 100 km) before it drops off to deeper water, the area is probably nourished with colder deep-water currents. This uniqueness of the area is also confirmed by the unique composition of corals compared to adjacent areas (CBD Report Oman 2010).

A further *Partecosta* species cf. *veliae* (Auby, 1991) (Pl. 2, Figs 3-4), probably originating from Broome, Western Australia, measuring about 13 mm with similar colour/pattern composition as *P. brunneanebulosa*, but having a somewhat wider apical angle and more rounded body whorl was brought to our attention. This probably constitutes another separate species within the nassariiform terebrids, but it was unfortunately not available for study. Moreover, the type material of *Partecosta veliae* (retrieved dead from shell grit in estuary) leaves little or no discriminative features for study and comparison in this case.

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## Plate 1

- 1-2: *Hastula nana*** (Deshayes, 1859)  
**1:** Lectotype, NHMUK 1979105, Mouth of Indus River, India, 10.0 mm (picture courtesy of the Trustees of the Natural History Museum).  
**2:** JR, Oman, Ras-al-Ruways, dived 1-3 m, 8.9 mm.
- 3-5: *Partecosta nassoides*** (Hinds, 1844)  
**3:** Lectotype, NHMUK 1968251/1, Gulf of Oman, 14.5 mm.  
**4:** Paralectotype, NHMUK 1968251/2, Gulf of Oman, 13.9 mm (pictures courtesy of the Trustees of the Natural History Museum).  
**5:** YT, Yemen, Al Hudaydah, on sand bar at low tide, 9.7 mm.
- 6-7: *Partecosta marqueti*** (Aubry, 1994)  
**6:** Holotype, UA, Kenya, Watamu, 15 mm (figure taken from original description).  
**7:** YT, Kenya, Watamu, 11.5 mm.
- 8: *Partecosta olivacea* sp. nov.**  
 Holotype, Oman, Ras-al-Ruways, dived at 2-6 m, 12.0 mm.
- 9: *Partecosta arabica* sp. nov.**  
 Holotype, Oman, Ras-al-Ruways, dived at 2-6 m, 13.8 mm.
- 10: *Partecosta brunneanubulosa* sp. nov.**  
 Holotype, Oman, E Mirbat, dived at 2-4 m, 12.0 mm.
- 11: *Partecosta keppensi* sp. nov.**  
 Holotype, Papua New Guinea, Manokwari, intertidal, 18.9 mm.

## Plate 2

- 1-2 & 22: *Partecosta nassoides*** (Hinds, 1844)  
**1:** YT, Yemen, Al Hudaydah, on sand bar at low tide, 12.0 mm.  
**2:** Idem, 11.9 mm.  
**22:** YT, Idem, 13.9 mm.
- 3-4: *Partecosta* species**  
 ex coll. CI, Western Australia, Broome, at low tide  
**3:** 13 mm.  
**4:** 12.7 mm.
- 5-8: *Partecosta marqueti*** (Aubry, 1994)  
**5:** YT, Tanzania, Zanzibar Archipelago, Kiwenga, 15.6 mm.  
**6:** YT, Kenya, Watamu, 12.1 mm.  
**7:** YT, Kenya, Bambun Beach, 13.0 mm.  
**8:** Idem, 16.2 mm.
- 9: *Partecosta olivacea* sp. nov.**  
 Paratype 2, YT, from type locality, 14.7 mm.
- 10-18: *Partecosta arabica* sp. nov.**  
**10:** Paratype 27, YT, Oman, Masirah Island, Garin, 16.8 mm.  
**11:** Paratype 31, YT, Oman, Masirah Island, low tide, 21.2 mm.  
**12:** Paratype 10, YT, Oman, Ras-al-Ruways, dived between 4 and 6 m, 20.8 mm.  
**13:** Paratype 29, MK, Oman, Ras-al-Masr, 17.7 mm.  
**14:** Paratype 20, JR, Oman, Ras-al-Ruways, dived between 4 and 6 m, 15.5 mm.  
**15:** Paratype 30, YT, Oman, Masirah, dredged at 2 m, 18.1 mm.  
**16:** Paratype 24, SG, Oman, Masirah, 15.7 mm;  
**17:** Paratype 7, YT, Oman, Ras-al-Ruways, dived between 4 and 6 m, 17.7 mm.  
**18:** Paratype 9, YT, Oman, Ras-al-Ruways, dived between 4 and 6 m, 18.2 mm.
- 19-21: *Partecosta brunneanubulosa* sp. nov.,**  
 All from the type locality  
**19:** Paratype 4, YT, 13.2 mm. **20:** Paratype 3, YT, 11.3 mm. **21:** Paratype 2, JR, 12.2 mm
- 23-31: *Partecosta keppensi* sp. nov.**  
 All from the type locality  
**23:** Paratype 11, 14.0 mm. **24:** Paratype 12, 4.9 mm; **25:** Paratype 2, 12.4 mm. **26:** Paratype 4, 11.4 mm; **27:** Paratype 5, 11.6 mm. **28:** Paratype 6, 12.0 mm; **29:** Paratype 3, 15.1 mm. **30:** Paratype 7, 16.2 mm. **31:** Paratype 8, 17.5 mm.

Plate 1



1



2



3



4



5



7



6



8



9



10



11

Plate 2

