

## First Pacific species of the genus *Choneplax* (Mollusca: Polyplacophora)

Boris I. SIRENKO

Zoological Institute of the Russian Academy of Sciences, Universitetskaya nab., 1,  
St.-Petersburg, 199034, RUSSIA

**ABSTRACT.** A new species of the genus *Choneplax* from American Samoa is described. It inhabits crustose coralline algae like *Choneplax lata* from the Caribbean Sea. The new species resembles both other species of *Choneplax* and some species of the genus *Acanthochitona*. A supposition is made about origin of species of the genus *Choneplax* from species of widespread genus *Acanthochitona* as the result of progressive reduction of tegmentum and slits of insertion plates.

The genus *Choneplax* was described by Carpenter in Dall, 1882 for the Caribbean species *Chiton strigatus* Sowerby (= *Chitonellus latus* Guilding, 1829). Pilsbry [1893] added *Choneplax hastata* (Sowerby, 1840) (habitat unknown). Twenty years later Odhner [1919] described a third species of *Choneplax* (*Ch. indica*) from the Indian Ocean.

Several years ago I received four samples of chitons from Mark M. Littler and Diane S. Littler. Among them, one sample from American Samoa contained a new species of *Choneplax*. The species of the genus *Choneplax* are closely associated with crustose coralline algae and perhaps all of them play a role similar to that of *Choneplax lata* in the Caribbean Sea [Littler, Littler, 1995]. This is the first finding of the genus in the Pacific Ocean.

Abbreviations: ZISP — Zoological Institute of the Russian Academy of Sciences, St.-Petersburg; USNM — United States National Museum of Natural History, Washington.

### Taxonomy

Class Polyplacophora Gray, 1821  
Order Chitonida Thiele, 1910  
Suborder Acanthochitonina Bergenhayn, 1930  
Superfamily Cryptoplacoidea  
H. et A. Adams, 1858  
Family Acanthochitonidae Pilsbry, 1893  
Subfamily Acanthochitoninae Pilsbry, 1893  
Genus *Choneplax* Carpenter in Dall, 1882

*Choneplax littlerorum* Sirenko sp. nov.  
(Figs. 1A-H, 2, 3, 4A-C)

**Diagnosis.** Chitons of small size (up to 13 mm), valves not carinated, weakly beaked with a progres-

sive narrowing of jugal sinus and jugal area from valves II to V, sculptured with small oval or elongate flat-topped pustules, mucro terminal. Dorsally the girdle clothed with much crowded short blunt longitudinally grooved spicules and 18 tufts composed of numerous (about 100) very slender needles ca. 520 µm long. Marginal spicules curved, with rounded top. Major lateral tooth with a tridentate cusp, central denticle slightly larger.

[**Диагноз.** Хитоны маленькие (до 13 мм), щитки не килеватые, со слегка оттянутым назад апексом, с прогрессивным зауживанием югального синуса и югального поля от II до V щитков, скульптурированы мелкими овальными или продолговатыми уплощенными сверху зернами, мукро терминальное. С дорсальной стороны мускулистый пояс покрыт близко стоящими, короткими, туповершинными спикулами с продольными желобками и 18 пучками, состоящими из многочисленных (около 100) очень тонких игл длиной около 520 мкм. Маргинальные спикулы изогнутые, с закругленной вершиной. Крючковая пластинка радулы с трехзубцовым лезвием, центральный зубец слегка крупнее.]

**Type material.** Holotype (ZISP No. 203/2150) and 3 paratypes (2 in ZISP, No. 204/2151; 1 in USNM), collected on February, 14, 1997 by M. M. Littler and D. S. Littler. Holotype (12 mm in length, 3 mm in width) is partly disarticulated: valves I, IV, VIII and piece of girdle are removed and dried for electron microscopy, radula is on slide in Canada balsam, remains are preserved in alcohol. Smallest paratype (7.5 mm in length) is disarticulated: valves are dried, radula and girdle are on slide in Canada balsam. Two paratypes (9 and 13 mm in length) are preserved in alcohol.

**Type locality:** Goal Is. Point, Pago Pago Harbor, American Samoa, 14°16.659'S; 170°40.926'W, 5-3 m, on crustose coralline algae.

**Description:** Holotype 12 × 3 mm. Animal elongated, with nearly parallel sides, girdle broad encroaching at the sutures. Valves imbricated, moderately elevated, not carinated, weakly beaked.

Head valve somewhat wider than long, strongly eroded. Intermediate valves elongate-pentagonal and various in shape and size. Their size increases from valves II to valves VII which are the widest. There is a progressive narrowing of the jugal sinus and jugal area from valves II to V. The posterior margin of

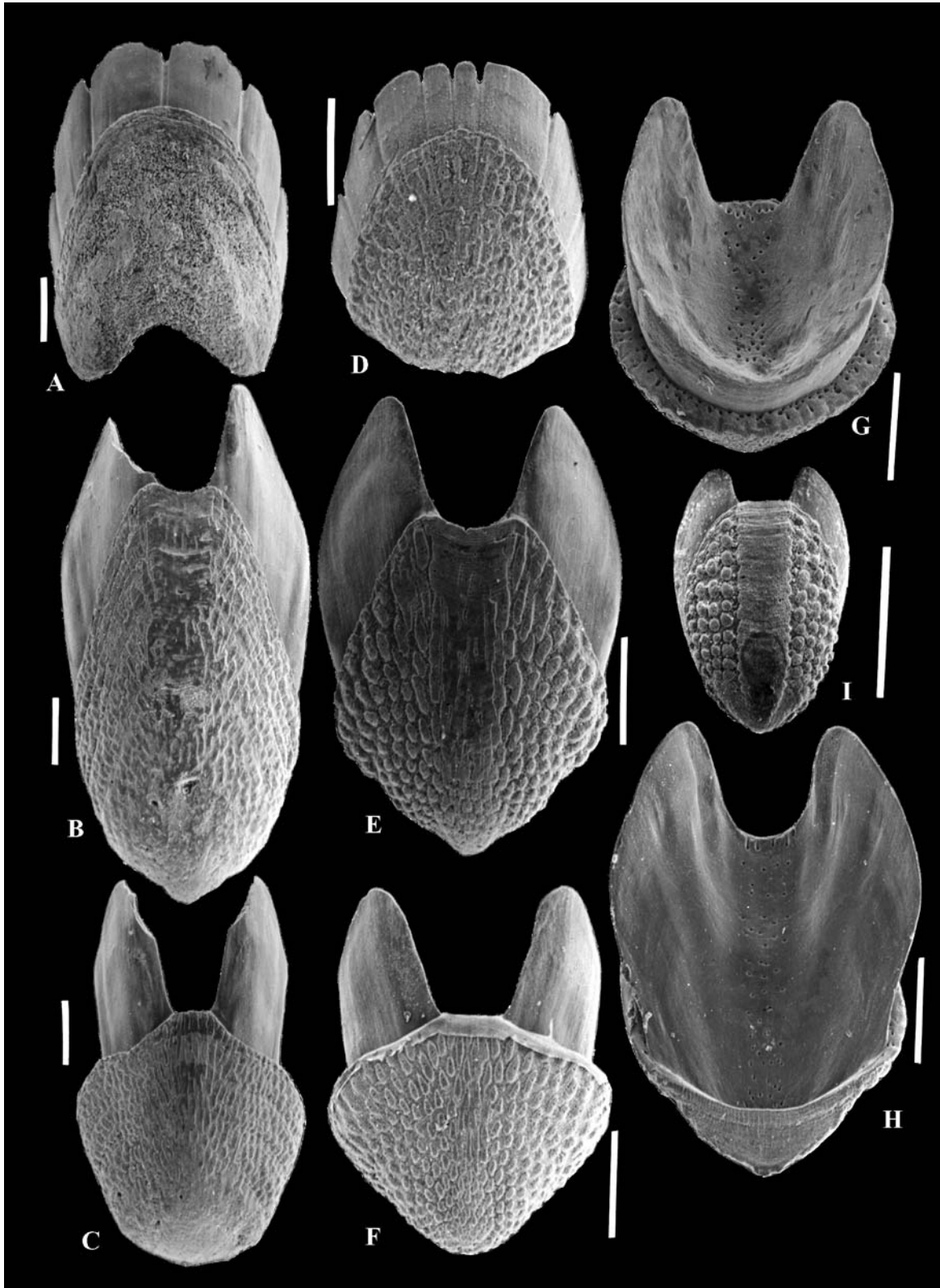


FIG. 1. *Choneplax littlerorum*, sp. nov., holotype (A-C), paratype, body length 7.5 mm (D-H) and *Ch. indica*, body length 5.0 mm, Indian Ocean, Saya-de-Malha Bank, 12-15 m, coll. B. Sirenko (I). A, D – valve I, dorsal view; B, E – valve IV, dorsal view; C, F, I – valve VIII, dorsal view; G – valve VIII, ventral view; H – valve IV, ventral view. Scale bar: 0.5 mm.

РИС. 1. *Choneplax littlerorum*, sp. nov., голотип (А-С), паратип, длина тела 7,5 мм (D-H) и *Ch. indica*, длина тела 5,0 мм, Индийский океан, банка Сая-де-Малья, 12-15 м, сб. Б. Сиренко (I). А, D – щиток I, вид сверху; B, E – щиток IV, вид сверху; C, F, I – щиток VIII, вид сверху; G – щиток VIII, вид снизу; H – щиток IV, вид снизу. Масштабная линейка: 0,5 мм.

intermediate valves obtusely angled. Hind portions of jugal area of all intermediate valves are more or less worn. Tail valve with strongly eroded terminal mucro. The sculpture of valve I, latero-pleural areas of intermediate valves, of tail valve and posterior area of tail valve consists of comparatively small oval or elongate flat-topped pustules. The jugal area is weakly sculptured by very elongate flat-topped pustules arranged in rows approximately parallel to the jugal tract.

The colour of tegmentum is dark buff near top and black near the margins. There is a red belt in the anterior margin of head valve. The colour of girdle is olive-green with a lot of white spots of different size.

Insertion plates of all valves are long. Head valve has five slits, tail valve has two slits. Valve II has one slit on each side, in valve VII slits are reduced to slight notches and in valves III-VI no slits or notches are visible.

The girdle is wide, dorsally clothed with much crowded, short, blunt and longitudinally grooved spicules ( $18-20 \times 1 \mu\text{m}$ ). There are 14 sutural tufts and 4 more around the head, composed of numerous (about 100) very slender needles 520  $\mu\text{m}$  long. There is a fringe of long curved, light-brown or white marginal spicules 100  $\mu\text{m}$  in length. Ventrally girdle is armed with distally pointed, longitudinally grooved spicules, 23-50  $\mu\text{m}$  long.

Radula of holotype is 3.4 mm long, with 45 transverse rows of mature teeth, central tooth short, with a rather strong blade, first lateral tooth wing-shaped, tapering to a small blade, major lateral with a tridentate cusp, denticles rather blunt, the central one slightly larger.

Gills merobranchial, abanal, nephropore situated between last and penultimate gills, holotype with 14 ctenidia on each side, gills extending from valve V to valve VII.

**Remarks.** There is age variability in this species. The paratype (7.5 mm long) has shorter valves, seven slits in valve I and a small number of gills (10 ctenidia on each side). Species inhabits crustose coralline algae. The gut of the paratype contains white lime (?crustose corallines).

*Choneplax littlerorum* resembles *Ch. lata* and *Ch. indica* in the terminal position of the mucro. The new species differs from both species by the presence of two slits in tail valve, shape and sculpture of intermediate and tail valves and armature of girdle, especially by the numerous slender needles of sutural tufts. Moreover *Ch. littlerorum* differs from *Ch. indicus* by less distinct jugal area, especially in valve VIII (Fig. 1, F, I; Fig. 2, A, C; Fig. 4, D) and more elongated pustules in latero-pleural area. At the same time *Ch. littlerorum* is also similar to several species of the genus *Acanthochitona*: *A. penetrans* Winckworth, 1933 from Andaman Islands, *A. kimberi* (Torr, 1912) from South Australia, *A. michaelsoni* (Thiele, 1911) from West Australia, *A. balesae* Pilsbry in Abbott, 1954 from Florida. Similarly to the new species, these five species have no slits in several

intermediate valves. But *Ch. littlerorum* well differs from species of *Acanthochitona* by its terminal mucro and the armature of girdle. Winckworth [1933] was correct when he noted "But it is worthy of note that such a series as *A. michaelsoni* — *A. penetrans* — *Choneplax indica* lessens the gap between *Acanthochitona* and *Cryptoplacinae*". However it is not certain that *Ch. lata*, *Ch. indicus* and *Ch. littlerorum* have a common ancestor. Evolution of members of superfamily *Cryptoplacoidea*, which includes three families: *Acanthochitonidae*, *Cryptoplacidae* and *Hemiarthridae* [Sirenko, 1997], was connected with a reduction of the tegmentum and, as a result, a reduction of slits of the insertion plates. It cannot be excluded that different species of the genus *Choneplax* originated from different species of the genus *Acanthochitona* as an adaptation to habitation in burrows and holes in crustose coralline algae. My supposition about the possible polyphyletic origin of the genus *Choneplax* requires additional investigations.

**Distribution.** According to the information of Enrico Schwabe, the isolated plates of *Ch. littlerorum* were found in Western Samoa (Savaii Id., Vaisala lagoon). In that case *Ch. littlerorum* inhabits both Western and Eastern Samoa.

**Etymology.** Named after Mark M. Littler and Diane S. Littler (USNM) who made a great contribution to the study of coralline alga communities and collected the samples of chitons.

## Acknowledgments

I am most indebted to Mark M. Littler and Diane S. Littler who gave me the opportunity to study this species, and for the gift of the material. I thank Taimuraz K. Tsogoev, ZISP for his valuable assistance with the SEM and late Kir Nesis, P.P. Shirshov Institute of Oceanology, Moscow for his valuable comments. I am also very grateful to Enrico Schwabe, Zoologische Staatssammlung München for his valuable comments and for the comparative material.

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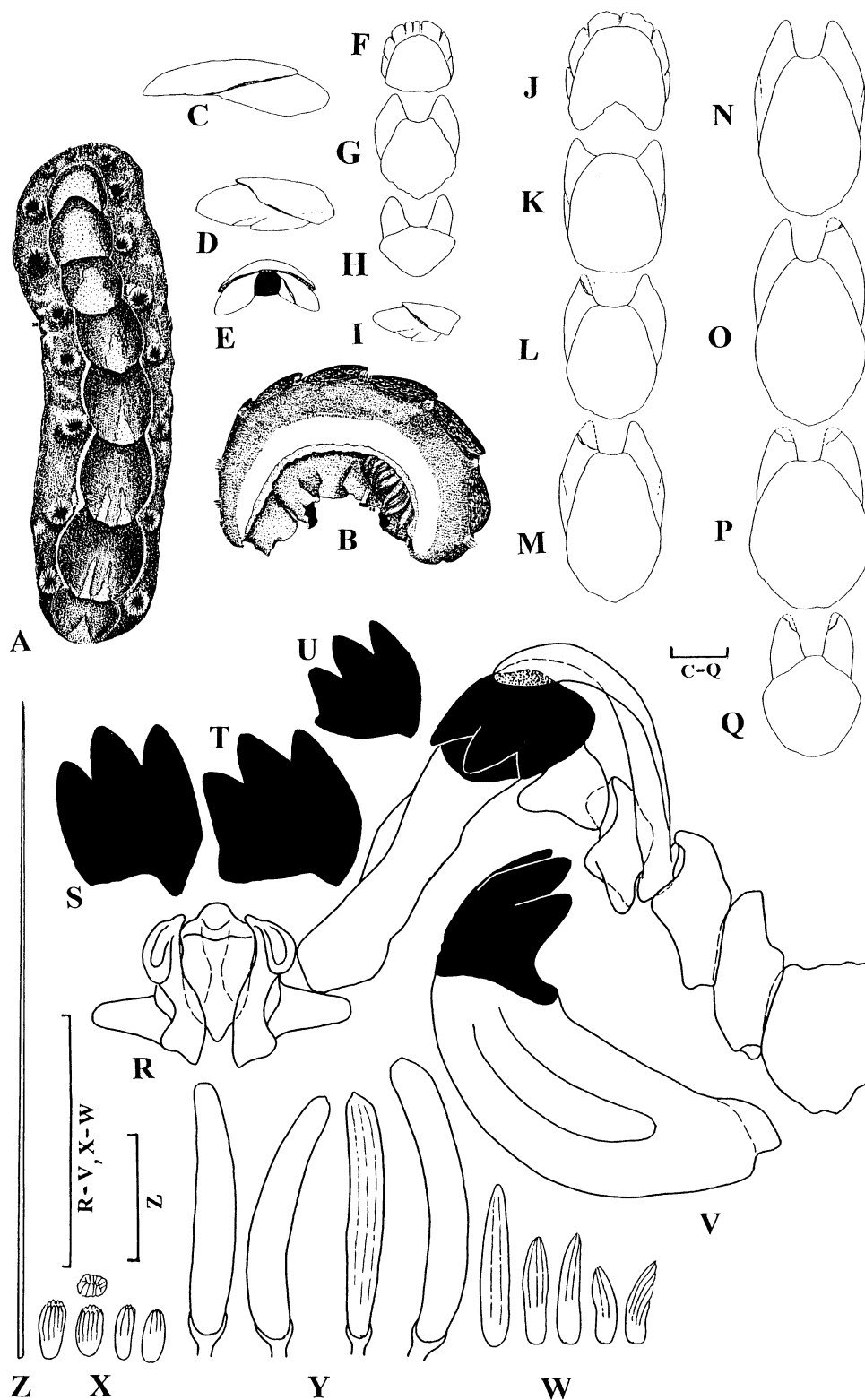


FIG. 2. *Choneplax littlerorum*, sp. nov., holotype (A, C-E, J-Q, R-T, V-W); paratype, body length 9.0 mm (B, U) and paratype, body length 7.5 mm (F-I).  
 A – holotype, dorsal view; B – paratype, lateral view; C – valve IV, lateral view; D, I – valve VIII, lateral view; E – valve IV, rostral view; F, N – valve I, dorsal view; G, M – valve IV, dorsal view; H, Q – valve VIII, dorsal view; K – valve II, dorsal view; L – valve III, dorsal view; N – valve V, dorsal view; O – valve VI, dorsal view; P – valve VII, dorsal view; R – half row of radula; S, T, U – cusp of major lateral tooth; V – major lateral tooth; W – ventral spicules. Scale bar: C-Q – 1 mm; R-W – 100  $\mu$ m; X – dorsal spicules; Y – marginal spicules; Z – needle of tuft.

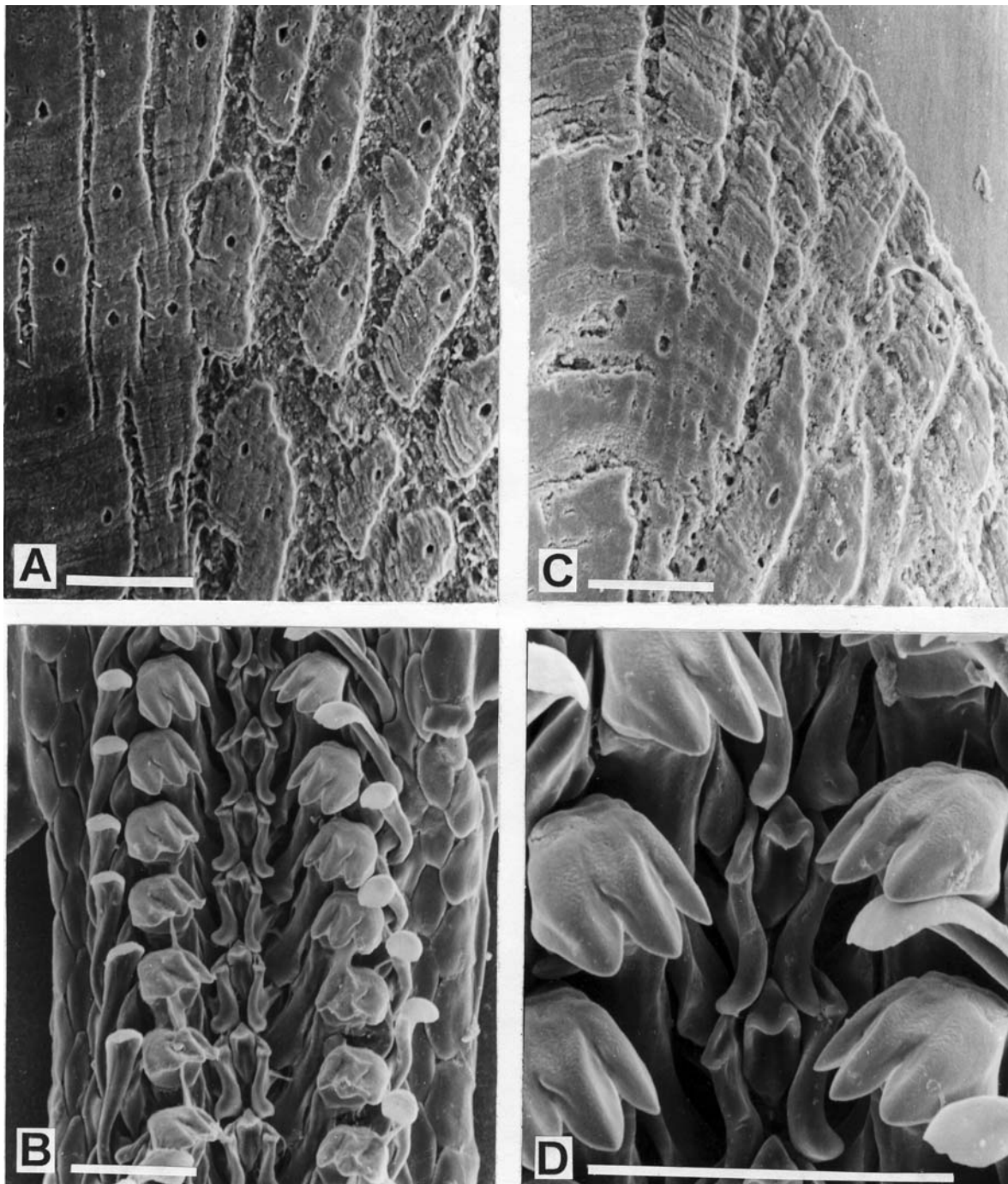


FIG. 3. *Choneplax littlerorum*, sp. nov., holotype (C) paratype, body length 7.5 mm (A); and paratype, body length 13 mm (B, D). A, C – jugal and latero-pleural areas of valve IV; B, D – radula. Scale bar: 100  $\mu$ m.

РИС. 3. *Choneplax littlerorum*, sp. nov., голотип (C), паратип, длина тела 7,5 мм (A) и паратип, длина тела 13 мм (B, D). A, C – югальное и латерально-плевральное поля щитка IV; B, D – радула. Масштабная линейка: 100 мкм.

На предыдущей странице. РИС. 2. *Choneplax littlerorum*, sp. nov., голотип (A, C-E, J-Q, R-T, V-W), паратип, длина тела 9,0 мм (B, U) и паратип, длина тела 7,5 мм (F-I). A – голотип, вид сверху; B – паратип, вид сбоку; C – щиток IV, вид сбоку; D, I – щиток VIII, вид сбоку; E – щиток IV, вид сверху; F, N – щиток I, вид сверху; G, M – щиток IV, вид сверху; H, Q – щиток VIII, вид сверху; K – щиток II, вид сверху; L – щиток III, вид сверху; N – щиток V, вид сверху; O – щиток VI, вид сверху; P – щиток VII, вид сверху; R – половина поперечного ряда радулы; S, T, U – лезвия крючковых пластинок радулы; V – крючковая пластинка радулы; W – вентральные спикулы; X – дорсальные спикулы; Y – маргинальные спикулы; Z – игла из пучка. Масштабная линейка: C-Q – 1 мм; R-W – 100 мкм.

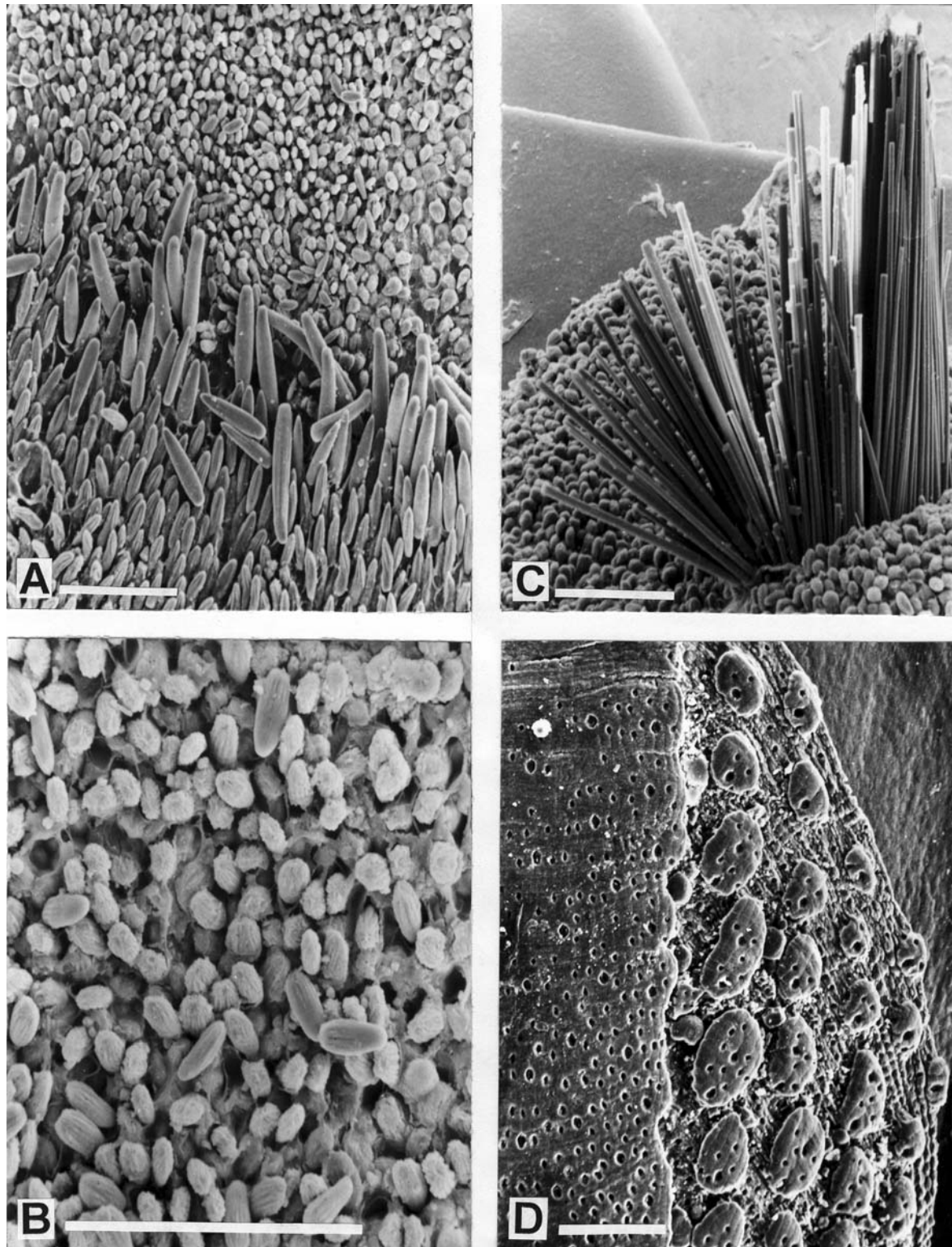


Fig. 4. *Choneplax littlorum*, sp. nov., holotype (A–C) and *Ch. indica*, body length 5.0 mm, Indian Ocean, Saya-de-Malha Bank, 12–15 m, coll. B. Sirenko (D).  
 A – dorsal, marginal and ventral spicules; B – dorsal spicules; C – sutural tuft and dorsal spicules; D – jugal and latero-pleural areas of valve IV. Scale bar: 100  $\mu$ m.

Рис. 4. *Choneplax littlorum*, sp. nov., голотип (A–C) и *Ch. indica*, длина тела 5,0 мм, Индийский Океан, банка Сая-де-Малья, 12–15 м, сб. Б. Сиренко (D).  
 А – дорсальные, маргинальные и вентральные спикулы; В – дорсальные спикулы; С – пучок игл и дорсальные спикулы; D – югальное и латерально-плевральное поля щитка IV. Масштабная линейка: 100 мкм.



Первый тихоокеанский вид рода *Choneplax*  
(Mollusca: Polyplacophora)

Борис СИРЕНКО

Зоологический институт Российской Академии наук,  
Университетская наб., Санкт-Петербург 199034,  
РОССИЯ

**РЕЗЮМЕ.** Описан новый вид рода *Choneplax* из  
Восточного Самоа. Он обитает на инкрустирую-

щих кораллиновых водорослях, подобно *Choneplax*  
*lata* из Карибского моря. Новый вид имеет сходство  
и с некоторыми видами рода *Acanthochitona*. Сделано  
предположение о происхождение видов, объединенных  
в род *Choneplax*, от разных видов широко  
распространенного в Мировом океане рода  
*Acanthochitona* в результате продолжающейся  
редукции тегментума и связанной с этим редукцией  
разрезов инсерционных пластинок раковины.

