
Molluscs of the genus *Leptoplax* (Mollusca: Polyplacophora) from Spratly Islands, South China Sea

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ABSTRACT. The paper deals with two species of chitons of the genus *Leptoplax*, *L. unica* and *L. duongae* sp. nov. collected in the South China Sea off the Spratly Islands. The new species differs from morphologically similar species of the genus by the sculpture of the jugum, absence of notch on the anterior margin of apophyses of the tail valve, rounded shape of pustules of tegmentum and distinctly ribbed dorsal girdle spicules.

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Моллюски рода *Leptoplax* (Mollusca: Polyplacophora) островов Спратли Южно-Китайского моря

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РЕЗЮМЕ. В статье описываются два вида хитонов рода *Leptoplax*, *L. unica* и *L. duongae* sp. nov., собранных в Южно-Китайском море у островов Спратли. Новый вид отличается от морфологически близких видов рода скульптурой югального поля, отсутствием вырезки на переднем крае апофизов хвостового щитка, округлой формой пустул тегмента и отчетливо ребристыми дорсальными спикулами.

shallow waters of the Western Pacific – off the coasts of Japan, Vietnam, Philippines, Indonesia, South Australia, as well as in the Coral Sea and the Red Sea.

The new species by some characters can be attributed to the genus *Leptoplax*; nevertheless, it lacks a notch on the anterior margin of the apophyses of the tail valve. This absence contradicts what was traditionally regarded as a stable characteristic of the genus *Leptoplax* [Sirenko, Saito, 2017]. Unfortunately, collections of species from this genus are rare, preventing the conduct of molecular studies in the near future. As a result, only morphological studies remain feasible.

Material and methods

The material was collected by the author during the expedition of the Joint Russian-Vietnamese Tropical Centre to the Spratly Islands in 2018 using the method described by Sirenko [2012]. The holotype of *Leptoplax duongae* sp. nov. and specimen of *L. unica* (Nierstrasz, 1905) were boiled for 4–5 min in a 7% KOH solution to remove all soft tissues. Afterwards the valves I, IV, V, and VIII and half of the girdle cuticle and half of the radula were examined with a FEI SEM Quanta 250, while the remaining half of the girdle and radula were embedded in Canada Balsam to be examined under a light microscope. The holotype is deposited in the Zoological Institute of the Russian Academy of Sciences, St. Petersburg.

Abbreviations: BL – body length; IEE RAS – A.N. Se-

Introduction

During three expeditions of the Joint Russian-Vietnamese Tropical Centre to the Spratly Islands in 2018, 2019 and 2020, 27 species of chitons were collected. Several of them are new for science and 3 species already have been described [Sirenko, 2021; Sirenko, Nguyen Tai, 2021, 2022]. In this article I am describing one more new species from the genus *Leptoplax*.

According to WoRMS the genus *Leptoplax* comprises 12 species. Most of them are distributed in

vertsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia; SCUBA – self-contained underwater breathing apparatus; WoRMS – World Register of Marine Species; ZIN – Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia; ZMA – Zoologisch Museum Amsterdam, Netherlands (now material is deposited in Naturalis Biodiversity Center, Leiden).

Taxonomy

Class Polyplacophora Gray, 1821
 Subclass Neoloricata Bergenhayn, 1955
 Order Chitonida Thiele, 1909
 Suborder Acanthochitonina
 Bergenhayn, 1930
 Superfamily Cryptoplacoidea
 H. et A. Adams, 1858
 Family Acanthochitonidae Pilsbry, 1893
 Subfamily Acanthochitoninae Pilsbry, 1893

Genus *Leptoplax* (Carpenter MS) Dall, 1882

Type species. *Chiton coarctatus* Sowerby, 1841, by monotypy.

Genus distribution. Western Pacific: Japan, Vietnam, Philippines, Indonesia, Papua New Guinea, New Caledonia, South Australia and Spratly Islands now.

Remarks. For a long time the genus *Leptoplax* was considered synonymous with the genus *Notoplax*. Finally, Gowlett-Holmes [2001] restored its generic status, although she did not provide a diagnosis. Sirenko and Saito [2017] presented a diagnosis of the genus. Here I give a somewhat refined distinction of *Leptoplax* from *Notoplax*.

The main characters of *Leptoplax* distinguishing it from *Notoplax* are: 1) absence of diagonal line on tegmentum of intermediate valves, running from lateral incision to apex and decorated with large pustules; 2) presence of ribs on ventral flattened spicules and more often on dorsal spicules and needles; 3) absence of asymmetry of central and first lateral teeth of radula.

In the new species, the anterior margin of the apophyses of the tail valve is not concave, so I remove this feature noted in Sirenko and Saito [2017] from the diagnosis of *Leptoplax*.

Leptoplax unica (Nierstrasz, 1905)
 (Figs 1-4)

Acanthochites (*Notoplax*) *unicus* Nierstrasz, 1905: 62, pl. 1 fig. 20, pl. 4, figs 115–117, pl. 5, fig. 118.

Leptoplax unica – Schwabe, 2006: 104, figs 1D, 6G-L, 8-10).

Type material. Holotype, ZMA 1899.05.07.

Type locality. Indonesia, 6°32'32"S, 120°25'34"E, 8–10 m.

Material examined. South China Sea, Spratly Islands, 8°48'27"N, 113°56'04"E, 30 m, SCUBA, on



FIG. 1. *Leptoplax unica*, South China Sea, Spratly Islands (ZIN 2572), BL 18.0 mm.

РИС. 1. *Leptoplax unica*, Южно-Китайское море, острова Спратли (ZIN 2572) BL 18,0 мм.

old corals, 1 spm. ZIN 2572, BL 18 mm, 25.05.2019, leg. B. Sirenko.

Distribution. Indonesia, Papua New Guinea and Spratly Islands, 2–30 m.

Remarks. It is a rarely collected species, with a total of 6 known specimens. The specimen studied here is the first found in the Spratly Islands. This specimen, as well as the type specimen from Indonesia and the specimen studied by Schwabe [2006] from New Guinea, has a large number of slits on the tail valve. Its slit formula is 5/1/9. It has 11 gills on each side arranged from valve V to valve VII. The radula of this specimen is 3.0 mm long with 32 transverse rows of mature teeth. Ventral spicules are flattened with one or two oblique, irregular riblets which arranged on a lower side of the spicule.

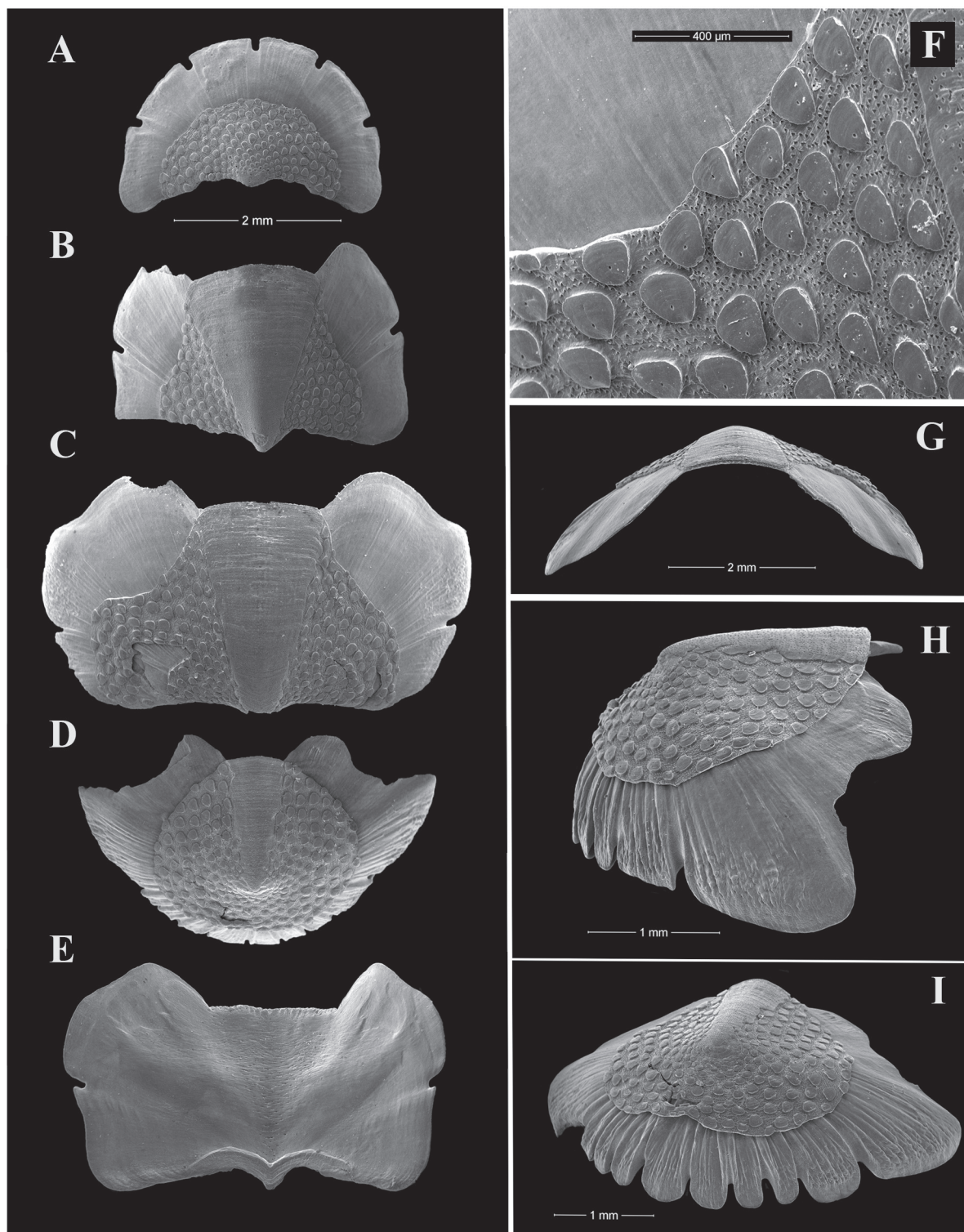


FIG. 2. *Leptoplax unica*, ZIN 2572. **A.** Head valve, dorsal view. **B.** Valve II, dorsal view. **C.** Valve V, dorsal view. **D.** Valve VIII, dorsal view. **E.** Valve IV, ventral view. **F.** Valve V, tegmentum sculpture in pleurolateral area. **G.** Valve V, frontal view. **H.** Valve VIII, lateral view. **I.** Valve VIII, from behind.

РИС. 2. *Leptoplax unica*, ZIN 2572. **A.** Головной щиток, вид сверху. **B.** Щиток II, вид сверху. **C.** Щиток V, вид сверху. **D.** Щиток VIII, вид сверху. **E.** Щиток IV, вид снизу. **F.** Щиток V, скульптура тегмента на ролатеральном поле. **G.** Щиток V, вид спереди. **H.** Щиток VIII, вид сбоку. **I.** Щиток VIII, вид сзади.

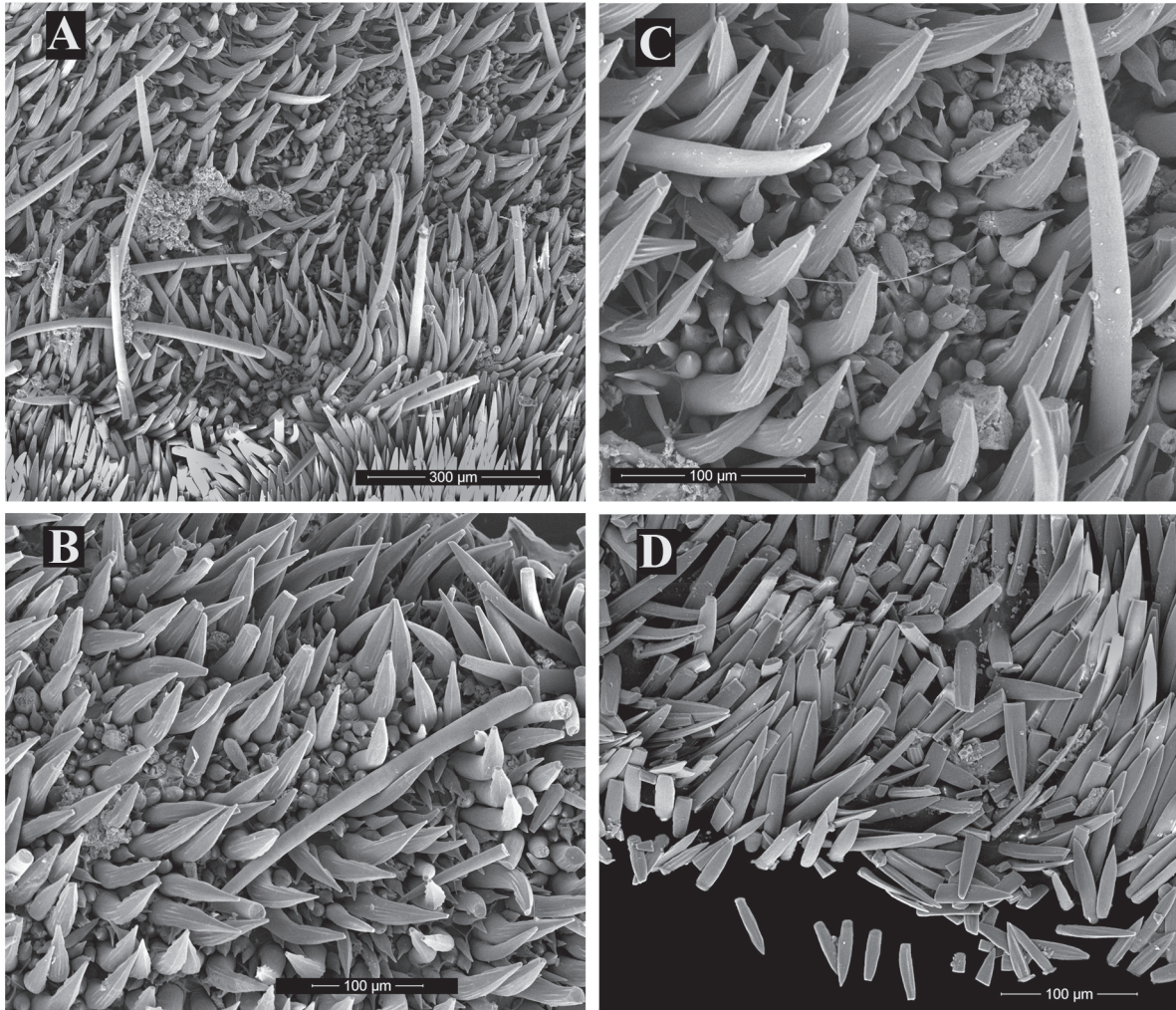


FIG. 3. *Leptoplax unica*, ZIN 2572. **A.** Dorsal spicules and needles, marginal needles and ventral spicules. **B, C.** Dorsal spicules and needles. **D.** Ventral spicules.

РИС. 3. *Leptoplax unica*, ZIN 2572. **A.** Дорсальные спикулы и иглы, маргинальные иглы и вентральные спикулы. **B, C.** Дорсальные спикулы и иглы. **D.** Вентральные спикулы

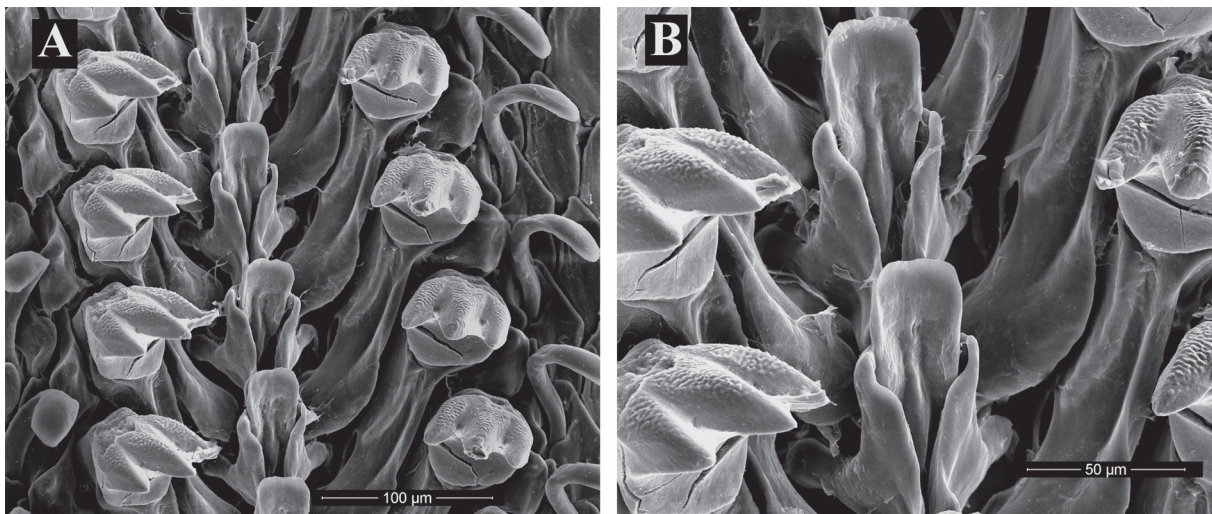


FIG. 4. *Leptoplax unica*, ZIN 2572. **A.** Central, first lateral, major lateral and major uncinal teeth of radula. **B.** Central, first lateral and major lateral teeth of radula.

РИС. 4. *Leptoplax unica*, ZIN 2572. Центральные, первые латеральные, крючковые и большие унциальные зубы радулы.

Leptoplax duongae sp. n.
(Figs 5–7)

Zoobank registration: urn:lsid:zoobank.org:act:7D2A0A51-5708-47D8-AFC3-FBB93EA086A1

Type material. Holotype, ZIN 2570, now disarticulated consisting of mounts of shell, perinotum and radula.

Type locality. South China Sea, Spratly Islands, 10°10'17"N, 114°21'59"E, 10 m, on old corals.

Etymology. Named after Hoang Thuy Duong, the leader of the expeditions to Spratly Islands who helped me to collect this material.

Material examined. South China Sea, Spratly Islands, 11°23'45"N, 114°35'15"E, 14–15 m, SCUBA, sand, 1 head and 1 intermediate valves, ZIN 2571, 25.11.2018, leg. B. Sirenko; Spratly Islands, 10°10'17"N, 114°21'59"E, 10 m, SCUBA, on old corals, holotype ZIN 2570, BL 4.0 mm, 05.12.2018, leg. B. Sirenko.

Diagnosis. Small oblong-oval chiton, moderately elevated, with distinctly elevated broad jugum. Pleural areas sculptured with roundish to less often oval small convex pustules arranged irregularly quincuncially. Intermediate valves carinated, beaked. Tail valve with central mucro. Girdle dorsally densely clothed with sharply pointed short and long ribbed spicules. Central tooth of the radula is markedly expanded in the lower half and with a relatively narrow blade above, major lateral tooth with a tridentate cusp, the median denticle largest.

Description. Animal small, elongate oval, moderately elevated (dorsal elevation 0.32). Color of tegmentum dirty-white with brown spots on pleural areas, jugal area olive-colored.

Head valve semicircular with roundish, small, convex pustules (about 50 μm) arranged irregularly quincuncially. Intermediate valves roughly rhombic, moderately elevated, carinated, beaked; jugum more or less smooth, wedge-shaped, broad and distinctly elevated, front margin concave between apophyses in valve II and straight in other intermediate valves; hind margin concave at both sides of strong beak. Tail valve oval, narrower than head valve, with central, low mucro; antemucronal area straight, posterior slope concave.

Top of each pustule with 1 megal aesthete and 2–3 microaesthetes. Microaesthete pores sparsely distributed also on tegmental plain.

Articulamentum moderately developed, white, with transverse callus in middle of valves, several large pores under anterior margin of jugum, numerous minute pores under remaining part of jugum. Apophyses wide, long, rounded at anterior margin in intermediate valves, truncated in tail valve. Insertion plate short with short, rather wide slits; slit formula 5/1/3.

Girdle dirty-white, rather wide. Dorsal side of



FIG. 5. *Leptoplax duongae* sp. nov., South China Sea, Spratly Islands, holotype (ZIN 2570), BL 4.0 mm.

РИС. 5. *Leptoplax duongae* sp. nov., Южно-Китайское море, острова Спратли, голотип (ZIN 2570), BL 4,0 мм.

girdle densely clothed with sharply pointed, short and long, ribbed spicules (40–90 μm x 8–14 μm). Sutural tufts of up to 10 straight, smooth needles (200–800 μm x 8–10 μm) surrounded by thick, smooth pointed spicules (35 μm x 15 μm). Marginal needles sharply pointed, distinctly ribbed (120 μm x 17 μm). Ventral spicules flat, with 1–2 riblets on a lower side (65 μm x 25 μm).

Radula 1.4 mm long with 31 transverse rows of mature teeth. Central tooth of the radula is markedly expanded in the lower half and with a relatively narrow blade above, major lateral tooth with a tridentate cusp, the median denticle largest.

Distribution. Only known from the Spratly Islands.

Remarks. The present species closely resembles *Leptoplax nhatrangi* Sirenko et Saito, 2017, *L. tongkingi* Sirenko et Saito, 2017, *L. richardi* (Kaas, 1990) and *L. doederleini* (Thiele 1909) in shell morphology, such as outline of the valves.

The new species differs from *L. nhatrangi* by the jugum, which in the new species is broader and less sharply separated from the pleurolateral areas;

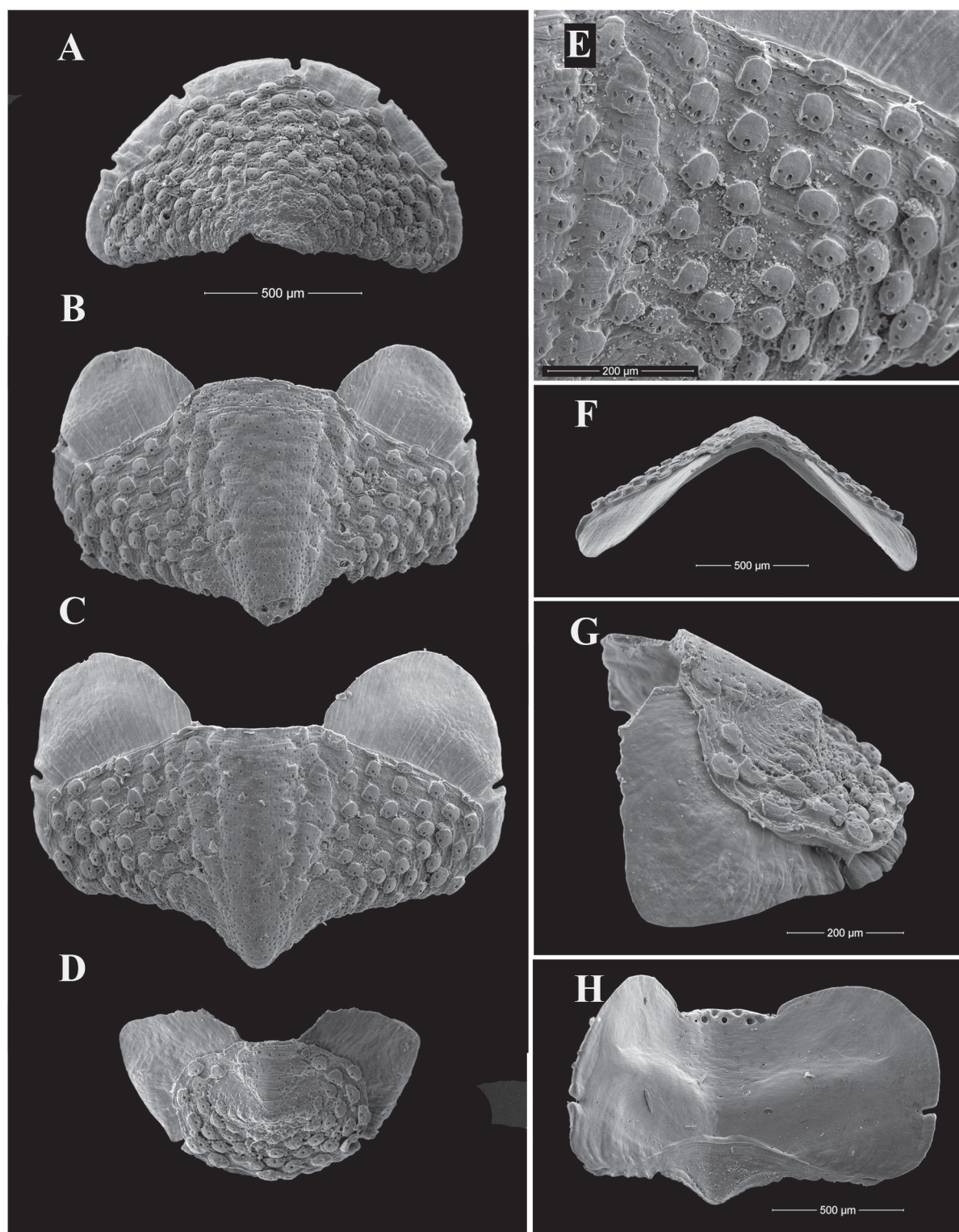


FIG. 6. *Leptoplax duongae* sp. nov., holotype (ZIN 2570). A. Head valve, dorsal view. B. Valve II, dorsal view. C. Valve V, dorsal view. D. Valve VIII, dorsal view. E. Valve V, tegmentum sculpture in pleurolateral area. F. Valve V, frontal view. G. Valve VIII, lateral view. H. Valve IV, ventral view.

РИС. 6. *Leptoplax duongae* sp. nov., голотип (ZIN 2570). А. Головной щиток, вид сверху. В. Щиток II, вид сверху. С. Щиток V, вид сверху. D. Щиток VIII, вид сверху. E. Щиток V, скульптура тегмента на плевролатеральном поле; F. Щиток V, вид спереди. G. Щиток VIII, вид сбоку; H. Щиток IV, вид снизу.

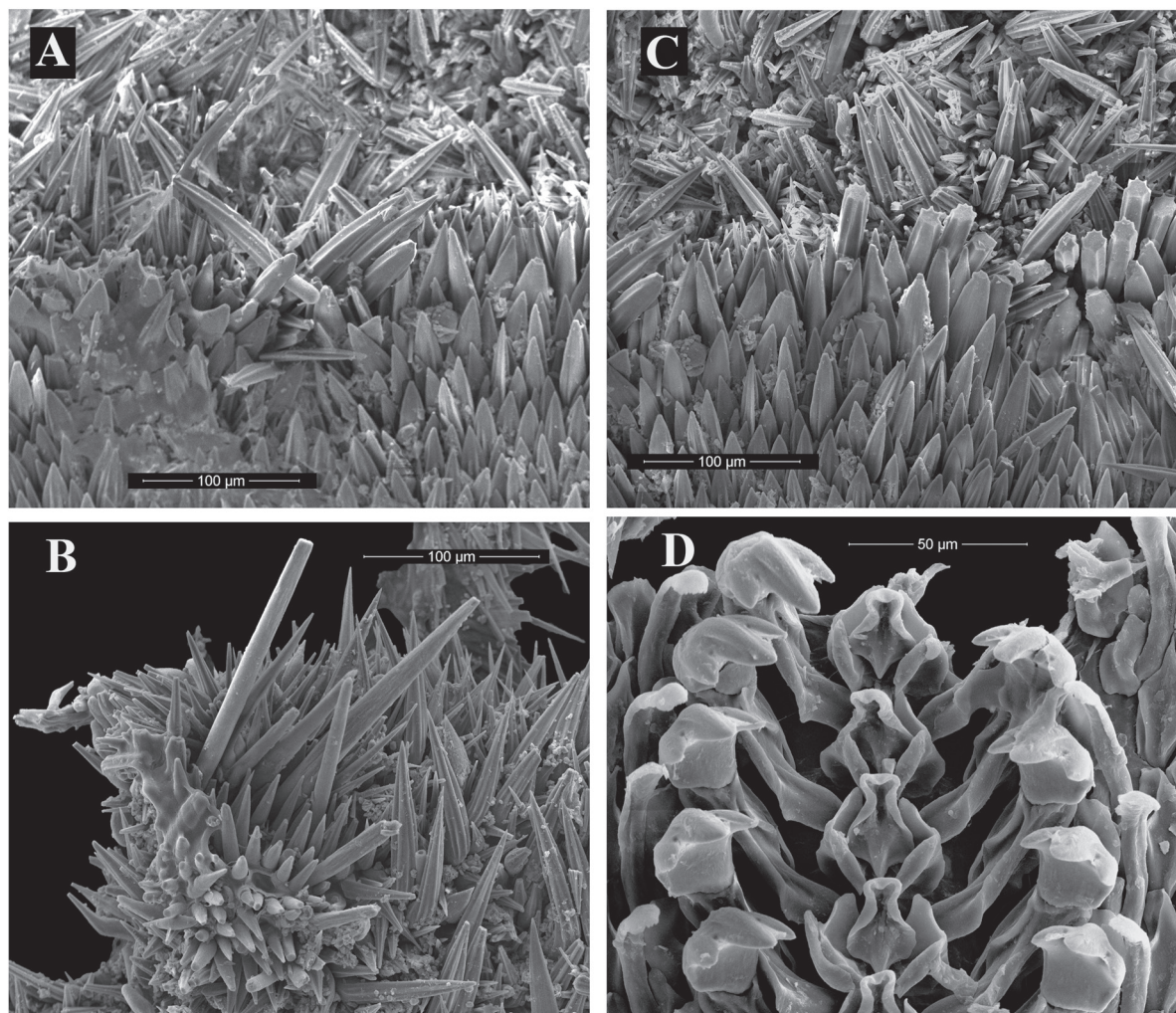


FIG. 7. *Leptoplax duongae* sp. nov., holotype (ZIN 2570). A, C. Dorsal spicules, marginal needles and ventral spicules. B. Tuft of needles among dorsal spicules. D. Part of radula.

РИС. 7. *Leptoplax duongae* sp. nov., голотип (ZIN 2570). A, C. Дорсальные спикулы, маргинальные иглы и ventральные спикулы. B. Пучок игл среди дорсальных спикул. D. Часть радулы.

rounded rather than oval pustules on the pleurolateral areas; absence of a notch on the anterior margin of the apophyses in the tail valve.

L. duongae sp. nov. differs from *L. tongkingi* by rounded rather than oval pustules on the pleurolateral areas; absence of a notch on the anterior margin of the apophyses in the tail valve; less ribbed and shorter ventral spicules; slit formula 5/1/3 (vs. 5/1/9 in *L. tongkingi*).

New species differs from *L. richardi* by rounded rather than oval pustules on the pleurolateral areas; absence of a notch on the anterior margin of the apophyses in the tail valve; long and narrow dorsal spicules (vs. two kinds of spicules in *L. richardi*: short, ribbed with a very sharp top and long, bent, smooth).

L. duongae sp. nov. differs from *L. doederleini* by having round pustules (vs. elongate-oval in *L.*

doederleini); straight anterior margin of apophyses in the tail valve (deep concave anterior margin in *L. doederleini*); ribbed dorsal spicules (vs. smooth dorsal spicules in *L. doederleini*); slit formula 5/1/3 (vs. 5/1/8 in *L. doederleini*).

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