



## ***Gebrukothuria profundus*, a new genus and species of laetmogonid holothurian (Elasipodida, Laetmogonidae) from around the Crozet Plateau in the Southern Indian Ocean\***

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### **Abstract**

A new genus and species of laetmogonid holothurian (Elasipodida, Laetmogonidae), collected from around the Crozet Plateau in the Southern Indian Ocean, is described. It differs from other members of the family in that the body wall lacks the wheel-shaped calcareous deposits completely. Instead only rods are present. The genus is also distinguished by the combination of other morphological characters lacking in other known genera: absence of circum-oral and ventrolateral papillae together with development of midventral tube feet. All other members of the family Laetmogonidae are known to have wheel-shaped deposits, therefore diagnosis of the family is refined.

**Key words:** Laetmogonidae, Holothuroidea, deep sea

### **Introduction**

Material collected on the RRS *Discovery* 300 cruise around the Crozet Islands (December 2005–January 2006) contained 47 different species of holothurians mainly from the order Elasipodida and the family Synallactidae (order Aspidochirotida). Six species were found which were undescribed species, including *Gebrukothuria profundus*, a new genus and species of laetmogonid holothurian described here.

The family Laetmogonidae Ekman, 1926 consists of five genera: *Apodogaster* Walsh, 1891, *Benthogone* Koehler, 1896, *Laetmogone* Théel, 1879, *Pannychia* Théel, 1882 and *Psychronaetes* Pawson, 1983. According to the last diagnosis of the family given by Hansen (1975), laetmogonids are characterised by small wheel-shaped deposits in the body wall and, in addition, scattered rods or (in *Laetmogone violacea* Théel, 1879) spinous crosses. The genus *Gebrukothuria* differs from all other known genera of the family by both the absence of wheels and the presence of numerous rods in the body wall. A revised diagnosis of the family Laetmogonidae is given.

### **Taxonomy**

Order Elasipodida Théel, 1882

Suborder Deimatina Hansen, 1975

Family Laetmogonidae Ekman, 1926

*Diagnosis.* Deposits wheel-shaped, scattered rods or (in *Laetmogone violacea*) spinous crosses or (in *Gebrukothuria*) rods only. Tube feet conspicuous, evenly distributed along entire ventrolateral radii, never fused into a brim. Midventral tube feet present or absent. Papillae numerous, placed along dorsal radii or dorsal and ventrolateral radii; papillae on dorsal radii free, on ventrolateral radii (if present) free or fused. Circum-oral papillae present or absent. Calcareous ring reduced or not calcified. Gonad composed of numerous branched ducts and tubules.

*Remarks.* Hansen (1975) assigned the families Deimatidae and Laetmogonidae to the suborder Deimatina. These families show similarities in the absence of primary cross-shaped deposits and presence of numerous large papillae and tube feet; the latter never form a brim. The family Laetmogonidae differs from Deimatidae by the absence of perforated plates or their derivatives (e.g. spatulated rods) and by gonads composed of numerous branched tubules instead of a single cluster of unbranched tubules. All deimatids possess ventrolateral papillae whereas in the Laetmogonidae only two species have them: *Apodogaster alcocki* Walsh, 1891 has ventrolateral papillae forming a brim above the ventrolateral tube feet and *Pannychia moseleyi* Théel, 1882 has free ventrolateral papillae. Almost all known deimatids have 18–20 tentacles in mature specimens, except for one specimen of *Orphnurgus glaber* Walsh, 1891 in which only 15 tentacles were found. Many representatives of the family Laetmogonidae develop 15 tentacles: seven species of *Laetmogone*, *Psychronaetes hansenii* and the new genus and species, *Gebrukothuria profundus*.

***Gebrukothuria* gen. nov.** Rogacheva and Cross

*Type species: Gebrukothuria profundus* sp. nov. Rogacheva and Cross

*Diagnosis.* Body elongated, dark violet in colour. Tube feet: 18 on each ventrolateral ambulacra, evenly distributed. Midventral tube feet tiny. About 65 dorsal papillae along the length of each of the dorsal radius; 2 additional rows of papillae present in anterior part of dorsum. Tentacles 15. Circum-oral papillae absent. Anus dorsal, subterminal. Deposits in body wall, papillae, tube feet and tentacles only rods with blunt, pointed or rounded ends, 0.09–0.35 mm long, rarely bearing small spines.

*Etymology.* The genus is named after Dr. Andrey Gebruk of the P.P. Shirshov Institute of Oceanology in Moscow, Russia for his numerous contributions to holothurian studies, and in particular for his work on the taxonomy of deep-sea holothurians.

***Gebrukothuria profundus* sp. nov.** Rogacheva and Cross

Fig. 1–2

*Type locality.* Southern Indian Ocean, to east of Crozet Isles, 45°40'S, 56°35'E, 4269–4275 m.

*Holotype:* NHM, Cat. Nr. NHM 2008.993, held at Natural History Museum, London. *Discovery* St. 15773#23, 45°40'S, 56°35'E, 4269–4275 m mud bottom, collected 16<sup>th</sup> December, 2005 by semi-balloon otter trawl (single specimen preserved in 4% buffered formaldehyde and then transferred to 80% ethanol).

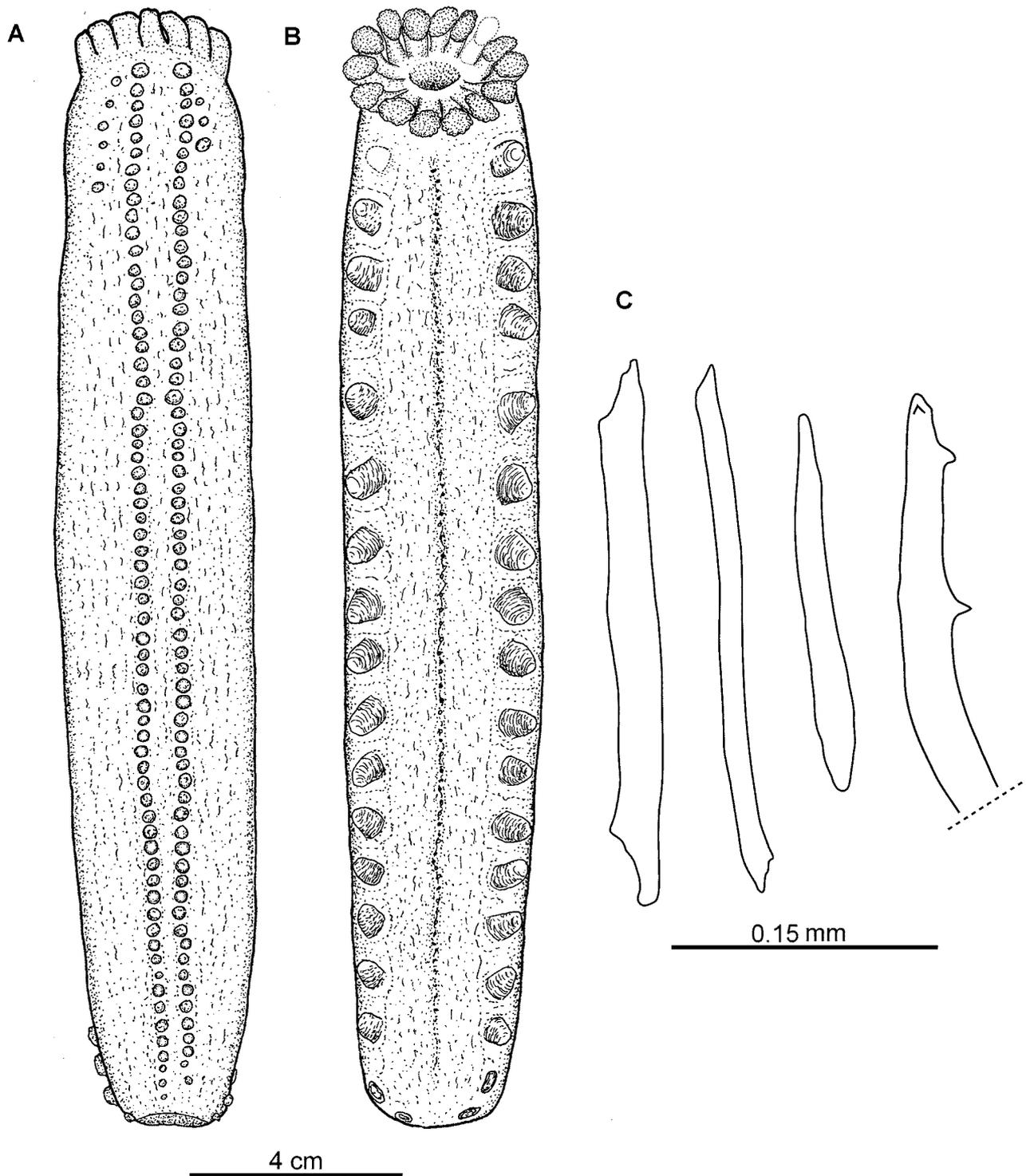
*Diagnosis.* As for the genus.

*Etymology.* The name *profundus* means 'deep' and it corresponds to the bathymetric range of this species: *Gebrukothuria profundus* is among the deepest known laetmogonids. Only *Laetmogone wyvillethomsoni* Théel, 1879 and *Psychronaetes hansenii* occur at greater depths—4410 m and 4800–5200 m respectively.

*Description.* Body elongated, 21 cm long, attaining a maximum width of 3.6 cm in the middle part of the body. Colour in alcohol uniform dark violet. Skin relatively thin, wrinkled (Fig. 1; A, B; Fig. 2: A, B, D).

Tube feet 18 on each side, conspicuous, separate not forming a brim; located evenly along the ventrolateral radii; almost not evident when viewed from dorsal surface; tube feet in the middle of the body slightly larger than others; the 2 posteriormost tube feet of each side are significantly smaller in size. Midventral tube feet tiny, located in a narrow channel which is probably a result of contraction.

Anus dorsal, sub terminal.



**FIGURE 1.** *Gebrukothuria profundus* gen. nov., sp. nov., holotype. A, dorsal view; B, ventral view; C, body wall deposits.

Dorsal papillae approximately 65 on each dorsal radius, evenly distributed. Papillae small, of equal size; retracted into long longitudinal wrinkles (Fig. 2: D). 2 additional irregular rows of papillae on both dorsal radii on the anterior part of the body; papillae of these irregular rows are smaller than others (Fig. 1: A). Rows of papillae occur close to each other; some of the posteriormost papillae are slightly smaller than others.

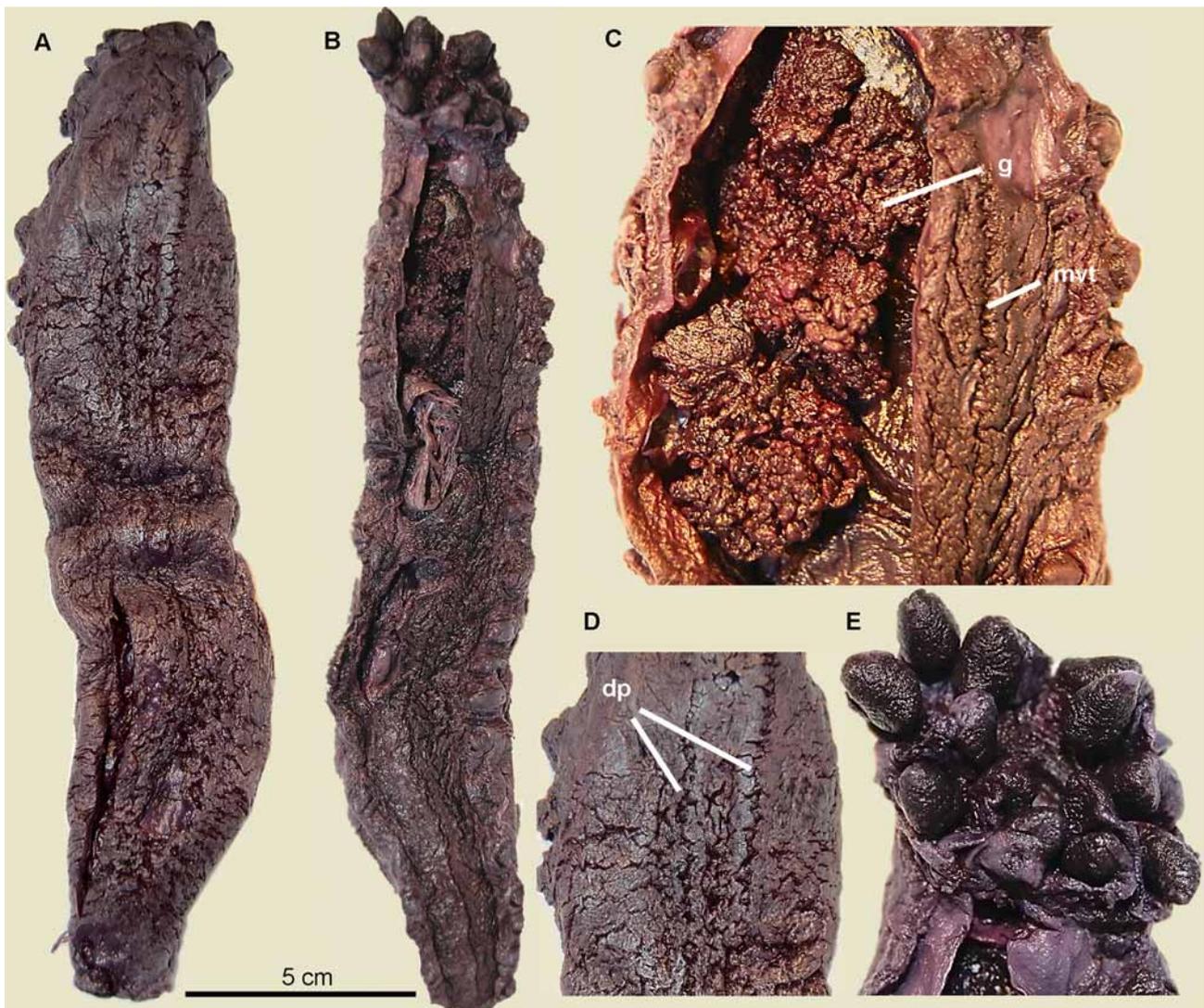
Tentacles 15; tentacle disk slightly convex with conspicuous knobs on the disk margin (Fig. 2: E).

Circum-oral papillae absent.

Deposits consist of rods in body wall (Fig. 1: C), papillae, tube feet and tentacles; not abundant in the body wall. Wheels never observed. The rod-shape deposits in the body wall are 0.09–0.35 mm in length. They are curved, often tetrahedral in cross section, with few spines close to the ends or without spines; a few with larger, blunt spines or knobbed processes. Rods in papillae abundant, between 0.09–0.3 mm, some with irregular blunt spinous processes, knobbed ends, or spear-like tips, rarely with a central swelling. Abundant deposits in tentacles and tube feet, tending to be in the upper size-range and thicker than those found in the body wall and papillae. Blunt spinous processes and central swellings common in deposits from tube feet and tentacles. Deposits absent in the gonad.

Calcareous ring not present.

Gonad consisting of clusters of multi-branched tubules (Fig. 2: C).



**FIGURE 2.** *Gebrukothuria profundus* gen. nov., sp. nov., holotype. A, dorsal view; B, ventral view; C, gonads; D, fragment of dorsum; E, tentacles. dp, dorsal papillae; g, gonads; mvt, midventral tube feet.

*Remarks.* The specimen is referred to the family Laetmogonidae based on the morphology of gonads consisting of clusters of branched tubules. Also rods found in *G. profundus* resemble rods typical for species of the genus *Laetmogone*. We suggest that the absence of wheels in the body wall was not a result of preservation history. Wheels in laetmogonids are relatively large compared to in other elasipodids, and if destruction of deposits took place, it is likely rods would dissolve first (before massive wheels). Furthermore

we found no traces of wheels. In the Laetmogonidae wheels are abundant and if they were present it is likely we would have seen traces of them. The absence of wheel-shaped deposits in this specimen is sufficient to consider it as representing a new genus.

*Relationships.* Based on the presence of midventral tube feet and absence of ventrolateral papillae, *Gebrukothuria profundus* most resembles species of *Pannychia* and *Laetmogone*. It differs from the *Pannychia* by the absence of wheel-shaped deposits and ventrolateral papillae. It differs from *Laetmogone* by the absence of wheel-shaped deposits and the presence of midventral tube feet.

The specimen is similar in appearance to another Antarctic holothurian, *Benthodytes browni* Vaney, 1908, known from one specimen in the Antarctic. Hansen assigned this specimen to the family Laetmogonidae based on discrete and cylindrical tube feet with a strictly ventral position. However, Hansen did not refer it to any genus or species in the family because the specimen lacked deposits. Nevertheless, *G. profundus* differs from *Benthodytes browni* by possessing a higher number of dorsal papillae and tube feet.

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