

A New Species of *Leptochiton* (Mollusca: Polyplacophora) from Shallow Water of the Andaman Sea

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Abstract A new chiton species, *Leptochiton myeikensis* n. sp. is described from the southern Myeik (Mergui) Islands, Andaman Sea, Myanmar. This is the fifth species of the genus *Leptochiton* from tropical shallow waters. The new species is distinguishable from other congeners by the sculptures of tegmentum and girdle scales, and shape of the radula teeth.

Key words: chiton, Myeik Islands, Myanmar, Indian Ocean, new species, taxonomy.

Introduction

The genus *Leptochiton* has large species richness, including 140 species (Molluscabase) which are distributed in the world seas. However, there is no record of *Leptochiton* species from the shallow water of the Andaman Sea (Kaas and Van Belle, 1985; 1998; Schwabe, 2006). This absence is due not only to a lack of research in this region, but also the scarceness of *Leptochiton* species in the tropical shallow waters (Sirenko and Schwabe, 2011): so far only four species were known from the vast area of the global tropics (Leloup, 1981; Schwabe and Lozouet, 2006; Sirenko and Schwabe, 2011; Sirenko and Saito, 2020). This paper describes a new species of the genus *Leptochiton* collected from the shallow water of the Myeik (Mergui) Islands, Myanmar coast in the Andaman Sea.

Material and Methods

The collected specimen was fixed and preserved

in 75% ethanol. The valves, girdle scales and spicules, and the radula were observed by the scanning electron microscope (SEM) JEOL-LV6380, Jeol Co., Tokyo. Preparation for the examination by SEM followed Sirenko (2020) with modification: girdle elements (hyponotum and perinotum) and radula were dried with a critical point dryer JCPD-5, Jeol Co. The girdle scales and spicules, and a part of the radula were observed also with light microscope, AxioImager[®] M1 light microscope with AxioCam[®] HRC image capture equipment controlled by AxioVision[®] ver. 4.8, Carl Zeiss, Jena. Those hard parts were mounted on glass slides with Entellan neu[®] Merck, Darmstadt. Drawings were made based on the images obtained with both SEM and light microscope.

Taxonomy

Class Polyplacophora Gray, 1821
Order Lepidopleurida Thiele, 1909
Family Leptochitonidae Dall, 1889
Genus *Leptochiton* Gray, 1847

1803 (non Linnaeus, 1767) = *Leptochiton asellus* (Gmelin, 1791) *fide* Lovén (1846), subsequent designation by Gray (1847).

***Leptochiton myeikensis* n. sp.**

(Figures 1–5)

Type locality. Andaman Sea, Maung Yin Island, southern Myeik Islands, Myanmar, 10.7657°N, 98.0580°E, 15.6 m.

Type depository. Department of Zoology, National Museum of Nature and Science, Tsukuba.

Etymology. From the name of the locality, Myeik Islands.

Material examined. Holotype: NSMT-Mo 79255, ethanol preserved specimen, part of girdle and radula mounted on glass slides and brass stubs for SEM, body length 4.3 mm, collected from the Andaman Sea, Maung Yin Island, southern Myeik Islands, Myanmar, 10.7657°N, 98.0580°E, 15.6 m, underside of dead coral piece on coarse shell sand, by H. Saito with scuba, 16 February 2020.

Diagnosis. Animal very small. Shells moderately elevated, round-backed. Central area with longitudinal rows of semi-fused granules with wide interspaces. Each granule also connected to granules of both sides with weakly raised commarginal ridges. Girdle dorsally densely covered with small, bent, imbricating, round-topped scales which are ornamented with 12–16 sharp ribs. Radula with ca. 80 transverse rows of very small teeth; central tooth narrow, taller than first lateral teeth; head of major lateral teeth with two denticles.

Description. Animal very small, 4.3 mm in body length, elongate-oval. Valves moderately elevated (dorsal elevation 0.30 in valve IV), round-backed, not beaked. Color of tegmentum and girdle light beige; soft parts reddish hue in living animal.

Head valve semicircular; anterior slope slightly concave. Intermediate valves rectangular, rounded in lateral margins, slightly convex in anterior margin, nearly straight in posterior mar-

gin; lateral areas not raised. Tail valve semicircular, narrower than head valve (width ratio: head valve/tail valve = 1.08); mucro central; antemucronal slope slightly convex; postmucronal slope almost straight.

Tegmentum of head valve, lateral areas of intermediate valves and postmucronal area of tail valve sculptured with radial rows of small, oval, raised granules, which are semi-fused with continuous granules by low, narrow ridges; number of radial rows 55, 6–8 and 37, respectively. Central area of intermediate valves and antemucronal area of tail valve sculptured with longitudinal rows of oval, flat-topped granules, which are semi-fused with continuous granules as those on the head valve, and also connected to granules of both sides with weakly raised commarginal ridges; the number of rows 32 and 25, respectively. Aesthete pore group on each granule in central and antemucronal areas comprising one megal aesthete and 4–5 micraesthetes on each side. In head valve, lateral areas and postmucronal area, of one megal aesthete and 3–4 micraesthete pores on each side at basal portion of granules; some of frontal micraesthete pores may be obscured below the granule in dorsal view. Articulation thin, white. Apophyses small, triangular in intermediate valves, rectangular in tail valve, widely apart.

Girdle narrow, dorsally densely covered with small round-topped scales, up to $40 \text{ (length)} \times 62 \text{ (width)} \mu\text{m}$, bent, imbricating, ornamented with 12–16 strong, occasionally bifurcated ribs, and scattered long needles, up to $230 \times 12 \mu\text{m}$, with fine longitudinal grooves, although they may be caused by destruction during preparation for observation. Marginal fringe with two kinds of elongate scales: wider type attaining to $80 \times 21 \mu\text{m}$, obtusely pointed at the top, truncated at the base, sculptured with 4–5 strong, longitudinal riblets extending from near the base to the tip; other type narrower, attaining to $70 \times 12 \mu\text{m}$, more pointed at the tip, sculptured with 2–3 longitudinal riblets also extending to the tip. Ventrally girdle covered with scales similar to wider marginal scales, but shorter, longitudinal riblets

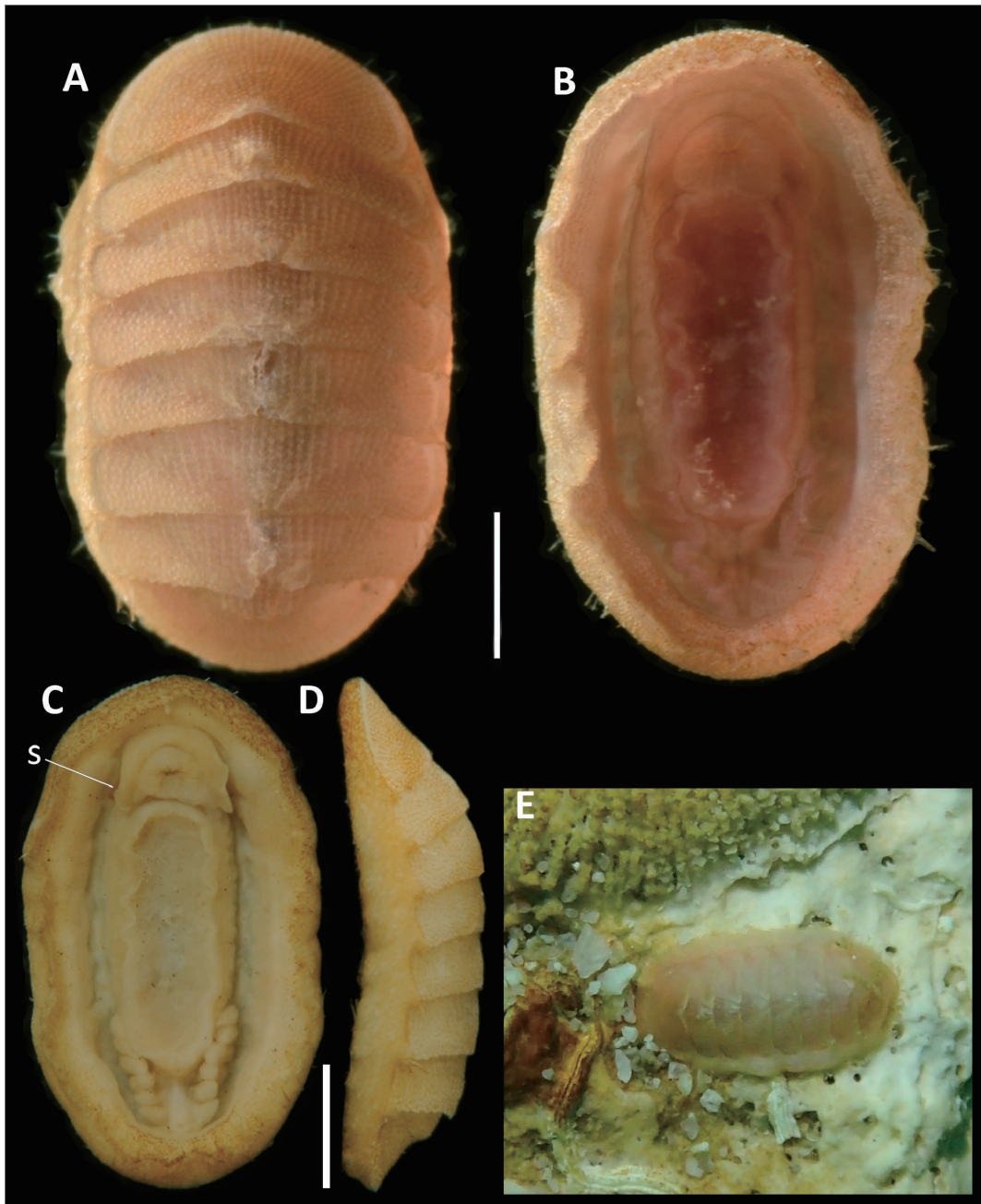


Fig. 1. *Leptochiton myeikensis*, holotype (NSMT-Mo 79255), Andaman Sea, Maung Yin Island, Myeik Islands, Myanmar, BL 4.3 mm. A, B. specimen in life, dorsal and ventral views; C, D. specimen in preserved condition, ventral and lateral views (s: Schwabe organ); E. specimen in situ, underwater photograph. Scale: 1 mm.

not extending to the tip. Ventral scales becoming shorter, more roundish, and having weaker sculpture towards pallial groove; surface of those along pallial groove almost smooth.

Gills seven per side, arranged from valve VI to anus.

Schwabe organ (Sigwart *et al.*, 2014) present on both side of oral lappets (Fig. 1C, s), brownish.

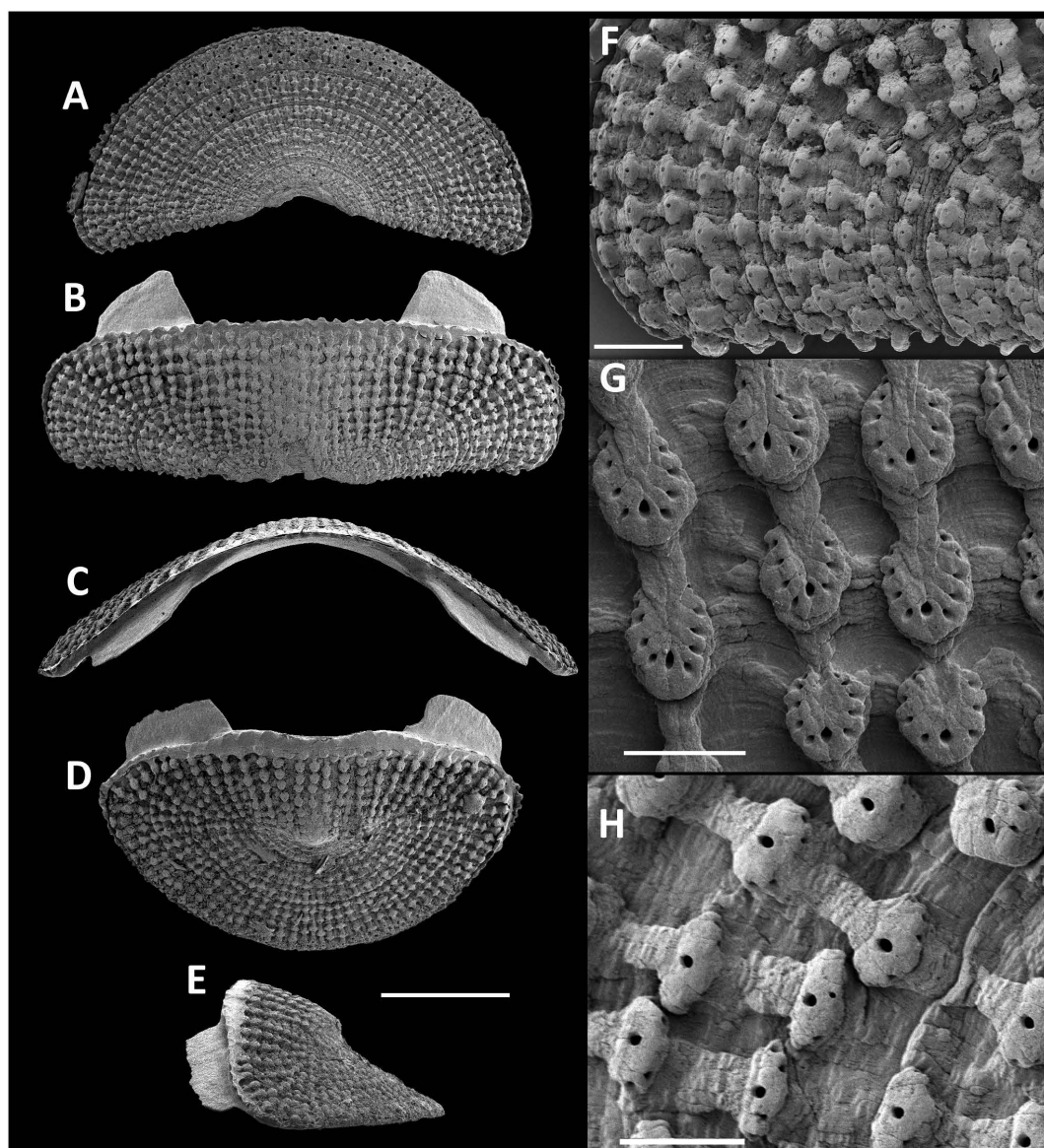


Fig. 2. *Leptochiton myeikensis*, holotype (NSMT-Mo 79255), Andaman Sea, Maung Yin Island, Myeik Islands, Myanmar, BL 4.3 mm. A. valve I, dorsal view; B. valve III, dorsal view; C. valve IV, frontal view; D, E. valve VIII, dorsal and lateral views; F. valve V, sculpture of lateral area; G. valve V, granules of central area, showing arrangement of aesthete pores; H. valve I, granules and arrangement of aesthete pores. Scale: 500 μ m for A–E; 100 μ m for F; 50 μ m for G, H.

Radula 1.3 mm long with 80 transverse rows of very small mature teeth. Central tooth narrow, with small blade at top, keeled, widened at basal half. First lateral teeth longer than central tooth, bearing small cusp at top. Major lateral teeth with bidentate cusp; inner denticle much smaller

than outer main one; shaft plate-like with folded part at proximal portion and fin-like process in outer-basal portion; fin-like process with small notch at distal portion. Major uncinal teeth rather wide, with folded blade in distal half. Inner marginal teeth small, roughly u-shape, holding base

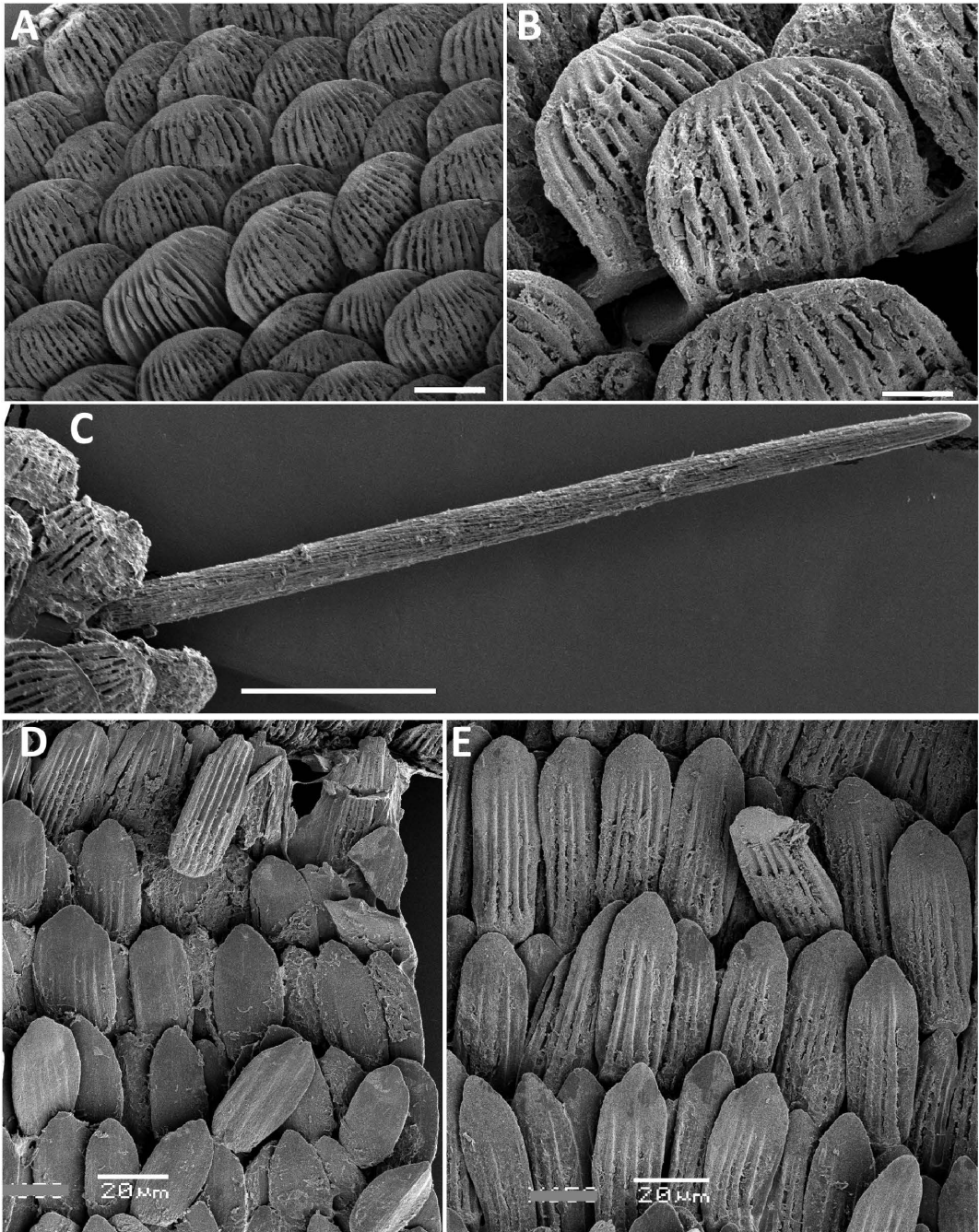


Fig. 3. *Leptochiton myeikensis*, holotype (NSMT-Mo 79255), Andaman Sea, Maung Yin Island, Myeik Islands, Myanmar, BL 4.3 mm. A. dorsal girdle scales; B. dorsal girdle scales, close up; C. dorsal needle; D. ventral girdle scales; E. ventral girdle scales near girdle margin. Scale: 20 μm for A, D, E; 10 μm for B; 50 μm for C.

of major uncinal tooth. Outer marginal teeth wide, obtusely pointed at both sides.

Distribution. Only known from type locality.

Remarks. The present new species is characterized by longitudinal rows of granules on the

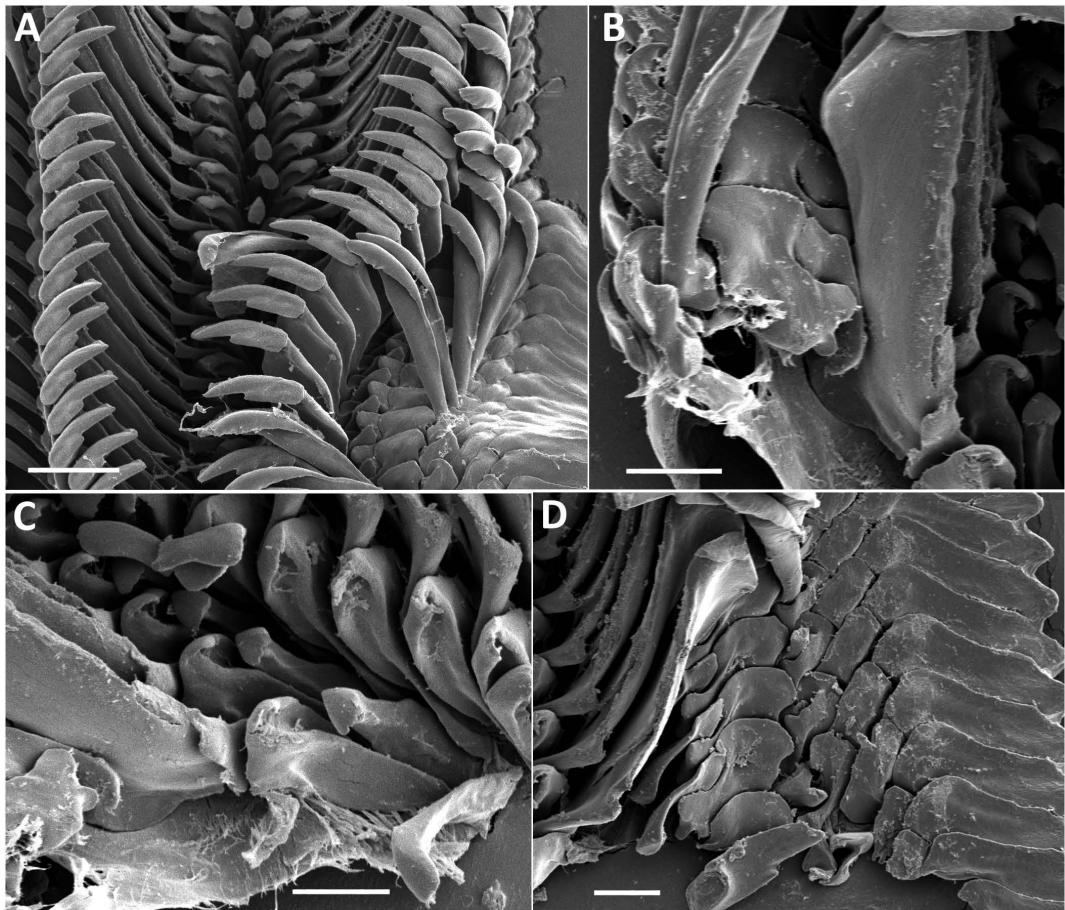


Fig. 4. *Leptochiton myeikensis*, holotype (NSMT-Mo 79255), Andaman Sea, Maung Yin Island, Myeik Islands, Myanmar, BL 4.3 mm. A. radula, dorsal view; B. close up of left side of radula; C. close up of central part of radula; D. close up of right side of radula. Scale: 20 μm for A; 10 μm for B–D.

central area of the intermediate valves and on the antemucronal area of the tail valve, 9–11 aesthetes in each granule, wide, round-topped dorsal scales with 12–16 riblets, a high number of transverse rows of radula teeth (80 rows), narrow central tooth of the radula and bidentate cusps of the major lateral teeth, with the inner denticle being distinctly shorter than the outer one. Sirenko (2020) recognized five species groups defined by the condition of the characters mentioned above (arrangement of granules, number of aesthete pores, shape and sculpture of dorsal girdle scales, number of transverse rows of radula, and shape of central tooth and the head of major lateral teeth). He assigned 47 species into those five

groups. The present species does not match any of those five groups. Among approximately ninety remaining species in this genus, the present species most resembles *Leptochiton lascrusesi* Sirenko, 2015 described from intertidal zone of Las Cruces, Chile, 33°30'S, 71°37'E, in having longitudinal rows of granules in central and antemucronal areas, wide, round-topped dorsal scales with distinct riblets, high number of transverse rows of the radula teeth. However, the present new species differs from the latter in having round-backed valves (carinate in *L. lascrusesi*), radial rows of granules on the head valve, lateral area of the intermediate valves and the antemucronal area of the tail valve (quincunx

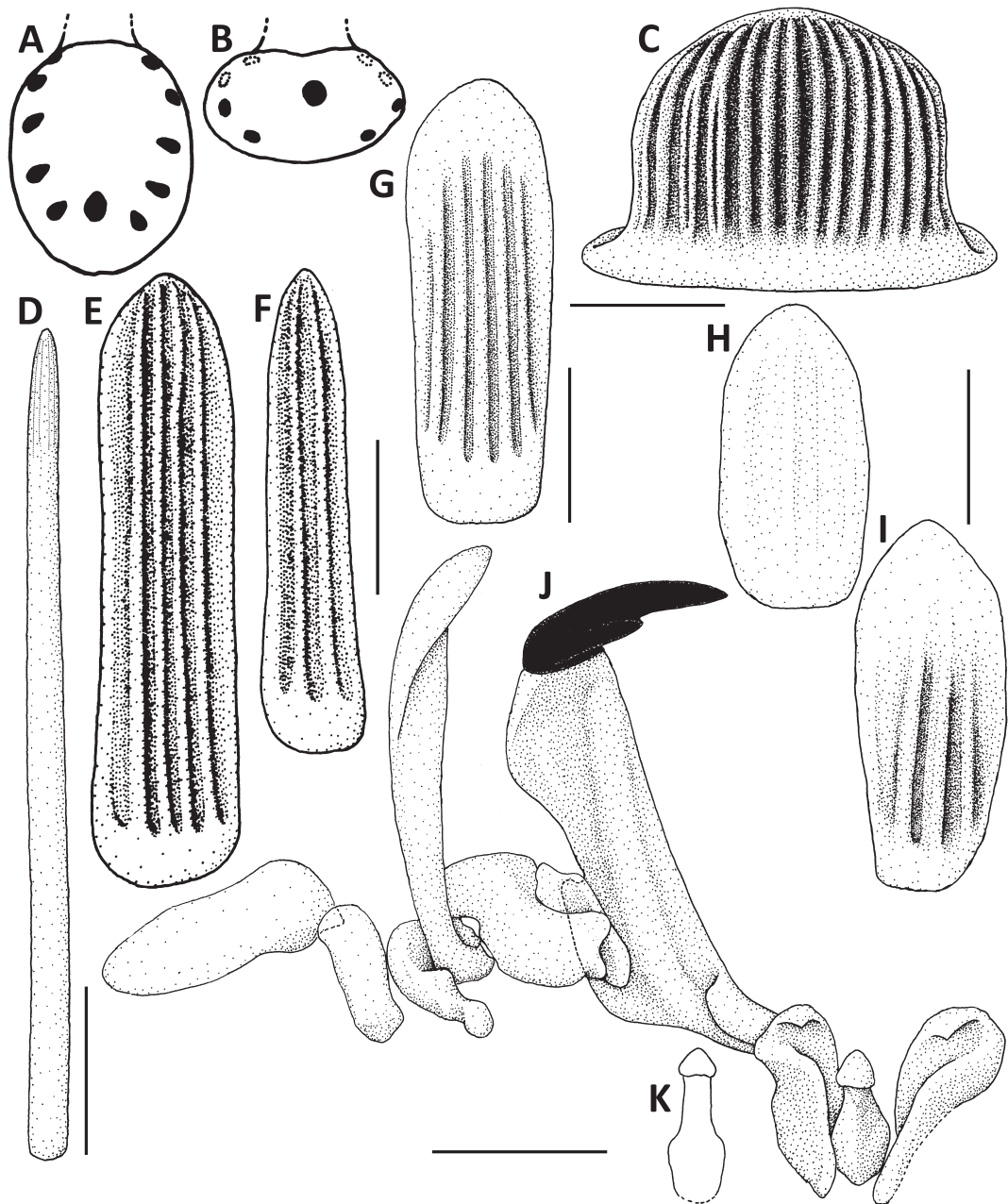


Fig. 5. *Leptochiton myeikensis*, holotype (NSMT-Mo 79255), Andaman Sea, Maung Yin Island, Myeik Islands, Myanmar, BL 4.3 mm. A. arrangement of aesthete pores in central area; B. arrangement of aesthete pores in head valve; C. dorsal scale; D. dorsal needle; E. wide marginal scale; F. narrow marginal scale; G. ventral scale near girdle margin; H. ventral scale near pallial groove; I. ventral scale in middle portion; J. radula, central three teeth and left side; K. central tooth, outline viewed from different angle, showing narrow body. Scale: 20 μm for C, E–K; 50 μm for D; A, B, schematic drawings, not to scale.

arrangement in *L. lascrusesi*), 9–11 aesthete pores on each granule (3 in *L. lascrusesi*), 12–16 riblets on the dorsal girdle scale (10–12 in *L. lascrusesi*), 80 rows of the radula teeth (120 in *L. lascrusesi*), and bicuspid head of the major lateral teeth (unicuspid in *L. lascrusesi*).

The present new species is easily distinguishable from the other four species known in this genus from tropical and subtropical shallow waters: *Leptochiton nierstraszi* (Leloup, 1981) described from Madagascar has a quincunx arrangement of the granules on the shell, and unicuspid head of the major lateral teeth of the radula; *Leptochiton hiriensis* Schwabe, 2006 from Rapa, Polynesia has prominent commarginal ridges, broader, rectangular central tooth of the radula and tricuspid head of the major lateral teeth. *Leptochiton muelleri* Sirenko and Schwabe, 2011 described from Sri Lanka, and reported from Vietnam (Sirenko, 2014) has higher valves, quincunx arrangement of the granules on the head valve, lateral and antemucronal areas, five aesthete pores on each granule, fewer number of transverse rows of the radula teeth (42 rows of mature teeth in the holotype), and tricuspid head of the major lateral teeth; *Leptochiton pumilus* Sirenko and Saito, 2020 from Papua New Guinea and the Philippines has much higher valves with grid-like sculpture on the central and antemucronal areas, five aesthete pores on each granule, flat ventral scales, and fewer number of transverse rows of the radula teeth (31 rows of mature teeth in the holotype).

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