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***Spondylus avramsingeri*: a new species from the Red Sea**

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Abstract: A new taxon of **Spondylidae** from the Gulf of Aqaba, Red Sea is described: *Spondylus avramsingeri* sp. nov.. This species was mistakenly treated as an eroded *Spondylus spinosus* Schreibers, 1793 or *Spondylus lamarckii* Chenu, 1845. The main characteristic features that distinguish this species from other *Spondylus* species are described.

Introduction: A study of the **Spondylidae** living in the Gulf of Aqaba and the Red Sea in general revealed some confusion concerning the correct identification of a species which was mistakenly treated as an eroded *Spondylus spinosus* Schreibers, 1793 or as a *Spondylus lamarckii* Chenu, 1845. This species turned out to be a yet undescribed species. The main two characteristic features that distinguish it from other *Spondylus* species will be discussed in this paper. The copy of the type material Chenu used as the Holotype for *Spondylus lamarckii* is shown at the end of this paper.

Material: This study is based on material from Israeli Malacological Society members, old and new collections (15 specimens), and 12 specimens that the author personally collected in the Gulf of Aqaba, Red Sea.

Spondylus avramsingeri sp. nov.

Type material: Holotype (53 x 46 x 25 mm) MT.2309 and three paratypes (MT.2310-MT.2312) in the Royal Belgian Institute for Natural Sciences (RBINS).

Type locality: East Sinai Coast, Gulf of Aqaba, Red Sea. On rocks at about 25 metres.



Spondylus avramsingeri Holotype. Length 53mm, width 46mm, height 25mm.

Left: lower valve. Middle and right: exterior and interior of upper valve.



Figs 1-2; Live *Spondylus avramsingeri*. Night dive at 31m. Sinai, Red Sea.

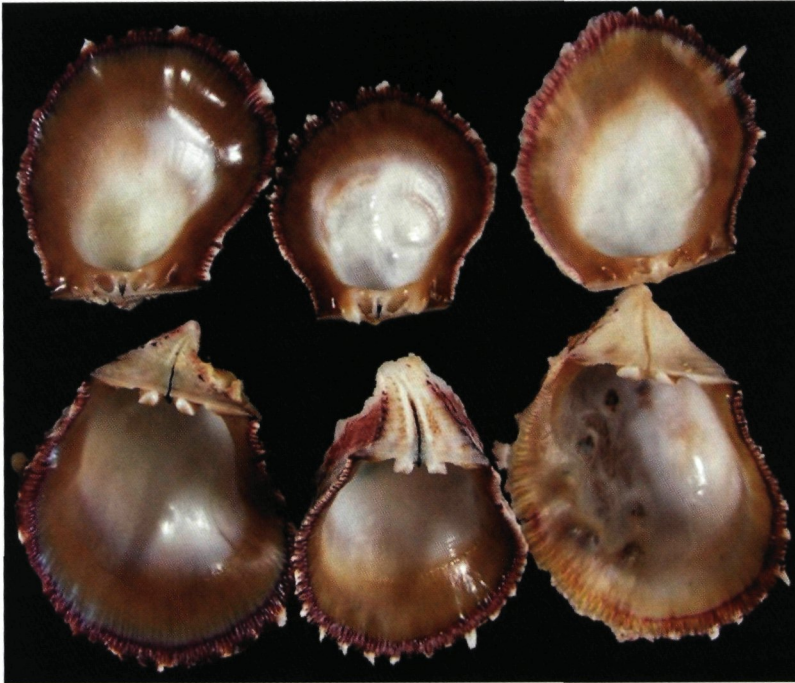


Fig. 3: Lower and upper valves of *Spondylus avramsingeri*.



Fig. 4: Upper view of *Spondylus avramsingeri*.

Description: Elongated oval shell, both valves are asymmetrical. The upper valve is relatively flat and looks very eroded. Sculpture of 6 to 40 strong principal white ribs. Some shells have very small or short and sharp spines on a part of the upper valve. In some cases the long white ribs grow beyond the valves and then look like small sharp spines (Fig. 11). Umbonal area creamy or white. In some cases the upper valve is white with purple blotches (Fig. 12). The lower valve is cap-like in shape (when attached to natural surfaces) with 6 to 40 spineless white ribs. Specimens that grow on artificial surfaces (wrecks or metal structures) have a flatter lower valve. In these cases the area of attachment extends over the entire base of the shell. The lower valve has a distinct flattish triangular plate anterior to the hinge. There is a slit that runs down the triangular plate to its apex. The basic colour is deep purple or maroon.

Size: The average size of the studied specimens was 50mm, 2 specimens reached 69mm and 71mm. All specimens over 60mm were found on artificial surfaces.

Habitat: From all my personal observations I can state that it is definitely a deeper water specimen. Below 20 metres it is very common, sometimes even in large colonies. In the shallows it is very hard to find. As common in many other *Spondylus* species it can be found on every available hard surface (artificial structures, rocks, stones, and corals).

Distribution: All specimens collected for this work were found in the Gulf of Aqaba in the Red Sea. So far there are no records from the southern part of the Red Sea. The only record from the Gulf of Suez is in the new book "Seashells of the Egyptian Red Sea" (2008) page 203 as *Spondylus marisrubri* Röding, 1798. It is still hard to say whether this specimen is present in the entire Indo-pacifi.

Etymology: *Spondylus avramsingeri* is named in honour of Mr. Abraham Singer, one of the senior members of the Israel Malacological Society, shell collector and diver.

Comparison: There are two main characteristic features that differentiate this species from *Spondylus spinosus* Schreibers, 1793 and *Spondylus lamarckii*, Chenu, 1845:

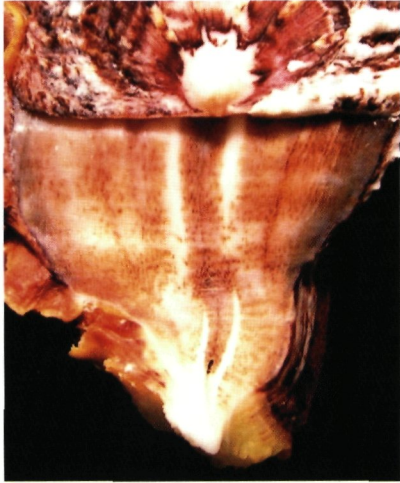
1. The interior: Internally white-greyish with a deep purple crenulated ring and a wide brown inner band, which may cover half of the interior. This brown band is only present in this species (among the Red Sea species). The interior of *S. spinosus* is pearly white with a dark purple crenulated ring on the edge of the aperture. In premature specimens the purple ring is much brighter. A similarity with the interior of *S. avramsingeri* can be found in mature and thickened specimens of *S. smythae* Lamprell, 1998 (= *S. marisrubri* Röding, 1798) where brown blotches may be present.



Left: Fig. 5: Upper valve of *S. spinosus* (left) and *S. avramsingeri* (right).

Right: Fig. 6: Lower valve of *S. spinosus* (left) and *S. avramsingeri* (right).

2. The cardinal triangular area (Cardinal triangular area: the smooth, flattish, triangular area anterior to the hinge of the lower valve): The cardinal triangular plate area has a slit, which starts from the ligament area and starch down the triangular plate to the apex. This slit is also present in another specimen: *Spondylus smythae* Lamprell, 1998, but the cardinal triangular slit in addition to the big interior brown band makes a sure identification, since this slit and interior band are not present in *S. spinosus* or in *S. lamarckii* or in any other species.



Left: Fig. 7: The cardinal triangular area of *S. spinosus*.

Right: Fig. 8: The slitted cardinal triangular area of *S. avramsingeri*.

Spondylus smythae Lamprell, 1998 (syn.: *S. marisrubri* Röding, 1798) cannot be identified as *S. avramsingeri* because of the huge morphological differences between the two species. However, in mature and large specimens of *S. smythae* it is possible to find the interior not to be entirely white. The auricle ears area at the umbo are very

narrow. The lateral teeth are larger and massive. The main recognizable feature of *S. smythae* Lamprell, 1998 that differs from the other *Spondylus* species is the V-shaped black callused ridge on both sides of the shell, starting from behind the auricles and extending to about the earliest part of both valves, as shown in Figs 16-17.

Discussion: For many years collectors have treated this species as *Spondylus spinosus* Schreibers, 1793. On consulting Mr. H. Mienis, he pointed out that this species might be *Spondylus lamarckii* Chenu, 1845. In his book, page 46, Lamprell (1987) described a *Spondylus lamarckii* but the description does not match the Holotype Chenu (1845) used in his work. A very important feature like the cardinal slit was not mentioned in Lamprell's (1987) description at all.

The research of the specimen that Chenu (1845) used for the Holotype (Holotype 1089/2) turns out not to have the same recognized features (interior wide band and the triangular area slit) as the specimens from the Red Sea. In his description of *Spondylus spinosus* Schreibers (1793) did not mention either of these two features. Figs 5-6 clearly show the difference between *S. spinosus* and *S. avramsingeri*.

Some collectors suggested that the wide brown band may be a juvenile feature, but as clearly seen in Figs 12-13 a very small specimen is attached to a much larger and more mature specimen and both of them have the same typical recognizable feature.

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Further figures:



Figs 9-10: two Red Sea forms of *Spondylus spinosus*.
In the interior of the left specimen is no inner wide band.

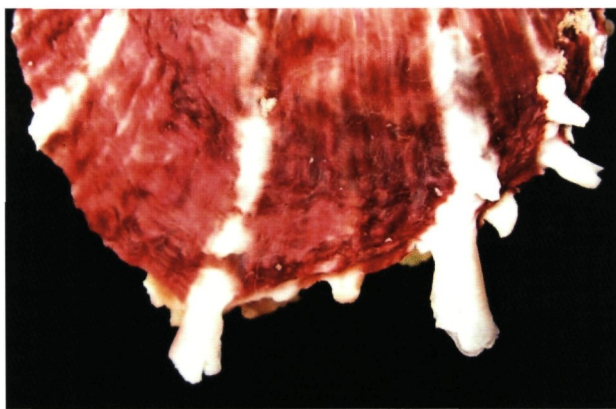
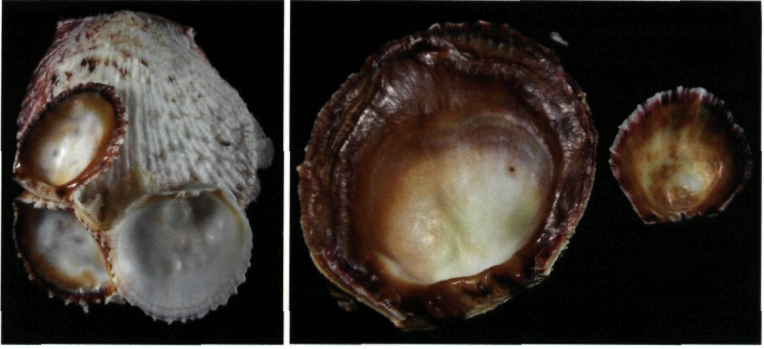


Fig 11: detail of the white spines.



Figs 12-13: Juvenile specimens keep the same identification features as mature specimens. Inner wide band and cardinal slit. Fig. 12 shows a very small *S. avramsingeri* and a lower valve of *S. nicobaricus* attached to a large *Spondylus avramsingeri*.



Figs 14-15: the exterior and interior of *S. smythae* and *S. avramsingeri*.



Figs 16-17: Typical ctenolium line of *S. smythae*

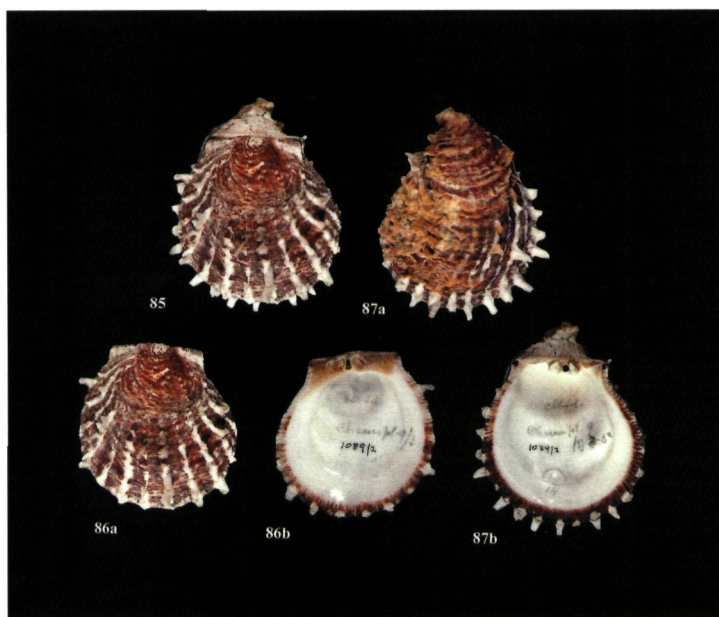


Fig. 18: *Spondylus lamarckii* Chenu, 1845. Holotype. Specimen 1089/2.
It is clear that both recognizable features of *Spondylus avramsingeri* are not present on this original Holotype used by Chenu to describe *S. lamarckii*.