
**SAMARANGIA LEWINSOHNI, A NEW SPECIES FROM THE RED SEA
(BIVALVIA, VENERIDAE)**

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Abstract: A new species of *Samarangia* characterized by a pseudo-sculpture showing only three nodular radial ribs on the posterior part of the agglutinated sand and silt cover of the valves is described as *Samarangia lewinsohni* from the Red Sea. The new species is compared with the only other known recent species *Samarangia quadrangularis* (A. Adams & Reeve, 1850).

Keywords: Mollusca, Veneridae, *Samarangia*, taxonomy, distribution, Red Sea.

Introduction

In the waters of the Red Sea occurs an interesting Venerid species of which the exterior of both valves is covered by a thick layer of firmly agglutinated sand and silt grains. In addition these valves are adorned with a pseudo-sculpture consisting of three radially arranged, nodular ribs at the posterior part. This species has been listed as *Samarangia quadrangularis* (A. Adams & Reeve, 1850) in Oliver (1992) and Zuschin & Oliver (2003), while Dekker & Orlin (2000), Singer & Mienis (2008) and Singer (2008) recorded it as *Samarangia* species.

Samarangia quadrangularis was originally described as *Venus quadrangularis* by A. Adams & Reeve (1850: 79, pl. 24, fig. 7) from a single specimen obtained in waters of the "Corean Archipelago". The figured holotype was probably cleaned of the sand grains cemented to the valves before Adams & Reeve could study it because they did not mention that peculiar feature in the description. Fischer-Piette & Vukadinovic (1977: 127, pl. 22, figs. 207-211) share the opinion that the original holotype had been cleaned of its outer layer before it was described.

Additional material collected in the Yellow Sea, East China Sea or the Sea of Japan (Clench, 1942: figs. 2-3; Kuroda, 1945: fig. 1; Okutani, 2000: pl. 503, fig. 35) has shown that the *Samarangia* species inhabiting the waters in that part of the world are all covered with a thick layer of cemented sand grains and in addition the artificial cover of the valves is adorned with 10-12 well developed raised radial pseudo-ribs of which at least always the most posterior ones show also well developed tubercles.

Similar shells with ten or more raised radial pseudo-ribs from other areas in the Indo-Pacific have been illustrated in Habe & Kosuge (1966), Drivas & Jay (1988), Lamprell & Whitehead (1992) and Abbott & Dance (2000),

If this layer is removed artificially from a valve then it reveals that the latter has in fact a completely smooth surface and is covered by a very thin periostracum (A. Adams & Reeve, 1850: pl. 24, fig. 7; Clench, 1942: fig. 1; Kuroda, 1945: fig. 3; Habe & Kosuge, 1966: pl. 64, fig. 12; Keen, 1969: Fig. E146-7c; Fischer-Piette & Vukanidovic, 1977: pl. 22, fig. 209-210).

Since the Red Sea material seems to differ not only in particulars of the pseudo-sculpture covering the exterior of the valves but also by slight changes in the general outline and most probably also in its colour, it is here described as a new species.

Material

This study is based primarily on material from the Red Sea present in the Mollusc Collections of the Tel Aviv University (TAU MO) and the Hebrew University of Jerusalem (HUJ). In addition material has been studied in the private collections of members of the Israel Malacological Society.

Material from other areas was received on loan from the Museum of Comparative Zoology, Cambridge, or could be studied on the spot in the Zoological Museum of Amsterdam.

Description

Family Veneridae Rafinesque, 1815

Subfamily Samarangiinae Keen, 1969

Genus *Samarangia* Dall, 1902

Type species by original designation *Venus quadrangularis* A. Adams & Reeve, 1850.

Synonym: *Petroderma* Kuroda, 1945. Type species by original designation *Petroderma thaanumi* Kuroda, 1945, which was considered a synonym of *Samarangia quadrangularis* (sic!) by Kuroda & Habe (1952: 30), see also Kuroda (1960: 66) and Habe (1977: 259).

Samarangia lewinsohni new species – Figs. 1-holotype, and 2-paratype.

Samarangia quadrangularis: Oliver, 1992: 181, pl. 44, figs. 3a-b.

Samarangia species: Dekker & Orlin, 2000: 15.

Samarangia quadrangularis: Zuschin & Oliver, 2003: 154, pl. 47, figs. 11a-b.

Samarangia species: Singer & Mienis, 2008: 2, pl. 2, fig. 22.

Samarangia species: Singer, 2008: 7.

Holotype

Gulf of Aqaba, Israel Elat, off Coral Beach Reserve, 30 m., leg. D. Blum, September 1988 (TAU MO 72642).

Paratypes

Gulf of Aqaba, Israel, Elat, off Coral Beach Reserve, 40-50 m, leg. D. Blum, 1988 (TAU MO 72641; HUIJ 53127); idem, 30 m, leg. D. Blum, September 1988 (HUIJ 53128); idem, 25 m, leg. S. Lavy, 1989 (TAU MO 72643); idem, 20 m, leg. D. Blum, 1990 (TAU MO 60390).

Additional non-type material chiefly collected by D. Blum and S. Lavy in the same area off Elat is or was present in the private collections of D. Blum (deceased), M. Fainzilber, E.L. Heiman, E. Holzer, D. Korkos, S. Lavy (deceased), J. Rappoport (deceased), B.S. Singer and I. Yeruslavski (deceased).

Additional literature records: Israel & Egypt, Gulf of Aqaba, off the East coast of the Sinai Peninsula (Singer & Mienis, 2008: 2; Singer, 2008: 7); Egypt, Safaga, Northern Bay (Zuschin & Oliver, 2003: 154); Saudi Arabia, Duba (Oliver, 1992: 181).

Type locality

The type locality of *Samarangia lewinsohni* is situated in the Gulf of Aqaba, Israel, Elat, off the Coral Beach Reserve, where this species is irregularly encountered at depths between 20-50 m.

Diagnosis

A species belonging to the genus *Samarangia* characterized by only three tubular radial ribs on the agglutinated sand and silt coating on the posterior part of each valve, a more rounded posterior edge and a uniformly pale cream coloured shell below the coating.

Description

Fairly large shells of up to 88 mm in length, of a sub-quadrate to oval outline; shell surface smooth except for irregularly spaced concentric growth lines, the exterior of the valves of a very pale cream colour, periostracum thin, of a darker cream colour than the valves; the entire valves are encrusted by a very thick and hard layer of agglutinated sand grains mixed with silt, the posterior part of this cemented sand cover shows three well developed raised ridges with irregularly spaced tubular nodules; in addition the sand cover shows irregularly spaced concentric ridges, which are best developed towards the ventral and posterior margin. Interior of the shells white with a very thin cream coloured rim all around; the pallial line is without a sinus.

Measurements

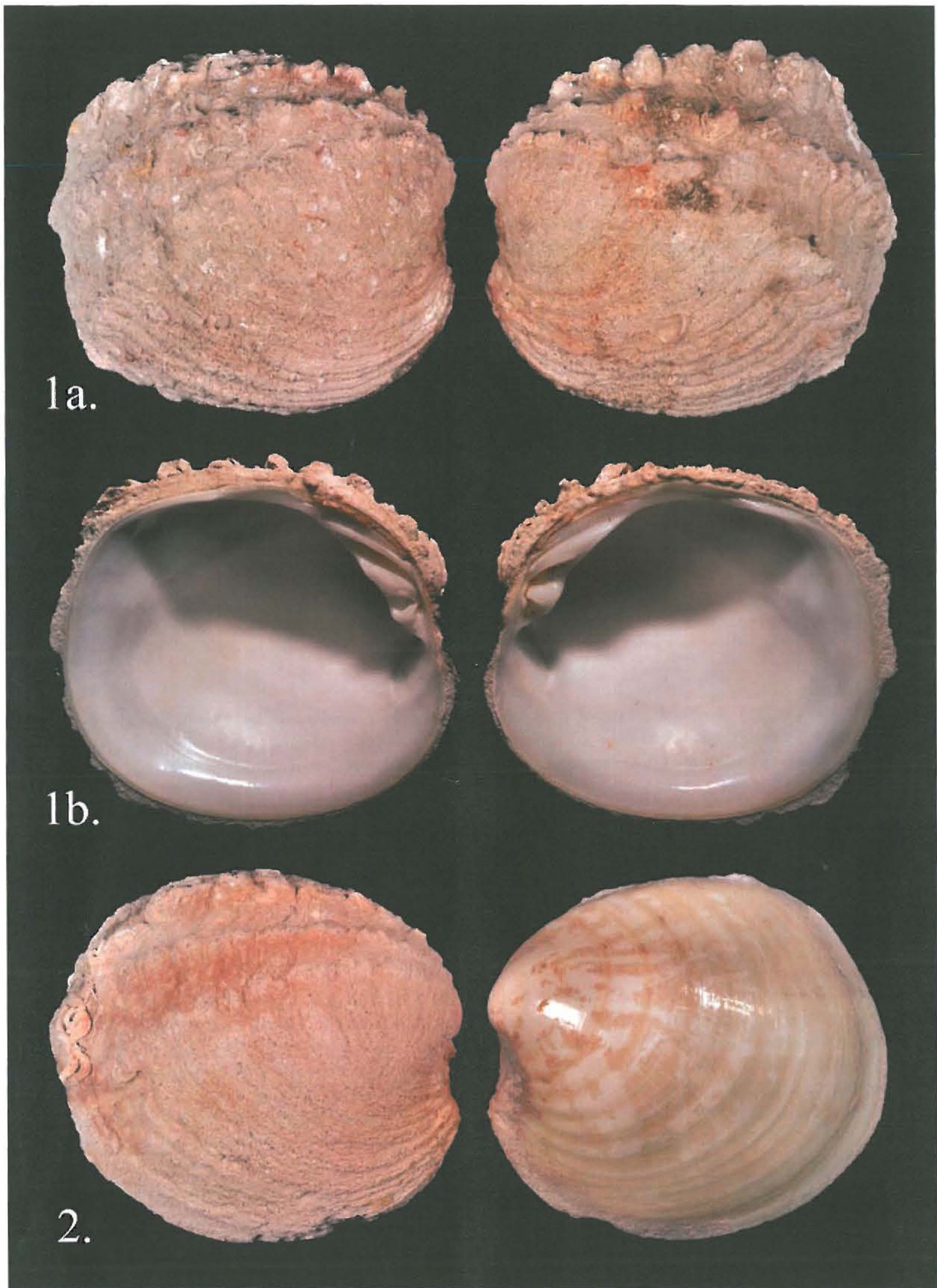
Collection	Length	Height	Breadth	Remarks
TAU MO 72642	72.5	66.3	45.1	Holotype
TAU MO 72641	87.6	76.9	54.8	Paratype
HUIJ 53127	78.9	67.5	40.2	Paratype
HUIJ 53128	67.2	56.7	34.4	Paratype
TAU MO 72643	59.2	51.9	28.2	Paratype
TAU MO 60390	58.7	52.9	33.4	Paratype

Discussion

All the shells so far mentioned in the literature from the Red Sea or seen in various collections in Israel show a formation of only three heavy posterior radial ridges in the sand/silt encrusted layer which covers the entire exterior of the valves.



3: *Samarangia quadrangularis* (A. Adams & Reeve, 1850), copy of the original holotype collected in the "Corean Archipelago". The shell was obviously cleaned from its normally agglutinated sand crust covering the entire valves.



Figs. 1-2: *Samarangia lewinsohni* new species. Figs. 1a-d: Gulf of Aqaba, Israel, Elat, off Coral Beach Reserve, 30 m depth, actual size 72.5 x 66.3 mm (Holotype TAU MO 72642); Figs. 2a-b: Gulf of Aqaba, Israel, Elat, off Coral Beach Reserve, 40 m depth, actual size 87.6 x 76.9 mm, left valve cleaned off the cemented sand particles (Paratype TAU MO 72641).

Etymology

The species is named after the marine zoologist and specialist in the field of Crustaceans, in particular Decapoda, Prof. Chanan Lewinsohn (1926-1983), who passed away far too early. Prof. Lewinsohn carried out extensive dredging operations throughout the whole Gulf of Aqaba, from Elat in the north to off Tiran Island in the south, during the late sixties of the 20th Century. This material contained a wealth of deep water molluscs.

The presence of only three radial ridges differentiate the Red Sea specimens from those found in the Indo-Pacific where they number usually from 10-12 (Clench, 1942: plt. 6, figs. 2-3; Kuroda, 1945: plt. 1, figs. 1-4; Drivas & Jay, 1988; Lamprell & Whitehead, 1992: plt. 70, fig. 548; Abbott & Dance, 2000: 360; Okutani, 2000: 1011, plt. 503, fig. 35).

In addition the posterior part of specimens from the Red Sea is more rounded than in those from the Korean-Japanese area where the type of *Smaragdia quadrangularis* had been collected. The holotype of the latter (Fig. 3: copy of the original type figure) shows two axial pink (according to the description), but pale violet (in the original illustration) coloured radial blotches on the umbonal region, which are absent in the Red Sea specimens.

Most likely we are dealing in the case of *Samarangia quadrangularis* with a species-complex of which one: *Samarangia lewinsohni*, has now been separated.

Distribution

Samarangia lewinsohni has been reported so far only from the Red Sea area.

Ecology and behaviour

This bivalve seems to live offshore at depths of 20-50 m in a biotope consisting of a mixture of sand and silt. After settling the tiny juveniles start almost immediately to cement sand and silt grains to the exterior of the shells. This agglutinated layer covers the exterior of the shell completely at both sides. The layer is not evenly thick over the whole surface since from the beginning they produce also a pseudo-sculpture in this layer consisting of three axial rays which carry prominent tubercles. These nodules are strongest developed on the first posterior pseudo-rib. This process of cementing grains and silt to the outer surface of the valves has been described in full detail for *Samarangia quadrangularis* sensu lato by Taylor et al. (1999).

Natural predators

The late D. Blum (in litt.) observed a case of predation of *Samarangia lewinsohni* by a large specimen of a *Chicoreus* species. Although he mentioned specifically *C. ramosus* (Linnaeus, 1758), more likely *C. erythraeus* (P. Fischer, 1870) (= *C. virgineus* auct. not Röding, 1798, recorded from the Red Sea) was involved, the latter is much more commonly encountered in the Elat area.

Additional remark

Taylor et al. (1999: Fig. 1D) figure a specimen with a pseudo-sculpture of only three tubular ribs on the posterior part of a shell collected at a depth of 50 m off New Caledonia in the Pacific Ocean. That shell seems to look rather similar to shells found throughout the Red Sea. The present of similar shells elsewhere in the Indo-Pacific needs therefore some further investigation.

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References

- Abbott, R.T. & Dance, S.P., 2000. Compendium of Seashells. 7th Ed. 411 pp. Odyssey Publishing, El Cajon.
Adams, A. & Reeve, L., 1848-1850. Mollusca. In A. Adams (Ed.): The Zoology of the Voyage of H.M.S. Samarang under the command of Captain Sir Edward Belcher, 1-87, 24 pls. Reeve, Benham & Reeve, London.
Clench, W.J., 1942. A remarkable development of pseudo-sculpture on a bivalve. The Nautilus, 55: 73-74, plt.6.
Dall, W.H., 1902. Synopsis of the family Veneridae and of the North American species. United States National Museum, Proceedings, 26: 335-412, pls. 12-16.
Dekker, H. & Orlin, Z., 2000. Check-list of Red Sea Mollusca. Spirula, 47 (Supplement), 46 pp.

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- Drivas, J. & Jay, M., 1988. Coquillages de la Réunion et de l'île Maurice. 159 pp. Times Editions/Les Editions du Pacifique, Singapore.
- Fischer-Piette, É. & Vukadinovic, D., 1977. Suite des Révisions des Veneridae (Moll. Lamellibr.) Chioninae, Samaranginae et Complément aux *Venus*. Mémoires du Muséum National d'Histoire Naturelle, (A) 106: 3-186, 22 plts.
- Habe, T., 1977. Systematics of Mollusca in Japan. Bivalvia and Scaphopoda. 372 pp. Zukan-no-Hokuryukan, Tokio.
- Habe, T. & Kosuge, S., 1966. [Shells of the World in Colour, Volume 2: the Tropical Pacific]. 193 pp, 68 plts. Hoikusha, Osaka. [in Japanese]
- Keen, A.M., 1969. Superfamily Veneracea Rafinesque, 1815. In Moore, R.C. (Ed.): Treatise on Invertebrate Paleontology, Part N. Volume 2, Mollusca 6, Bivalvia: N670-N690. The Geological Society of America, Inc. & The University of Kansas.
- Kuroda, T., 1945. [New Japanese shells (6)]. *Venus*, 14: 29-42, plts.1-2. [in Japanese]
- Kuroda, T., 1960. A Catalogue of Molluscan Fauna of the Okinawa Islands (exclusive of Cephalopoda). 106 pp, 3 plts.
- Kuroda, T. & Habe, T., 1952. Check list and bibliography of the recent marine Mollusca of Japan. 210 pp. L.W. Stach, Tokyo.
- Lamprell, K. & Whitehead, T., 1992. Bivalves of Australia, Volume 1. 182 pp. Crawford House Press, Bathurst.
- Okutani, T., 2000. Marine Mollusks in Japan. 1173 pp. Tokay University Press, Tokyo.
- Oliver, P.G., 1992. Bivalved Seashells of the Red Sea. 330 pp. Verlag Christa Hemmen, Wiesbaden & National Museum of Wales, Cardiff.
- Singer, B.S., 2008. A diagnostic aid to "Shells of East Sinai, an illustrated list: Veneridae. Part 1". *Triton*, 18: 5-7.
- Singer, B.S. & Mienis, H.K., 2008. Shells of East Sinai, an illustrated list: Veneridae. Part 1. *Triton*, 18: 1-4.
- Taylor, J.D., Glover, E.A. & Braithwaite, C.J.R., 1999. Bivalves with 'concrete overcoats': *Granicorium* and *Samarangia*. *Acta Zoologica*, 80: 285-300.
- Zuschin, M. & Oliver, P.G., 2003. Bivalves and bivalve habitats in the northern Red Sea. The Northern Bay of Safaga (Red Sea, Egypt): An actuopalaontological approach. VI. Bivalvia. 304 pp. Naturhistorisches Museum Wien.

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