Zootaxa 2095: 57–59 (2009)
www.mapress.com/zootaxa/

Correspondence

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A new species of *Depressizona* and the family rank of Depressizonidae

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The microscopic scissurellids are being currently revised; scissurellids is used here for the small Vetigastropoda formerly classified in Scissurelloidea, but which has been shown to be a polyphyletic assemblage (e.g., Geiger 2008, Geiger & Thacker 2005). Geiger (2003) presented an overview, where the new monotypic subfamily, genus, and species were introduced: Depressizoninae with *Depressizona exorum* Geiger, 2003. Here a second species in the genus is described, which also helps to justify the family-level rank of the group.

Standard techniques for scanning electron microscopy were used (see Geiger *et al*. 2007). Abbreviations: AMS: Australian Museum Sydney, Australia. BMNH: The Natural History Museum, London, Great Britain. MNHN: Muséum national d'Histoire naturelle, Paris, France. NMNZ: Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand. USNM: United States National Museum, Smithsonian Institution, Washington (DC), USA.

Depressizonidae Geiger, 2003

Diagnosis. Shell calyptraeiform. Teleoconch with beaded sculpture, selenizone above periphery, slit closed to foramen. Umbilicate, brood pouch absent.

***Depressizona* Geiger, 2003**

Type species. *Depressizona exorum* Geiger, 2003 (OD).

Diagnosis. As for family.

***Depressizona axiosculpta* n. sp.**
(Fig. 1)

Type material. Holotype (AMS C.461464: Fig. 1), 1.08 × 0.80 × 0.55 mm (L × W × H).

Type locality. SE of Tongatapu, Tonga, 21.345˚S, 175.042˚W, 260 m.

Etymology. Named because of the pronounced axial sculpture on the shell.

Description. Shell calyptraeiform, moderately thick. Protoconch unknown (eroded). Teleoconch I whorls unknown. Teleoconch II of approximately 1.1 whorls. Shoulder flat, without recognizable sculpture. Base with weak constriction below selenizone, strong angulation at mid base forming periphery; approximately 13 axial lamellae visible near periphery only; weak spiral lines between selenizone and periphery; on underside from adjacent to periphery to umbilicus series of strongly beaded spiral cord, weakly beaded spiral line, approximately three spiral lines. Umbilicus wide, open. Selenizone above periphery; keels strong, low; slit closed to foramen (larger due to shell damage in holotype), anteriorly closed by raphe. Aperture D-shaped, roof overhanging; peristome thickened, recurved, with fine spiral lines over thickened portion. Soft parts unknown.

Differential diagnosis. *Depressizona exorum* from Easter Island has a much thinner shell, lacks the strong axial lamellae at the periphery and none of the three known specimens have a thickened apertural margin.

Distribution. Only known from type locality.

Remarks. The only known specimen is in poor condition, but sufficiently distinct to be assigned to the genus *Depressizona* due to the depressed shell with sharp basal margin, and the foramen in the shell. The specimen can be recognized as a new species. The strong axial sculpture with lamellar projections at the basal periphery is not present in

Accepted by B. Ruthensteiner: 18 Apr. 2009; published: 8 May 2009

D. exorum, the type of the thus far monotypic genus. Having examined the vast majority of scissurellids available from the Pacific Ocean (AMS, BMNH, MNHN, NMNZ, USNM as main collections), it is unlikely that better specimens are to be located any time soon.

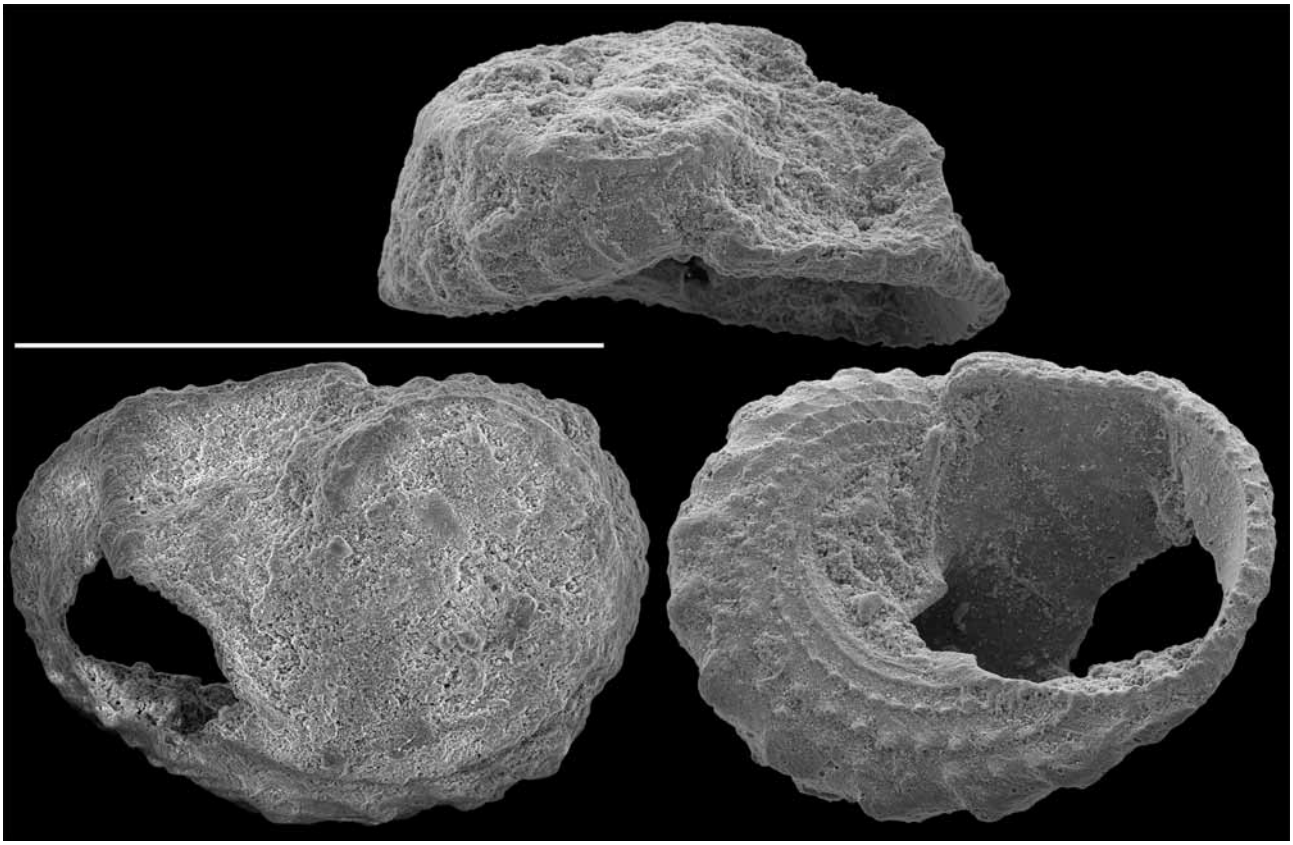

FIGURE 1. Holotype of *Depressizona axiosculpta* n. sp. SE of Tongatapu, Tonga, 21.345˚S, 175.042˚W, 260 m, (AMS C.461464). Scale bar = 1 mm.

Some may question the wisdom of describing a new species on a single worn specimen without anatomical data. Specimens of similar or even worse quality are regularly described in paleontology, and attempts at classifying those specimens are executed as well as possible. Anatomical data such as radular patterns are commonly held to be indicative of higher systematic placement. In scissurellids, this presumption is demonstrably questionable. For one, the most common radular pattern is most likely the plesiomorphic condition of Vetigastropoda (Geiger & Thacker 2005), and second, highly divergent radulae are found in conchological congeners (Geiger & Sasaki 2008). Although anatomical data may well provide insights, it is not guaranteed that they actually do. As is true in systematics in general, the here presented arguments are subject to revision when more data become available. In addition, this description may well bring to light new specimens that are currently lying dormant in someone's collection. The description of *Orthotheres haliotidis* Geiger & Martin, 1999 (Crustacea: Pinnotheridae) in a tropical abalone was met early on with much skepticism, but this commensal is now known to occur at infestation rates of up to 50% (E. Capinpin pers. comm. 2000). Bouchet & Rocroi (2005) synonymized Depressizonidae under Scissurellidae without comment or justification. However, the overall calyptraeiform shell shape is certainly as different from Scissurellidae as that of Temnocinclidae and Sutilizonidae. Additionally, the beaded sculpture is unknown in other scissurellids, further supporting the distinctness of Depressizonidae as a family. Anatomidae have a trochoid shell, an open slit, and the selenizone is at the periphery of the shell. Scissurellidae usually have a trochoid shell, and the limpet shape of *Incisura* is attained by strongly increased expansion rate of the shell, but maintains the height of the shell. In Depressizonidae, however, the axis is compressed, while the expansion rate of the shell is comparable to that of typical Scissurellidae. In Temnocinclidae, the limpet shape is also attained by strongly increased expansion rate of the whorl, but retaining the height of the shell. All species of Temnocinclidae are endemic to the hydrothermal vent environment. Sutilizonidae have a stronger expansion rate than Depressizonidae, and the axis is at a 45˚ angle to the apertural plane, maintaining more of the height of the shell. The protoconch in Sutilizonidae is pitted, whereas Depressizonidae have flocculent sculpture (sculpture only

known for *D. exorum*). All sutilizonid species are endemic to the hydrothermal vent environment. Larocheidae lack a slit, foramen, or selenizone.

The elevation of subfamily to family is due to the overall elevation of ranks of former scissurellid subfamilies to full families: Scissurellidae, Anatomidae, Larocheidae, Temnocinclidae and Sutilizionidae are now all treated as families (Geiger 2008, Geiger & Jansen 2004, Geiger & Thacker 2005). Depressizonidae is as distinct from any of those families, as they are from one another. It is recognized that the change in rank per se has no meaning with regard to phylogenetic relations, and is only carried out to keep the overall classification in balance.

This manuscript has benefited from the critical comments of the editor, Diego Zelaya, and an anonymous reviewer.

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