

The Orbitestellidae (Gastropoda: Heterobranchia) of the Sultanate of Oman with description of a new genus and two new species*

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ABSTRACT. Three species of the family Orbitestellidae are recognized from Oman. The first, *Orbitestella bermudezi* (Aguayo & Borro, 1946) was previously known from the tropical Atlantic Ocean. It is also recorded from the Red Sea. The two remaining species are new to science and require a new genus. *Boschitestella* nov. gen. with *B. donaldi* nov. sp., known from Oman, Red Sea, Thailand and Indonesia and *B. eloiseae* nov. sp. only known from Oman are assigned to this new genus.

KEYWORDS: Gastropoda, Orbitestellidae, *Orbitestella*, *Boschitestella* nov. gen, Indian Ocean, Oman.

INTRODUCTION

Because of their minute size, species of the family Orbitestellidae have been overlooked in most marine faunas. However, during recent years much progress has been made in the understanding of these very small gastropods. PONDER (1990) showed that the orbitestellids are primitive heterobranchs. Up to now most species were recorded from the southern hemisphere (especially [sub]Antarctica, Australia, and New Zealand) but recently some recordings have been made from the northern hemisphere. KAY (1979) described a new species from Hawaii. FABER (1991) and ROLAN & RUBIO (1992) recognized their existence in the western and mid Atlantic Ocean.

During fieldwork along the coastline of the Sultanate of Oman in November 1991, a limited number of these microgastropods were found in the intertidal zone, beneath rocks and among coralline algae. In our samples two types with different characters are distinguished. One with the typical outline of the genus *Orbitestella* Iredale, 1917 and shells of the other group are distinguished by only one single, sharp carina on the periphery of the teleoconch. These are considered here to belong to a new genus.

*Studies on the marine molluscan fauna of Oman, n^o. 9.

TAXONOMY

Orbitestella bermudezi (Aguayo & Borro, 1946)
Figs 1-8

Cyclostremiscus bermudezi Aguayo & Borro, 1946: 9-12

Orbitestella similis Rolán & Rubio, 1992: 17-18

Orbitestella cubana Rolán & Rubio, 1992: 18-19

Distribution. West Indies; Cape Verde Islands; Red Sea (Gulf of Aqaba); Oman (Al Hallaniyah, Sta. 91/60, 5 specs; Masirah Island; BERS camp, Sta. 91/95, 1 spec.; Ra's al Ya, Sta. 91/105, 1 spec., all November 1991, leg. R.G. Moolenbeek & H. Dekker).

Remarks. FABER (1991) recorded *O. bermudezi*, originally described as a Cuban fossil of Miocene or Pleistocene age, being an extant species known from several West Indian islands. ROLAN & RUBIO (1992) described two new species respectively *O. similis* from the Cape Verde Islands and *O. cubana* from Cuba. If the figure numbers in ROLAN & RUBIO (1992) are correct (and not reversed) it is obvious that the figured specimen of *O. similis* is nearly identical to Faber's figured specimen from the West Indies.

After comparing specimens from several West Indian islands it is my opinion that both taxa from ROLAN & RUBIO (1992) fall within the variability of *O. bermudezi*. Furthermore, their identical protoconchs support this view.

More remarkable is the occurrence of *O. bermudezi* in the northern Indian Ocean. Specimens from Oman (Figs 1-3) have the same type of protoconch with the minute granulations and a mid dorsal ridge (Figs 4-5). Also the sculpture of the teleoconch falls within the variation known in *O. bermudezi*. The only difference noticed is the height of the two peripheral spiral ridges. It appears slightly smaller on the figured specimen but varies in the Oman population. In a small grunge sample from the Red Sea, Gulf of Aqaba (Nuweiba), collected by Mr. C. Steenman in October 1992 this species was rather common (Figs 6-8). Again, the specimens show variability in shell morphology but are still considered to be identical to *O. bermudezi*. This exceptional large distribution pattern may be explained by its likely Tethyan origin.

TURTON (1932) described *Homalogyra gemmulata* from South Africa. This species is very similar to *Orbitestella bermudezi*, however his figures and description are too vague to give a definitive opinion. A study of the type material (Oxford University Museum, U.K.) and additional material from the Natal Museum (Pietermaritzburg, South Africa) has been initiated. Also *Cyclostrema bastowi* Gatliff, 1906, the type species of the genus *Orbitestella* might be identical and would be the oldest name for this taxon.

Boschitestella nov. gen.

Type Species: *Boschitestella donaldi* nov. sp.

Diagnosis. Shell minute, discoidal, width 0.5-0.9 mm, height 0.2-0.3 mm, widely umbilicate, translucent white, with numerous fine spiral threads, which consist of small granules (at high magnification), weak axial ribs or knobs and one spiral ridge on the periphery.

Etymology. The genus and the type species were named in honour of Dr. Donald Bosch, who stimulated my interest in the marine molluscs of Oman.

Distribution. Red Sea, Thailand and Indonesia. In Oman, from the Muscat area and from Al Hallaniyah (=Kuria Muria Islands).

Remarks. The genus is based on differences in shell morphology between species of this genus and species of the genus *Orbitestella* Iredale, 1917. The type of this genus is *Cyclostrema bastowi* Gatliff, 1906, described from Victoria, Australia. *Boschitestella* differs by its single sharp carina on the periphery, being larger and a different structure of its protoconch. Radula and soft parts are unknown.

The genus *Vitrinorbis* Pilsbry & Olsson, 1952 from the Panamic province has superficial resemblance to *Boschitestella*. However, it differs in being twice as large and having a different sculpture of fine spiral threads, cut into fine beads by close, retractively radial grooves.

Boschitestella donaldi nov. sp.

Figs 9-13

Description of the holotype (ZMA Moll. 3.93.002; width 0.86 mm, height 0.24 mm). Shell minute, translucent white, discoidal with a flat spire, widely umbilicate, strong axial plicae on the periphery and numerous fine spiral threads. Protoconch I of 0.6 whorl (diameter 0.09mm), initial part with a hexagonal, crateriform structure gradually becoming smooth and terminated by a varix. Apex slightly inrolled. Protoconch II of 0.5 whorl, smooth, terminated by a distinct varix (diameter Pc I + Pc II: 0.17 mm). Colour light tan. Teleoconch of approximately 1.8 whorls with numerous fine spiral threads on upper side and rather strong knobs on the mid part. Well developed plicae on the periphery and on the base the spiral threads diminish. Base with about 13 spiral rows gradually disappearing towards the protoconch and approximately 38 axial ribs on the body whorl.

Type Locality. Sultanate of Oman, Haramal near Muscat, Sta. 91/83, low tide, in tidal pools with rocks, 28.11.1991, leg. R.G. Moolenbeek & H. Dekker.

Variability. Two paratypes (ZMA Moll 3.93.003) from the type locality, conform favorably in all sculpture details with the holotype. Paratype 1 (fig. 11) width 0.76 mm; paratype 2, a subadult specimen (fig. 10) width 0.58 mm.

Other Material Studied. OMAN: Al Bustan near Muscat, Sta. 91/51, XI.1991, leg. R.G. Moolenbeek & H. Dekker (1 spec.). RED SEA: EGYPT, Gulf of Aqaba, Nuweiba, X.1992, leg. C. Steenman (4 specs). INDONESIA: N.E. Sumbawa, Bima Island, 10 m, IX.1987, leg. J. Veth (10 specs); Bunaken

Island, 20 m, VII.1988, leg. J. Veth (1 spec.). THAILAND: Phuket Island, Patong Beach, XII.1983, leg. J. de Visser, coll. T. Keukelaar-Van den Berge (2 specs).

Remarks. *Boschitestella donaldi* nov. sp. differs from *Orbitestella bermudezi* by having (probably) planktotrophic larval development and only one ridge on the periphery. It differs from *Boschitestella eloiseae* nov. sp. by having planktotrophic larval development, and fewer spiral threads on the bodywhorl.

Boschitestella eloiseae nov. sp.

Figs 14-16

Description of the holotype (ZMA Moll. 3.93.003; width 0.55 mm, height 0.2 mm, subadult specimen). Shell minute, translucent white, discoidal with flat spire, widely umbilicate, small axial plicae on periphery and numerous fine spiral threads. Protoconch of 1.3 whorls (diameter 0.18 mm), initial part with a hexagonal, crateriform structure gradually becoming smooth and terminated by a varix. Colour white. Teleoconch of about 1.3 whorls with many fine spiral threads on upper side (about 25) and rather strong axial ribs (about 21). Under side with 25 fine spiral threads of which only about 5 are visible near the protoconch and about 38 axial ribs.

Type Locality. Sultanate of Oman, Al Hallaniyah (=Kuria Muria Islands) Sta. 91/60, tidal pools with rocks, 12.11.1991, leg. R.G. Moolenbeek & H. Dekker.

Variability. One paratype (0.5 mm width; 0.2 mm height) from Masirah Island, Ra's Abu Rasas, tidal pools, Sta. 91/90, 19 November 1991, leg. R.G. Moolenbeek & H. Dekker, closely resembling the holotype.

Remarks. A single species comparable to this taxon is *Boschitestella donaldi* nov. sp. However, it can be distinguished by its different type of protoconch, indicating a non-planktotrophic larval development.

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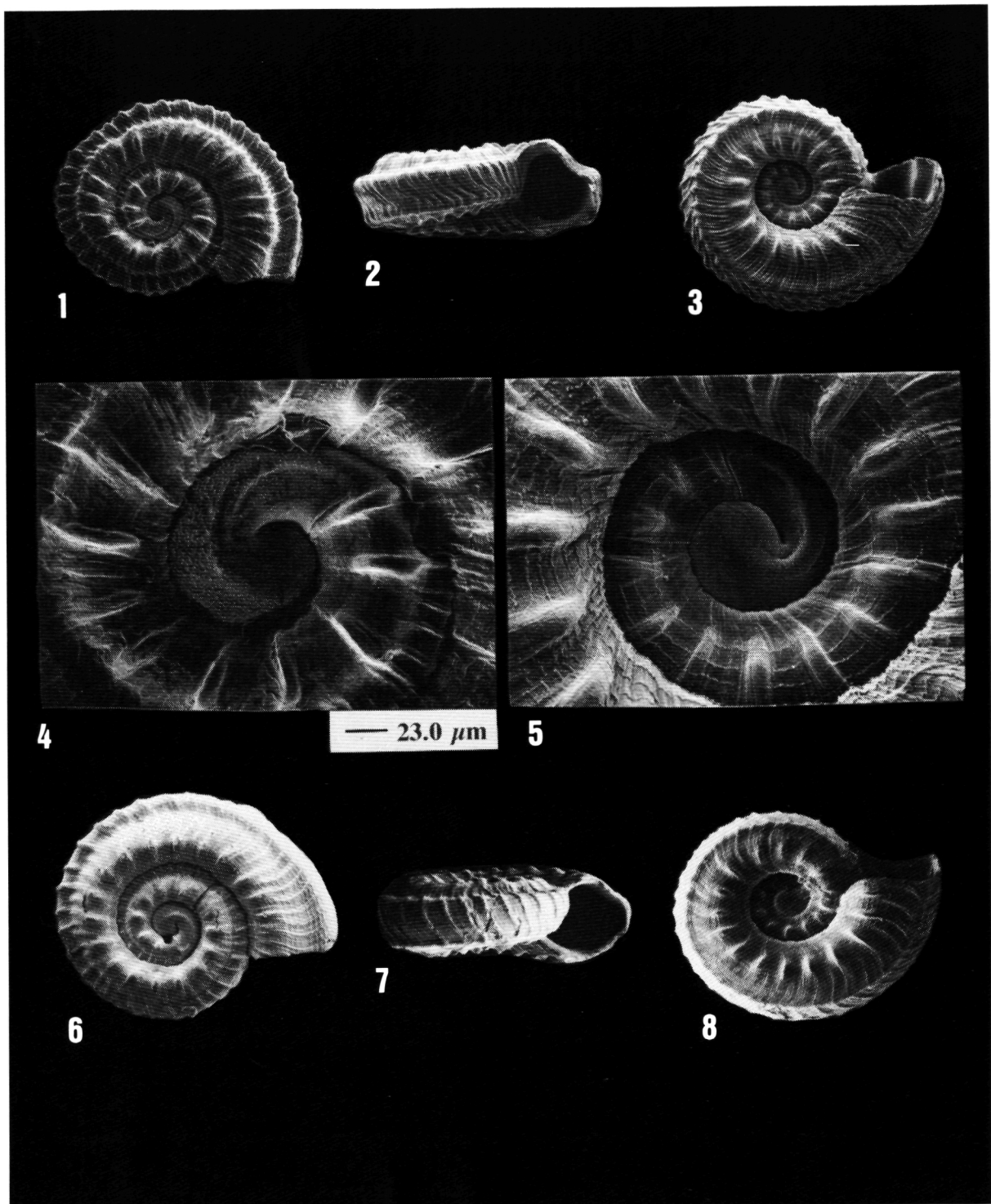
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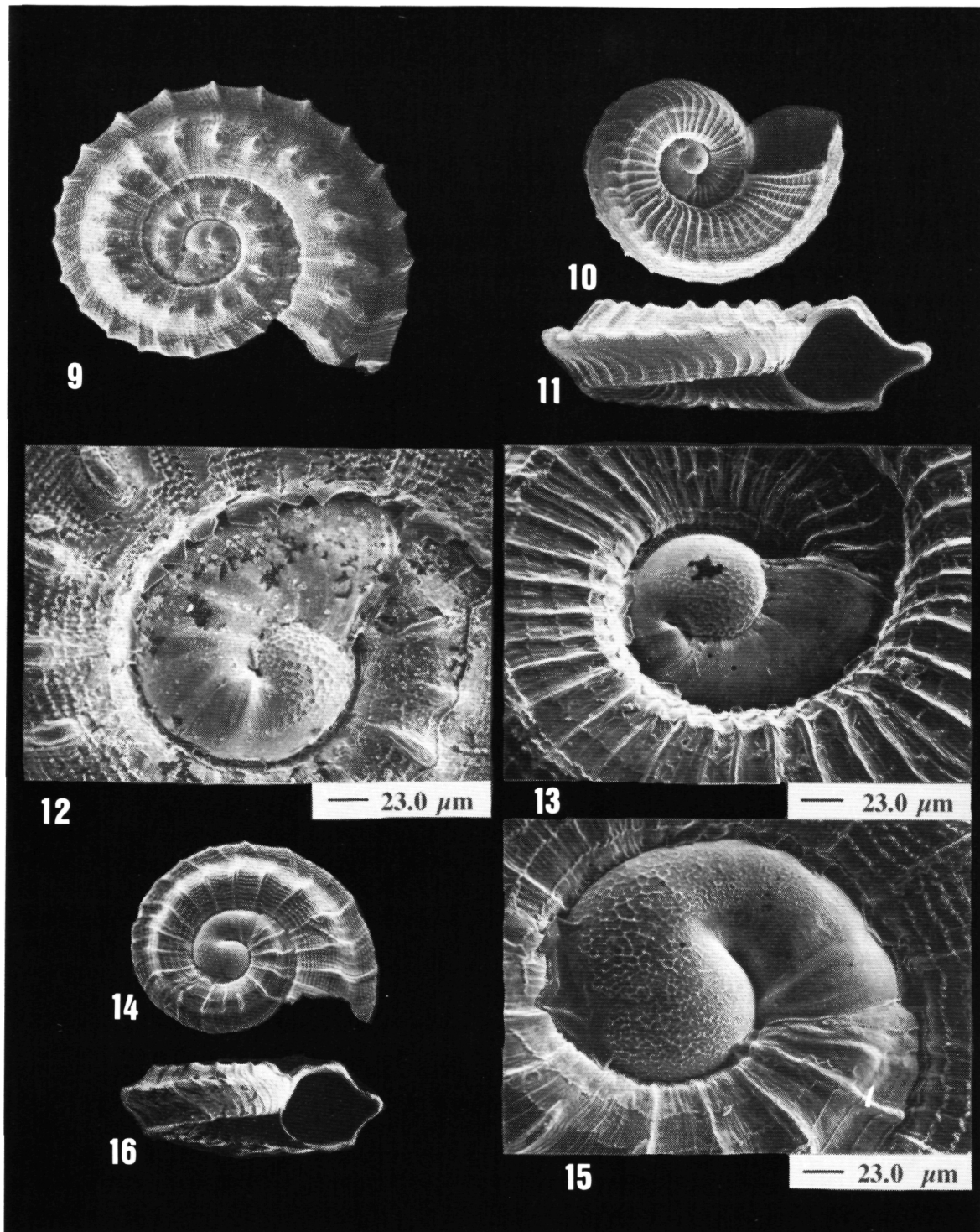
APPENDIX: In the final stage of this paper, a congress lecture was published in *Venus* 51(1-2), 1992: 133-135 by S. Kaneko. He figured two unidentified orbitestellids from Japan which definitely belong to the genus *Boschitestella*. Whether these are conspecific with the Oman species needs further research.

REFERENCES

- AGUAYO, C.G. & P. BORRO. 1946. Nuevos moluscos del Terciario Superior de Cuba. *Rev. Soc. Malac.* 4: 9-12.
- FABER, M.J. 1991. *Cyclostremiscus bermudezi*: first record of a recent member of the Orbitestellidae (Gastropoda, Prosobranchia) in the Caribbean. *APEX* 6(3-4): 77-79.
- KAY, E.A. 1979. Hawaiian marine shells, reef and shore fauna of Hawaii. Bernice P. Bishop Museum, Honolulu: 1-653.
- PONDER, W.F. 1990. The anatomy and relationship of the Orbitestellidae (Gastropoda: Heterobranchia). *J. Moll. Stud.* 56: 515-532.
- ROLAN, E. & F. RUBIO. 1992. Two new species of the genus *Orbitestella* Iredale, 1917 from the Atlantic Ocean. *La Conchiglia* 23(262): 17-20.
- TURTON, W.H. 1932. The marine shells of Port Alfred, South Africa. Oxford University Press, London: 1-331.

Figs 1-8. (opposite page) *Orbitestella bermudezi* (Aguayo & Borro, 1946). 1-5. Oman, Al Hallaniyah, Sta. 91/60. 1. Dorsal view, width 0.50 mm. 2. Lateral view, height 0.2 mm. 3. Ventral view, width 0.60 mm. 4-5. Detail of protoconch, dorsal and ventral view. 6-8. Red Sea, Nuweiba, X.1992. 6. Dorsal view, width 0.55 mm. 7. Lateral view, height 0.2 mm. 8. Ventral view, width 0.55 mm.





Figs 9-13. *Boschitestella donaldi* n.sp., Oman, Haramal, Sta. 91/83. 9. Dorsal view of paratype 1, Width 0.76 mm. 10. Ventral view of paratype 2, Width 0.58 mm. 11. Lateral view of holotype, height 0.26 mm. 12-13. Details of protoconch, dorsal and ventral views of paratype 1.

Figs. 14-16. *Boschitestella eloiseae* n.sp., Oman, Al Hallaniyah, Sta. 91/60, holotype. 14. Dorsal view, width 0.55 mm. 15. Details of protoconch. 16. Lateral view, height 0.20 mm.