

## First finding of a widely distributed Antarctic chiton species (Mollusca: Polyplacophora) in the North Pacific

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**ABSTRACT.** For the first time, the widely spread Antarctic species *Leptochiton antarcticus* was found at the Emperor Seamounts in the North Pacific Ocean. In spite of a large distance between the Emperor Seamounts and Antarctica, the found specimen have very similar shell, girdle, radula and gill features to the type material. I propose that *L. antarcticus* spread to the North Pacific from the Antarctic via a deep-water current near the ocean floor, and perhaps it inhabits the slopes of islands and continents from the South Ocean to the Emperor Seamounts.

The genus *Leptochiton* Gray, 1847 includes both shallow and deep-water species. Typically, the shallow-water species have limited geographic distribution. For example, most Mediterranean and north-east Atlantic species do not spread into the north-west Atlantic [Kaas, Van Belle, 1985]. Distribution of the deep-water species is less known because of fewer findings and smaller study areas where they were found.

*Leptochiton antarcticus* Sirenko, 2015 is widely distributed around the whole Antarctica at depths of 87 to 1,524 m [Sirenko, 2015]. The species is found mainly deeper than 300 m, and may be considered a deep-water species.

In 1984, I took part in the 33<sup>rd</sup> cruise of R/V *Odissey* and found four specimens of deep-water chitons on the Emperor Seamounts in the North Pacific. Two of these specimens were collected in 1060 m depth by a geological dredge near Ojin Seamount (37°55'06"N, 170°28'E). They were identified as *Leptochiton macleani* Sirenko, 2015. Two more specimens were collected from a stone in 1,150 m depth lifted by a dredge near Nintoku Seamount (40°54'07"N, 170°33'07"E). One chiton was 5.0 mm long (BL) and was identified as *L. macleani*. Second chiton with BL 4.5 mm was identified as *L. antarcticus* after examination with the scanning electron microscope (Fig. 1). Herein I

compare this specimen with the type material from the Antarctica kept in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZISP) (holotype ZISP 2250 and two paratypes, ZISP 2251 and ZISP 2252).

In spite of a large distance between the Emperor Seamounts in the North Pacific Ocean and Antarctica, the new specimen has very similar shell, girdle, radula and gill to those of the type material. The specimens is most similar to a paratype (ZISP 2251) having the same body length (4.5 mm). Its valves have the same elevation ratio of 0.40, very similar to



FIG. 1. *Leptochiton antarcticus*, Emperor Seamounts, BL – 4.5 mm, dorsal view.

РИС. 1. *Leptochiton antarcticus*, Императорские горы, BL – 4.5 мм, вид сверху.

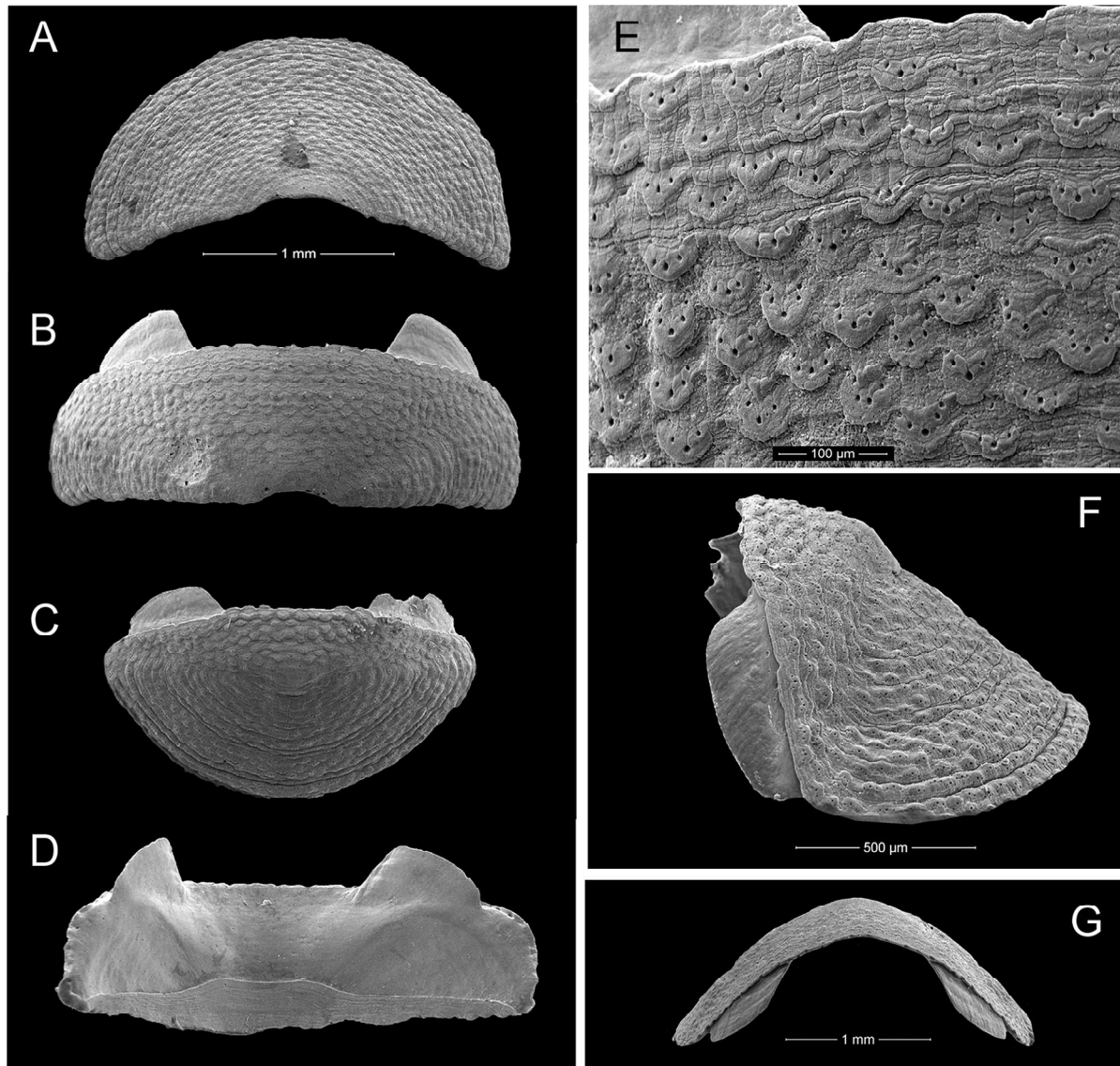


FIG. 2. *Leptochiton antarcticus*, Emperor Seamounts, BL – 4.5 mm: **A.** Valve I, dorsal view. **B.** Valve V, dorsal view. **C.** Valve VIII, dorsal view. **D.** Valve IV, ventral view. **E.** Valve V, tegmentum sculpture in central area. **F.** Valve VIII, right lateral view. **G.** valve V, rostral view.

РИС. 2. *Leptochiton antarcticus*, Императорские горы, BL – 4.5 мм: **A.** Щиток I, с дорсальной стороны. **B.** Щиток V, с дорсальной стороны. **C.** Щиток VIII, с дорсальной стороны. **D.** Щиток IV, с вентральной стороны. **E.** Щиток V, скульптура тегмента в центральном поле. **F.** Щиток VIII, вид справа. **G.** Щиток V, вид с рострума.

the shape of the valves and the sculpture of the tegmentum, especially in the absence of granules on the lateral areas (Figs 2, 3A,C) [Sirenko, 2015: figs 5B, 6A]. New specimen has dorsal scales with 13–14 ribs and the other scales and needles also resemble typical *L. antarcticus* (Fig. 3 A–D). The radula of the Pacific specimen is also very similar to that of paratype (Fig. 4). The head of the major lateral tooth has a small ledge on its outer edge similar to the ledge of the paratype [Sirenko, 2015: figs 4H and 7B, C]. The Pacific specimen also have seven gills on each side, arranged from valve VI to the anus.

It is here proposed that *L. antarcticus* spread to

the North Pacific from the Antarctica via a deep-water current near the ocean floor. The Antarctic cold waters are distributed along the bottom in the Northern part of the Pacific ocean [Deacon, 1937]. In this direction species with floating larvae as well as brooding species apparently spread. Perhaps *L. antarcticus* inhabits the slopes of islands and continents from the South Ocean to the Emperor Seamounts. The hypothesis of the Antarctic species spreading to the north is supported by the data for several other groups of animals, such as Crustacea, Holothuroidea and Pycnogonida [Kussakin, 1967; Belyaev, 1974; Brandt, 1991; Kuznetsov, Turpaeva, 1998].

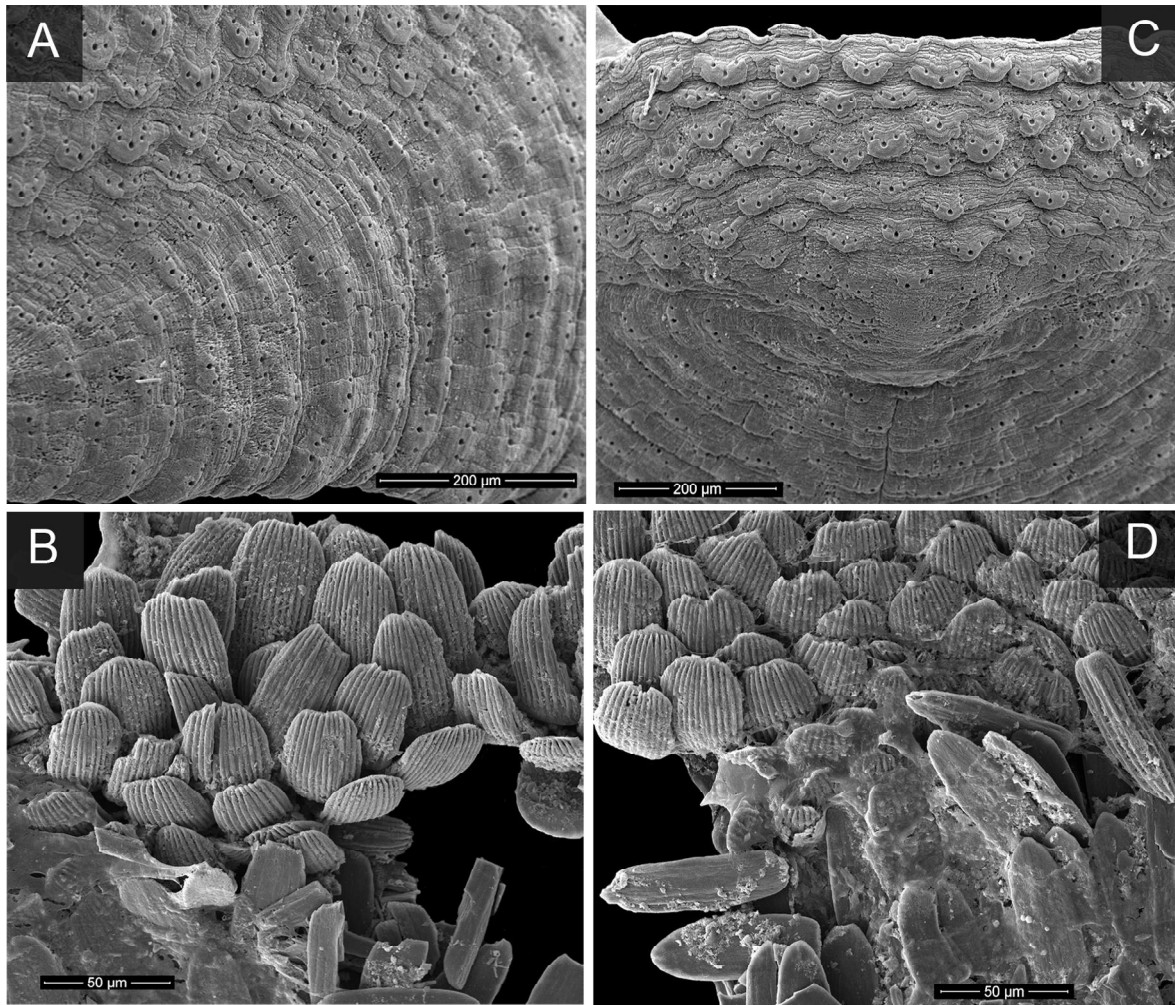


FIG. 3. *Leptochiton antarcticus*, Emperor Seamounts, BL – 4.5 mm: **A.** Valve V, tegmentum sculpture on lateral area. **B.** Dorsal and ventral scales. **C.** Valve VIII, tegmentum sculpture in antemucronal and postmucronal areas. **D.** Dorsal, marginal and ventral scales.

РИС. 3. *Leptochiton antarcticus*, Императорские горы, BL – 4.5 мм: **A.** Щиток V, скульптура тегмента на латеральном поле. **B.** Дорсальные и вентральные чешуйки. **C.** Щиток VIII, скульптура тегмента на антемукрональном и постмукрональном полях. **D.** Дорсальные, маргинальные и вентральные чешуйки.

It is interesting to note that the findings of *Leptochiton macleani* which was described from Peru-Chile Trench, on the Clarion-Clipperton Zone [Wiklund *et al.*, 2017] as well as our new findings of this species on the Emperor Seamounts significantly expand its range to the Pacific Ocean.

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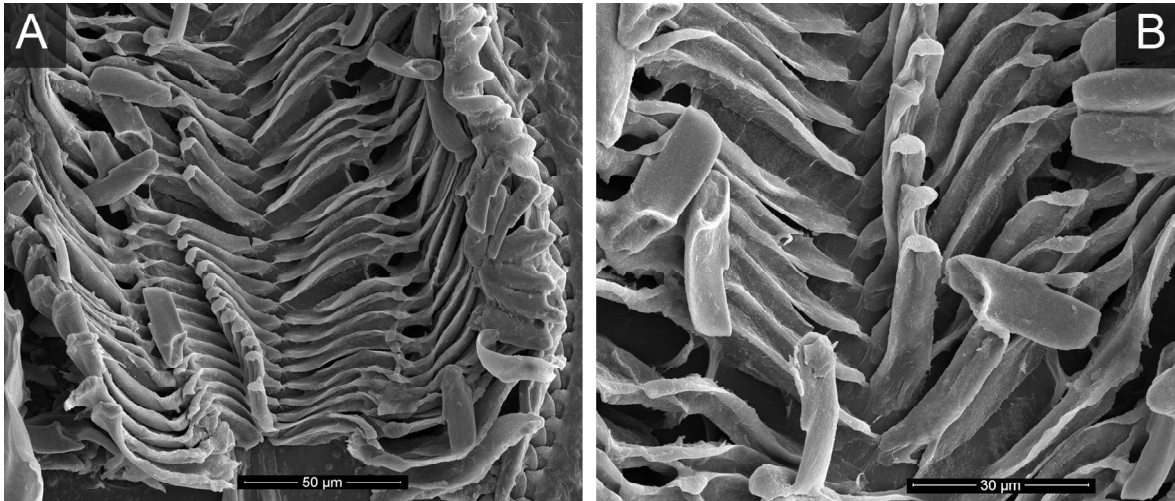


FIG. 4. *Leptochiton antarcticus*, Emperor Seamounts, BL – 4.5 mm: **A.** Radula. **B.** Central, first lateral teeth and head of major lateral teeth of radula.

РИС. 4. *Leptochiton antarcticus*, Императорские горы, BL – 4.5 мм: **A.** Радула. **B.** Центральные, промежуточные зубы и наконечники крючковых зубов радулы.

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Первая находка широко распространенного антарктического вида хитонов (Mollusca: Polyplacophora) в северной Пацифике

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**РЕЗЮМЕ.** Широко распространенный антарктический вид *Leptochiton antarcticus* впервые найден на севере Тихого океана на Императорских горах. Несмотря на огромное расстояние между Императорскими горами и Антарктидой, найденные экземпляры очень сходны по основным признакам раковины, перинотума, радулы и жабр с таковыми типового материала. Предполагается, что *L. antarcticus* проник в северную Пацифику с придонным глубоководным течением из Антарктики и, возможно, сейчас этот вид заселяет склоны островов и материков от Южного океана до Императорских гор.

