

Description of a minute new chiton (Mollusca, Polyplacophora) from Sri Lanka

Boris SIRENKO*, Enrico SCHWABE**

*Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, 199034, St. Petersburg, RUSSIA; marine@zin.ru;

**Bavarian State Collection of Zoology, Münchhausenstraße 21, D-81247 Munich, GERMANY; enrico.schwabe@zsm.mwn.de

ABSTRACT. Among a small collection of Polyplacophora from the Hans-Georg Müller collection at the Bavarian State collection we recognized an undescribed species of *Leptochiton* Gray, 1847, which is described herein. The species is minute (2.1 mm) and shows a strong sculpturing of roundish granules. The species' small size, long intersegmental spicules, and the high tail valve with a concave postmucronal slope, easily separates this species from its congeners. In addition, based on the new material, we are able to raise the number of chiton species identified in Sri Lanka to 24, although three of them require further study. The former known species are compiled to make an easy tracing of the Sri Lanka chiton fauna possible. Within this evaluation we transferred the species *Tonicia pectinoides* Sykes, 1903 and *Tonicia ceylonica* Leloup, 1936 to the genus *Lucilina*, following the concept of Schwabe *et al.* [2008]. Besides the new species, *Rhyssoplax maldivensis* (E. A. Smith in Gardiner, 1903) and *Acanthochitona leopoldi* (Leloup, 1933), were the first time mentioned from Sri Lanka. Comparisons with the chiton faunas of the Andaman Sea area and the Maldives show that minimal species overlapping occurs, despite a similar species numbers in the three areas discussed.

Introduction

The earliest-derived extant chitons belong to the suborder Lepidopleurina Thiele, 1909, which contains the genus *Leptochiton* Gray, 1847. Despite a wide range of interpretation of the genus' characteristics, resulting in an inhomogeneous use (see also discussion in Sigwart, 2009 and Sigwart *et al.*, 2010), the genus generally is interpreted by a) a lacking of insertion plates, b) the more or less posteriorly arrangement of gills that extend to the anus, and c) the general outline, defined by a more or less elongate body shape, thin valves, which are generally round backed and show a fine granulation [Kaas, Van Belle, 1985]. At present about 90 species [Schwabe, Gofas, 2010] are attributed to this genus with the majority of them having a body length of around 10 mm. Among them several tiny species are also

known: e.g., *Leptochiton tenuis* Kaas, 1979 (body length 3.0 mm, from the Bay of Biscay), *L. hiriensis* Schwabe et Lozouet, 2006 (body length 1.4 mm, from Rapa Island) [Kaas, Van Belle, 1985; Schwabe, Lozouet, 2006]. From our own examinations we recognized that the species in the genus *Leptochiton* inhabit shallow or deep waters (in cold or temperate regions) at high latitudes, or deep waters at low latitudes. Only a few leptochitons inhabit shallow warm water including tropical coral zones. Probably one of the main reasons for such a distribution of leptochitons is an inability to compete for resources with gastropods and more advanced groups of chitons. Only a few species of very small leptochitonids could find niches in shallow tropical seas. Among them is a new species from Sri Lanka, which is described below.

Material and methods

Examination of coral rubble yielded a few chitons, which were preserved in 75% ethanol. For Scanning Electron Microscopy (SEM), valves, armature of girdle and the radula of the holotype were boiled for 15 minutes in 7% KOH solution to remove all organic material.

Abbreviations: SMF – Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt a. M., Germany. ZISP – Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia. ZSM – Bavarian State collection of Zoology, Munich, Germany.

Class Polyplacophora Gray, 1821
Subclass Neoloricata Bergenhayn, 1955
Order Lepidopleurida Thiele, 1909
Suborder Lepidopleurina Thiele, 1909
Family Leptochitonidae Dall, 1889

Genus *Leptochiton* Gray, 1847

Type species: *Chiton cinereus* (sensu) Montagu 1803 (*non* Linnaeus, 1767) = *Leptochiton asellus*

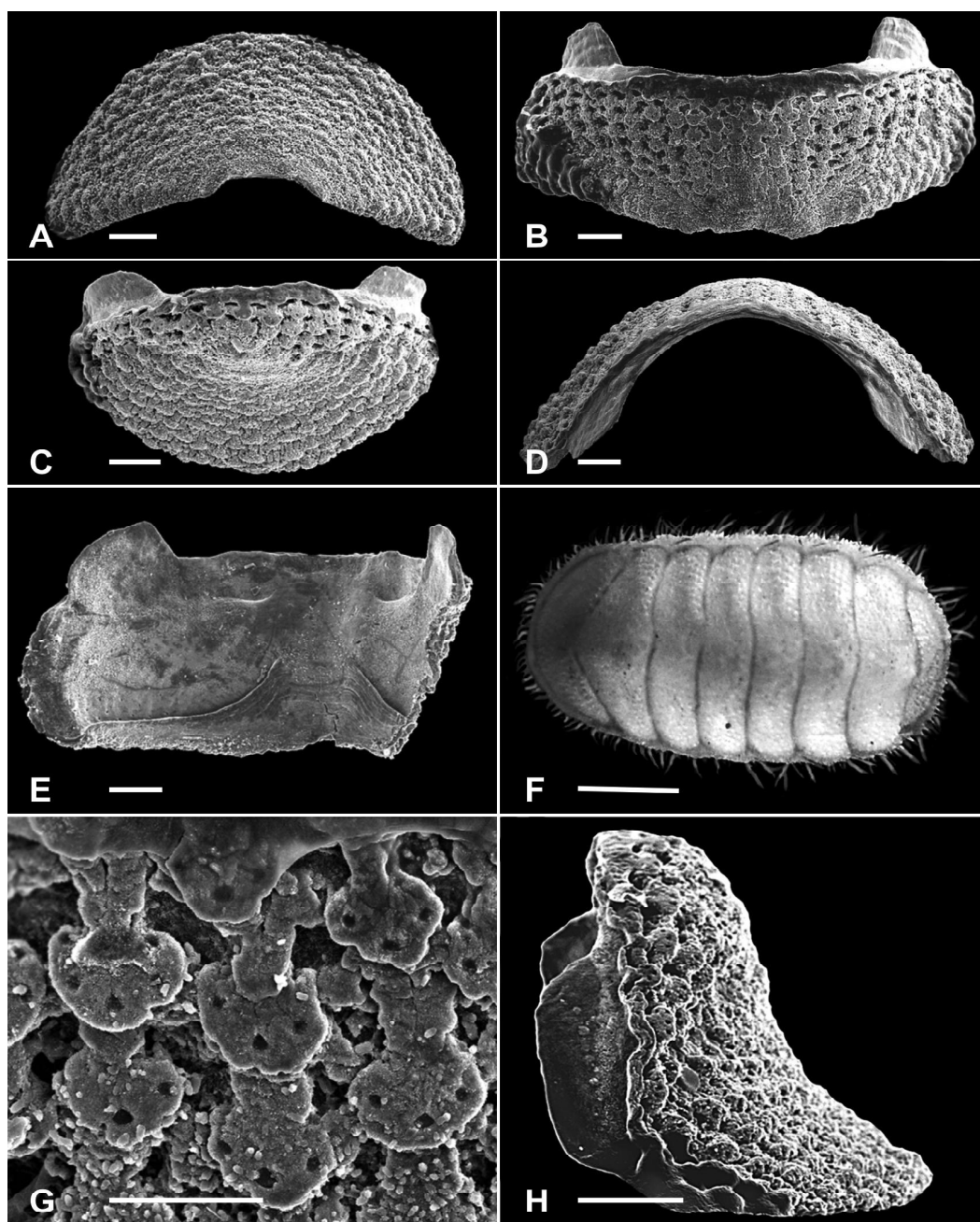


FIG. 1. *Leptochiton muelleri* n. sp., holotype (ZISP 2170), 2.1 mm: A, valve I, dorsal view; B, valve V, dorsal view; C, valve VIII, dorsal view; D, valve IV, rostral view; E, valve VI, ventral view; F, whole animal, dorsal view; G, valve V, tegmentum sculpture; H, valve VIII, left lateral view. Scale bars: A-E, H 100 μ m, F 500 μ m, G 10 μ m.

РИС. 1. *Leptochiton muelleri* n. sp., голотип (ZISP 2170), 2.1 мм: А, створка I, с дорсальной стороны; В, створка V с дорсальной стороны; С, створка VIII, с дорсальной стороны; D, створка IV, вид с роострума; Е, створка VI, с вентральной стороны; F, вид животного с дорсальной стороны; G, створка V, скульптура тегмента; H, створка VIII, вид слева. Масштаб: А-Е, H 100 мкм, F 500 мкм, G 10 мкм.

(Gmelin, 1791) *vide* Lovén [1846: 159], subsequent designation by Gray [1847: 168].

Genus distribution: Worldwide. Palaeocene-Recent.

Leptochiton muelleri n. sp.
(Figs. 1-3)

Type material. – Holotype (ZISP 2170), 2

paratypes (ZSM Mol 20050545, 20100702) from the type locality; 2 paratypes (ZSM Mol 20041563) from India, Sri Lanka, Ahangama (5°58'N 80°22'E), fringing reef; dead corals, partly covered with algae; moderately exposed reef flat and reef channels, intertidal to shallow subtidal; extracted from algae by H.-G. Müller, 28.02.1993; 1 paratype (ZSM Mol 20061085) from same station.

Type locality. – India, Sri Lanka, Unawatuna

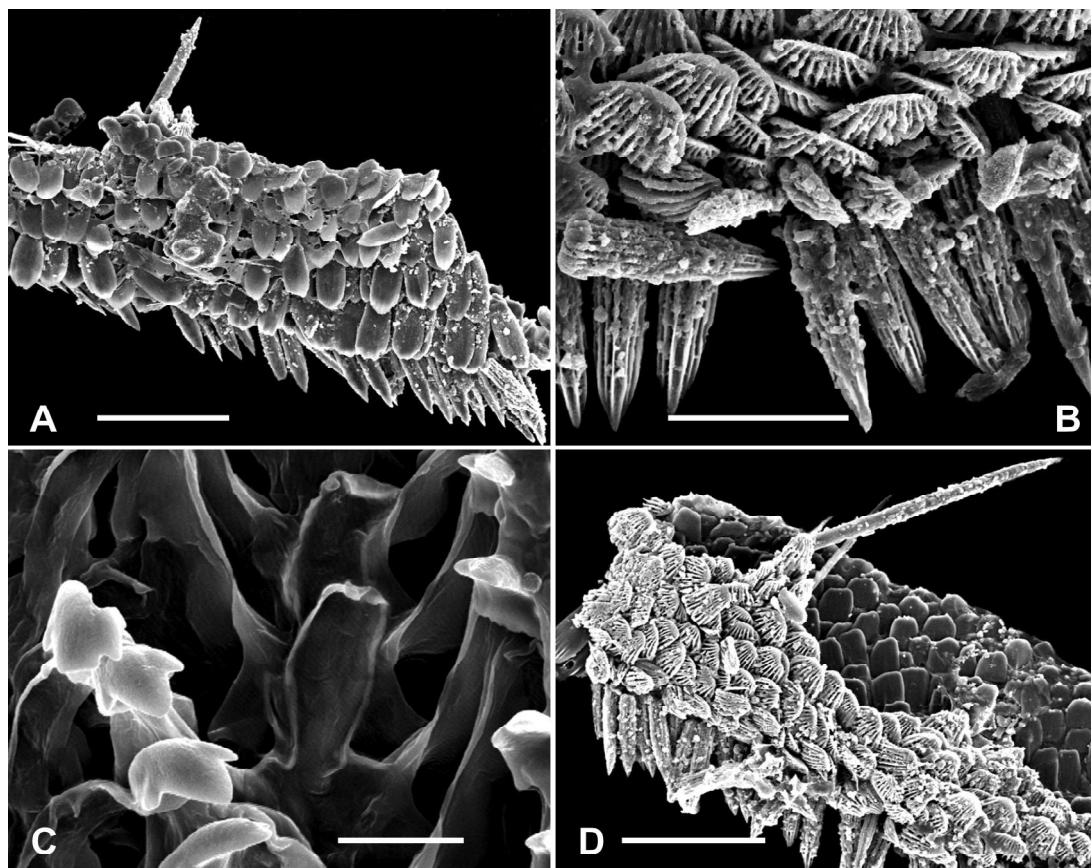


FIG. 2. *Leptochiton muelleri* n. sp., holotype (ZISP 2170), 2.1 mm: A, ventral scales (above) and marginal scales (below) and needle-like spicule; B, dorsal (above) and marginal scales; C, central portion of radula; D, dorsal (middle), ventral (above) and marginal scales (below) and intersegmental needle-like spicules. Scale bars: A, D 100 μ m, B 50 μ m, C 10 μ m.

РИС. 2. *Leptochiton muelleri* n. sp., голотип (ZISP 2170), 2.1 мм: А, вентральные (сверху) и маргинальные (снизу) чешуйки и игловидная спикула; В, дорсальные (сверху) и маргинальные чешуйки; С, средняя часть радулы; D, дорсальные (в середине), вентральные (сверху) и маргинальные чешуйки (снизу) и межсегментные игловидные спикулы. Масштаб: А, D 100 мкм, В 50 мкм, С 10 мкм.

(6°N, 80°14'E), dead corals with sabellid colonies at inner reef edge, 0.5–1.0 m.

Etymology. – Named in honour of the late Dr. Hans-Georg Müller (Germany), a skilled collector who found this species in 1993.

Material examined. – The type material, a total of seven specimens.

Diagnosis. – Animal minute, elongate-oval. Valves moderately elevated, rounded, not beaked, tail valve very high with anterior mucro. Tegmen- tum sculptured with oval or rounded, flattened granules arranged in longitudinal rows in central areas of intermediate valves and in antemucronal area of tail valve. In other areas granules arranged in quincuncial pattern. Each granule with one megal-aes- thete and four micraesthetes located in front of megal-aes- thete. Perinotum densely covered with scales with ca. 10 ribs on each; needle-like spicules at intersegmental area and near margin. Second lateral tooth of radula with tridentate cusp.

[Диагноз. Животное маленькое, удлинённо-овальное.

Щитки умеренно приподнятые, закругленные, без оттянутого апекса, хвостовой щиток очень высокий, с передним мукро. Тегментум скульптурирован овальными или округлыми уплощенными гранулами, собранными в продольные ряды в центральных частях средних щитков и переднего края хвостового щитка. В других местах гранулы располагаются в шахматном порядке. Каждая гранула с одним мега- и четырьмя микроэстетам, расположенными перед мегалозестом. Перинотум густо покрыт чешуйками, каждая из которых несет примерно 10 ребер. Игловидные спикулы располагаются в межсегментных областях и около краев. Второй латеральных зуб радулы с трехзубцовым лезвием.]

Description. – Up to 2.1 x 1.3 mm (largest specimen examined is the figured holotype, Fig. 1F), elongate – oval. Width of valves: I – 0.90 mm (Fig. 1A), V – 1.05 mm (Fig. 1B), VIII – 0.74 mm (Fig. 1C). Valves moderately elevated, dorsal elevation 0.42 (of valve V), dorsum evenly rounded (Fig. 1D), not beaked. Head valve semicircular. Intermediate valves short (Figs 1B, E), side margins rounded, lateral area weakly raised; anterior and posterior

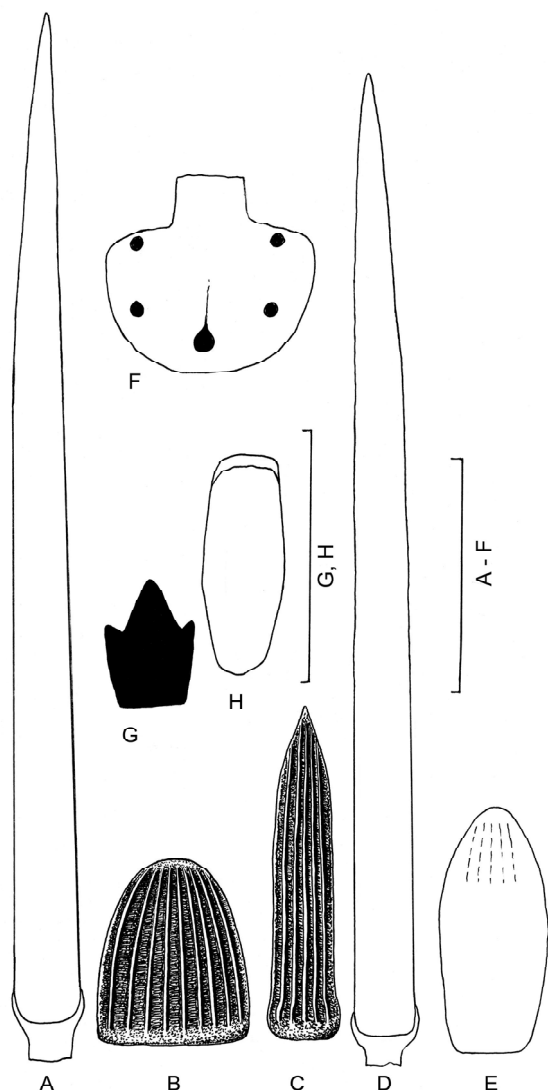


FIG. 3. *Leptochiton muelleri* n. sp., holotype (ZISP 2170), 2.1 mm: A, intersegmental needle-like spicule; B, dorsal scale; C, marginal scale; D, marginal needle-like spicule; E, ventral scale; F, aesthete group; G, head of major lateral tooth of radula; H, central tooth of radula. Scale bars: A-F 50 μ m, G-H 20 μ m.

РИС. 3. *Leptochiton muelleri* n. sp., голотип (ZISP 2170), 2.1 мм: А, межсегментная игловидная спикула; В, дорсальная чешуйка; С, маргинальная чешуйка; D, маргинальная игловидная спикула; Е, вентральная чешуйка; F, группа эстетов; G, коронка основного латерального зуба радулы; H, центральный зуб радулы. Масштаб: А-F 50 мкм, G-H 20 мкм.

margin nearly straight. Tail valve (Figs 1C, H) high, mucro anteriorly situated, short antemucronal area strongly convex postmucronal slope evenly concave. Tegmentum evenly granulose. On head valve, lateral areas of intermediate valves, and postmucronal area of tail valve the granules are oval; evenly arranged quincuncially. Central areas of intermediate valves and antemucronal area of tail valve

with longitudinal chains of roundish, flat, only weakly raised granules. There are 19 chains in central area, and about 14 in antemucronal area. Each granule with one megal aesthete and four micraesthetes positioned in front of megal aesthete (Figs 1G, 3F).

Articulamentum weakly developed, insertion plates lacking, apophyses broadly rounded, triangular in valves II-VII, trapezoidal in tail valve.

Perinotum very narrow (about 0.13 mm near valve V), densely covered with small, bluntly pointed, dorsally strongly ribbed (with ca. 8–10 ribs) scales (40 $\times$ 30 μ m) (Figs 2B, D, 3B). Intersegmental area with long (210 $\times$ 20 μ m), smooth needle-like spicules (Fig. 3A). Margin armed with two different kinds of elements: 1) few long needle-like spicules similar to the intersegmental spicules (Fig. 3D) and 2) numerous, dorsally finely ribbed (6–7 ribs) scales (70 $\times$ 18 μ m) with a sharply pointed distal end (Figs 2B, 3C). Hyponotum clothed with small (50–60 $\times$ 20 μ m), oval, distally obtusely-pointed blunt scales, which show five short ribs near their tip (Figs 2A, 3E).

Radula 0.5 mm long with 42 transverse rows of mature teeth. Central tooth high, rectangular, slightly broadened in middle part (Figs 2C, 3H). Second lateral tooth with tricuspid head (Fig. 3G), central denticle clearly longer than the outer ones. The remaining teeth hardly visible in the examined radula.

One paratype (ZSM Mol 20100702) with six ctenidia of nearly equal length on each side extending from valves VI to VIII. Ctenidia in holotype not countable.

Distribution. – The species is only known from Sri Lanka.

Remarks. – *Leptochiton muelleri* n. sp. is morphologically similar to the “Mediterranean” *L. cimicoides* (di Monterosato, 1879). There is a record of *L. cimicoides* outside the Mediterranean Sea, from the West Sahara [Pizzini, Tringali, 1993], but geography still separates it from the new taxon. The two are similar in the girdle scales and the form of the head of the second lateral tooth, but *L. muelleri* n. sp. is distinct in a) the oval shape of the tail valve with a round anterior margin, which is semicircular with a straight anterior margin in *L. cimicoides*; b) the mucro is situated anteriorly in *L. muelleri* n. sp. vs. centrally in *L. cimicoides*; and c) the long needle-like intersegmental spicules in *L. muelleri* n. sp. are never present in *L. cimicoides* [Dell’Angelo, Smriglio, 1999].

Another very similar species is known from the Polynesian region of the Pacific: *Leptochiton hiriensis* Schwabe et Lozouet, 2006. This species was originally known from Rapa but has been subsequently discovered in samples from Moorea Island by the second author (ES), while studying Polynesian chitons from another part of the Hans-Georg

Müller collection at the SMF. Both species are very small (*L. hiriensis* is 1.4 mm vs. *L. muelleri* n. sp. at 2.1 mm). The main differences separating these species are: a) tegmental sculpture: widely separated granules (*L. hiriensis*) vs. close-packed granules (*L. muelleri* n. sp.), strong commarginal ridges vs. no traceable commarginal structures, well pronounced and elevated lateral areas vs. hardly elevated lateral areas; b) shape of tail valve, central mucro vs. anteriorly situated mucro, flat and straight post-mucronal slope vs. steep and concave slope; c) perinotum elements, strongly ribbed sutural needles up to 50 µm vs. smooth up to 210 µm long intersegmental needles, dorsal scales (35 x 20 µm) with up to 15 strong ribs vs. 40 x 30 µm measuring scales with up to 10 strong ribs.

Discussion

The chitons of Sri Lanka (known as Ceylon until 1972) were first mentioned in the late 19th century [Pilsbry, 1893; E. A. Smith, 1894], but to our knowledge Sykes [1903] provided the first comprehensive list of the chiton fauna of this island. He interpreted nine species, including five he described as new. According to Kaas, Van Belle [1998] some of his taxa fall in the synonymy of previously known species, so Sykes' [1903] list represents five valid species, with four additional species actually of unclear taxonomic position (Table 1).

(Re-)Examination of local faunas often yields a surprisingly higher number of chitons than previously known from literature [e.g., Schwabe *et al.*, 2008; Dell'Angelo *et al.*, 2010]. This is also true for the chiton fauna of Sri Lanka. Summarizing the available data from literature records shows the total number of valid clarified species was 17 prior to the new material presented here (Table 1). Two species that were historically reported from Sri Lanka remain taxonomically dubious: Sykes [1903] described *Ischnochiton ferreus* from the holotype, which is now lost. Based on the original description, Kaas, Van Belle [1990] considered the material probably belonging to *Lepidozona luzonica* (Sowerby, 1842) but no other specimens have yet been collected from Sri Lanka to confirm this. Sykes [1903] also listed *Callochiton platessa* (Gould, 1846) which is probably an unidentified species of *Callochiton*.

Due to the collecting activities of Dr. Hans-Georg Müller, we can add some additional taxa he obtained (deposited in ZSM) from coral reefs at Ahangana (5°58'N 80°22'E), Tangalle Bay (6°1'N 80°48'E) and Unawatuna (6°N 80°14'E), including *Leptochiton muelleri* n. sp. (Table 2).

The new data add at least three further species to the known fauna of Sri Lanka, raising the total number of 24. This number is three times greater than the eight valid chiton species reported by Hylleberg, Kilburn [2002], given that those authors also

Table 1: Present stage of knowledge of the chiton fauna of Sri Lanka, based upon literature records. Taxa indicated in bold refer to valid species.

Taxon	source	current status	source	comment
Family Leptochitonidae Dall, 1889				
<i>Leptochiton alveolus</i> (M. Sars MS, Lovén, 1846)	Kaas, Van Belle, 1985: 36	<i>Leptochiton belknapi</i> Dall, 1878	Kaas, Van Belle 1987: 23	Recorded as <i>Lepidopleurus similis</i> E. A. Smith, 1894
<i>Lepidopleurus similis</i> F. A. Smith, 1894	F. A. Smith, 1894: 167, pl. 4, figs 9-12	<i>Leptochiton belknapi</i> Dall, 1878	Kaas, Van Belle, 1987: 23	
Family Callochitonidae Plate, 1901				
<i>Callochiton platessa</i> (Gould, 1846)	Sykes, 1903: 178	? <i>Callochiton</i> sp.		The nominal species <i>Chiton platessa</i> Gould, 1846 is <i>Ischnochiton versicolor</i> (Sowerby, 1840) <i>fide</i> Kaas, Van Belle [1980: 102]
<i>Callochiton sublaevis</i> Sykes, 1903	Sykes, 1903: 177, pl. 1, fig. 3	unchanged		
Family Ischnochitonidae Dall, 1889				
<i>Ischnochiton aequigranulatus</i> von Knorre, 1925	Von Knorre, 1925: 605, figs 6-9, pl. 32, fig. 55, pl. 33, fig. 57	<i>Ischnochiton bouryi</i> Dupuis, 1917	Winckworth in Leloup, 1952: 11	
<i>Ischnochiton alatus</i> (Sowerby, 1841)	Leloup, 1937: 163	<i>Stenoplax alata</i> (Sowerby, 1841)		
<i>Ischnochiton ferreus</i> Sykes, 1903	Sykes, 1903: 178, pl. 1, fig. 5	nom. dub.	Kaas, Van Belle, 1990: 250	? <i>Lepidozona luzonica</i> (Sowerby, 1842)
<i>Ischnochiton gallensis</i> von Knorre, 1925	Von Knorre, 1925: 611, text figs 10-12, pl. 34, fig. 58	unchanged		

Table 1. (from previous page)

Taxon	source	current status	source	comment
<i>Ischnochiton herdmanni</i> Sykes, 1903	Sykes, 1903: 178, pl. 1, fig. 6	<i>Stenoplax alata</i> (Sowerby, 1841)	Leloup, 1937: 163	
<i>Ischnochiton winckworthi</i> Leloup, 1936	Leloup, 1936: 51, figs 1-9, 12	unchanged		
<i>Ischnochiton</i> sp.	Sykes, 1903: 179	unknown		
? <i>Lepidozona luzonica</i> (Sowerby, 1842)	Kaas, Van Belle, 1990: 250, map 15			This is the record of <i>Ischnochiton ferreus</i> Sykes, 1903.
Family Chitonidae Rafinesque, 1815				
<i>Chiton ceylanicus</i> E. A. Smith, 1904	E. A. Smith, 1904: 7	unchanged		
<i>Ischnochiton ravanae</i> Sykes, 1903	Sykes, 1903: 178, pl. 1, fig. 4	<i>Tegulaplax hululensis</i> (E. A. Smith in Gardiner, 1903)	Kaas, 1979: 866	
<i>Tegulaplax hululensis</i> (E. A. Smith in Gardiner, 1903)	Kaas, 1979: 866	unchanged		This is the record of <i>Ischnochiton ravanae</i> Sykes, 1903.
<i>Tonicia ceylonica</i> Leloup, 1936	Leloup, 1936: 57, figs 13-21	<i>Lucilina ceylonica</i> (Leloup, 1936)	new comb.	Following the concept discussed in Schwabe <i>et al.</i> 2008
<i>Tonicia pectinoides</i> Sykes, 1903	Sykes, 1903: 179, pl. 1, fig. 1	<i>Lucilina pectinoides</i> (Sykes, 1903)	new comb.	Following the concept discussed in Schwabe <i>et al.</i> , 2008
<i>Squamopleura stratiotes</i> Winckworth MS, Leloup, 1939	Leloup, 1939: 9, figs 5-7, 12-15, 28	<i>Acanthopleura miles</i> (Carpenter in Pilsbry, 1893)	Ferreira, 1986: 239	
<i>Squamopleura salisburyi</i> Winckworth MS, Leloup, 1939	Leloup, 1939: 9, figs 8-9, 16-19, 29	<i>Acanthopleura miles</i> (Carpenter in Pilsbry, 1893)	Ferreira, 1986: 239	
<i>Acanthopleura miles</i> (Carpenter in Pilsbry, 1893)	Ferreira, 1986: 240	unchanged		
Family Mopaliidae Dall, 1889				
<i>Plaxiphora indica</i> Thiele, 1909	Thiele, 1909: 23, pl. 3, figs 15-19	unchanged		
<i>Plaxiphora platei</i> von Knorre, 1925	Von Knorre, 1925: 617, text figs 15-17, pl. 32, fig. 56, pl. 35, fig. 59	<i>Plaxiphora indica</i> Thiele, 1909	Kaas, Van Belle, 1994: 274	Leloup [1937: 167] first recognized that both taxa are identical, but grouped them under <i>P. tricolor</i> .
<i>Plaxiphora tricolor</i> Thiele, 1909	Kaas, Van Belle, 1994: 271	unchanged		Originally described as being from "Lobos Island", Kaas, Van Belle [1994: 271] speculated that the species comes from "Ceylon"
Family Acanthochitonidae Pilsbry, 1893				
<i>Angasia tetrica</i> Carpenter in Pilsbry, 1893	Pilsbry, 1893: 287, pl. 61, figs 27-32	<i>Craspedochiton tetrica</i> (Carpenter MS, Dall, 1882)	Schwabe, 2006: 20	
<i>Angasia tetrica</i> var. <i>calculosa</i> Carpenter in Pilsbry, 1893	E. A. Smith, 1904: 7	<i>Craspedochiton tetrica</i> (Carpenter MS, Dall, 1882)	Leloup, 1952: 6	In synonymy of <i>Craspedochiton laqueatus</i> (Sowerby, 1842). Schwabe [2006] separated both taxa.
<i>Craspedochiton laqueatus</i> (Sowerby, 1842)	Sykes, 1903: 179, pl. 1, fig. 7	cf. <i>Craspedochiton tetrica</i> (Carpenter MS, Dall, 1882)	Von Knorre, 1925: 615; Schwabe, 2006: 21	
<i>Acanthochitona mahensis</i> Winckworth, 1927	Subba Rao, Dey, 2000: 6	unchanged		
<i>Acanthochitona penetrans</i> Winckworth, 1933	Subba Rao, Dey, 2000: 6	unchanged		
<i>Acanthochites penicillatus</i> (Deshayes, 1863)	Sykes, 1903: 179, pl. 1, fig. 2	<i>Acanthochitona penicillata</i> (Deshayes, 1863)		
<i>Acanthochitona alisonae</i> Winckworth MS, Kaas, 1976	Kaas, 1976: 119, figs 1-6	<i>Notoplax alisonae</i> (Winckworth MS, Kaas, 1976)	Kaas, Van Belle, 1980: 6	
Nomen nudum				
<i>Streptochiton zonulatus</i> Carpenter MS, Palmer, 1945	Palmer, 1945: 102	nom. nud.		

Table 2. The polyplacophoran fauna of Sri Lanka. New records for Sri Lanka, reported herein from the collections of H.G. Mueller, are noted including the specific collecting localities from coral reefs at: A, Ahangana (5°58'N 80°22'E), T, Tangalle Bay (6°1'N 80°48'E) and U, Unawatuna (6°N 80°14'E).

Lepidopleurida: Leptochitonidae		
<i>Leptochiton belknapi</i> Dall, 1878		
<i>Leptochiton muelleri</i> n. sp.	A, U	new record
Chitonida: Callochitonidae		
<i>Callochiton sublaevis</i> Sykes, 1903		
? <i>Callochiton</i> sp.		
Chitonida: Ischnochitonidae		
<i>Ischnochiton bouryi</i> Dupuis, 1917		
<i>Ischnochiton gallensis</i> von Knorre, 1925		
<i>Ischnochiton winckworthi</i> Leloup, 1936	A	
? <i>Lepidozona luzonica</i> (Sowerby, 1842)		
<i>Stenoplax alata</i> (Sowerby, 1841)	A	
Chitonida: Chitonidae		
<i>Chiton ceylanicus</i> E. A. Smith, 1904		
<i>Acanthopleura miles</i> (Carpenter in Pilsbry, 1893)		
<i>Lucilina ceylonica</i> (Leloup, 1936) n. comb.		
<i>Lucilina pectinoides</i> (Sykes, 1903) n. comb.		
<i>Plaxiphora indica</i> Thiele, 1909		
<i>Plaxiphora tricolor</i> Thiele, 1909	A,U	
<i>Rhyssoplax maldivensis</i> (E. A. Smith in Gardiner, 1903)	A,T,U	new record
<i>Tegulaplax hululensis</i> (E. A. Smith in Gardiner, 1903)		
Chitonida: Acanthochitonidae		
<i>Craspedochiton tetrica</i> (Carpenter MS, Dall, 1882)		
<i>Acanthochitona leopoldi</i> (Leloup, 1933)	A,T	new record
<i>Acanthochitona mahensis</i> Winckworth, 1927		
<i>Acanthochitona penetrans</i> Winckworth, 1933		
<i>Acanthochitona penicillata</i> (Deshayes, 1863)		
<i>Acanthochitona</i> sp.	A	new record
<i>Notoplax alisonae</i> (Winckworth MS, Kaas, 1976)		

cited taxa that are no longer in use. Similar total numbers of chiton species were reported in faunistic evaluations of Schwabe [2006], with 18 species from the Andaman Sea, and 19 species in the Maldives by Dell'Angelo *et al.* [2010]. Surprisingly, the Sri Lanka fauna shares with the Andaman Sea only eight species (38%), and the geographically somewhat closer situated Maldives only four (19%) identified species in common. This may either reflect a faunistic overturn between the areas, or that all three regions are still under studied. We hope that further investigations of the chiton fauna

in Sri Lanka and the near vicinity may allow a better understanding of this apparent transition zone.

Acknowledgements

We would like to thank Taimuras K. Tsogoev for his technical assistance with SEM procedures and Dr. Pavel V. Kijashko and Galina A. Kuznetsova (ZISP) for their help in preparation of figures. Dr. Ronald Janssen (SMF) is thanked for the loan of the Polynesian material. Dr. Julia Sigwart (Belfast, Northern Ireland, UK) is especially thanked for helpful comments on an earlier version of the manuscript.

References

- Dell'Angelo B., Gori S., Baschieri L., Bonfitto A. 2010. Chitons (Mollusca, Polyplacophora) from the Maldives islands. *Zootaxa*, 2673: 1–38.
- Dell'Angelo B., Smriglio C. 1999. *Chiton viventi del Mediterraneo*. Arti Grafiche La Moderna, Roma, 255 pp.
- Ferreira A. J. 1986. A revision of the genus *Acanthopleura* Guilding, 1829 (Mollusca: Polyplacophora). *Veliger*, 28 (3): 221–279.
- Gray J.E. 1847. A list of the genera of recent Mollusca, their synonyma and types. *Proceedings of the zoological Society of London*, 15: 129–206.
- Hylleberg J., Kilburn R. N. 2002. Annotated inventory of molluscs from the Gulf of Mannar and vicinity. *Phuket Marine Biological Center Special Publication*, 26: 19–79.
- Kaas P. 1976. Notes on Loricata. 8. Description of a new *Acanthochitona* species from the Bay of Bengal. *Basteria*, 40: 119–122.
- Kaas P. 1979. The Chitons (Mollusca: Polyplacophora) of Mozambique. *Annals of the Natal Museum*, 23 (3): 855–879.
- Kaas P., Van Belle R. A. 1980. *Catalogue of Living Chitons (Mollusca: Polyplacophora)*. Dr. W. Backhuys Publisher, Rotterdam, 144 pp.
- Kaas P., Van Belle R. A. 1985. *Monograph of Living chitons volume 1. Order Neoloricata: Lepidopleurina*. E.J. Brill/Dr.W. Backhuys Leiden. London. Köln. Kobenhavn, 240 pp.
- Kaas P., Van Belle R. A. 1987. *Monograph of living chitons. (Mollusca: Polyplacophora) 3, Ischnochitonidae: Chaetopleurinae, Ischnochitoninae (pars), additions to vols 1 & 2*. E. J. Brill/ W. Backhuys, Leiden, 302 pp.
- Kaas P., Van Belle R. A. 1990. *Monograph of living chitons (Mollusca: Polyplacophora). 4, Suborder Ischnochitonina: Ischnochitonidae: Ischnochitoninae (continued). Additions to vols 1, 2 and 3*. E. J. Brill, Leiden, 298 pp.
- Kaas P., Van Belle R. A. 1994. *Monograph of living chitons. (Mollusca: Polyplacophora) 5, Suborder Ischnochitonina: Ischnochitonidae: Ischnochitoninae (concluded) Callistoplacinae; Mopaliidae; Additions to Volumes 1-4*. E. J. Brill/ W. Backhuys, Leiden, 402 pp.
- Kaas P., Van Belle R. A. 1998. *Catalogue of living chitons (Mollusca, Polyplacophora). second, revised edition*. Backhuys Publishers Leiden, 204 pp.
- Leloup E. 1936. Descriptions de Deux Espèces d'Amphineures Provenant de Trincomali (Ceylan). *Proceedings of the Malacological Society of London*, 22 (2): 51–61, pl. 6.
- Leloup E. 1937. Notes sur les Polyplacophores. *Proceedings of the Malacological Society, London*, 22 (4): 163–176.
- Leloup E. 1939. Caractères anatomiques de certains Amphineures du genre *Squamopleura*. *Bulletin du Musée royal d'Histoire naturelle de Belgique*, 15 (33): 1–12.
- Leloup E. 1952. Polyplacophores de l' Océan Indien et des côtes de l' Indochine française. *Mémoires du Musée royal d'Histoire Naturelle de Belgique*, 2 (47): 1–69, pls 1–6.
- Lovén S. L. 1846. Index Molluscorum litora Scandinaviae occidentalia habitantium. – *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 3: 135–204.
- Montagu G. 1803. *Testacea Britannica or natural history of British shells, marine, land and freshwater, including the most minute, systematically arranged and embellished with figures*. London.
- Palmer K. V. W. 1945. Molluscan types in the Carpenter collection in the Redpath Museum. *The Nautilus*, 58 (3): 97–102.
- Pilsbry H.A. 1892-1894. Monograph of the Polyplacophora. In: Tryon G.W. (Ed.) *Manual of Conchology*, Academy of Natural Sciences, Philadelphia, Vol. 14, 1–128, pls 1–30 (1892); i–xxxiv, 129–350, pls 31–68, Vol. 15, 1–64, pls 1–10 (1893); 65–133, pls 11–17 (1894).
- Pizzini M., Tringali L. 1993. Nota sulla Presenza in W Africa di *Lepidopleurus (Leptochiton) cimicoides* (Monterosato, 1879) e *Johania retifera* (Forbes, 1844) (Mollusca). *Notiz. CISMA*, 14 (1992): 43–46.
- Schwabe E. 2006. Chitons (Mollusca, Polyplacophora) collected during the Thai-Danish Bioshelf Surveys (1996-2000) in the Andaman Sea, Indian Ocean. *Journal of the Zoological Society Wallacea*, 2: 19–28.
- Schwabe E., Gofas S. 2010. *Leptochiton* Gray, 1847. In: Bouchet P., Gofas S., Rosenberg G. (eds) World Marine Mollusca database. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=138117> on 2010-10-07.
- Schwabe E., Lozouet P. 2006. Chitons (Mollusca, Polyplacophora) from Rapa, the southernmost island of Polynesia. *Zoosystema*, 28 (3): 617–633.
- Schwabe E., Sirenko B. I., Seeto J. 2008. A checklist of Polyplacophora (Mollusca) from the Fiji islands. *Zootaxa*, 1777: 1–52.
- Sigwart J. D. 2009. Morphological cladistic analysis as a model for character evaluation in primitive living chitons (Polyplacophora, Lepidopleurina). *American Malacological Bulletin*, 27: 95–104.
- Sigwart J. D., Schwabe E., Saito H., Samadi S., Giritbet G. 2010. Evolution in the deep sea: a combined analysis of the earliest diverging living chitons (Mollusca: Polyplacophora: Lepidopleurida). *Invertebrate Systematics*, 24: 560–572.
- Smith E. A. 1894. Natural history notes from H.M. Indian marine Survey Steamer “Investigator”, commander C.F. Oldham, R.N. – Series III., No. 10. Report upon some Mollusca dredged in the Bay of Bengal and the Arabian Sea. *The Annals and Magazine of Natural History*, (6) 14: 157–174, 366–368, pls 3–5.
- Smith E. A. 1904. Natural history notes from H.M. Indian Marine Survey Steamer ‘Investigator’, Commander T. H. Heming, R. N. – Series III., No. 1. On Mollusca from the Bay of Bengal and the Arabian Sea. *The Annals and Magazine of Natural History*, (7) 14 (79): 1–14.
- Subba Rao N. V., Dey A. 2000. Catalogue of Marine Molluscs of Andaman and Nicobar Islands. *Records of the Zoological Survey of India, Occasional Paper*, 187: 1–323.
- Sykes E. R. 1903. Report on the Polyplacophora collected by Professor Herdman, at Ceylon, in 1902. *Report of the Government of the Ceylon Pearl*

- Oyster Fisheries, Gulf of Manaar. Royal Society Supplementary Report*, 4: 177–180, pl. 1.
- Thiele J. 1909. Revision des Systems der Chitonen. I. Teil. *Zoologica. Original-Abhandlungen aus dem Gesamtgebiete der Zoologie, Stuttgart*, 22 (56/1): 1–70, pls 1–6.
- Von Knorre H. 1925. Die Schale und die Rückensinnesorgane von *Trachydermon (Chiton) cinereus* L. und die ceylonischen Chitonen der Sammlung Plate. (Fauna et Anatomia ceylanica, III, Nr. 3.). *Jenaische Zeitschrift für Naturwissenschaft*, 61 (n.s. 54) (3): 469–632, pls 18–35.

Описание мелкого нового хитона (Mollusca, Polyplacophora) из Шри-Ланки

Борис СИРЕНКО*, Энрико ШВАБЕ**

*Зоологический институт РАН, Университетская наб., 1, 199034, Сп-Петербург; marine@zin.ru;

**Bavarian State Collection of Zoology, Münchhausenstraße 21, D-81247 Munich, GERMANY; enrico.schwabe@zsm.mwn.de

РЕЗЮМЕ. В небольшой коллекции Polyplacophora, собранной Hans-Georg Müller и хранящейся в Государственной коллекции Баварии, мы обнаружили неизвестный вид *Leptochiton* Gray, 1847, который описывается в настоящей статье. Вид мелкий (2.1 мм) и характеризуется сильной скульптурой из округлых гранул. Мелкие размеры вида, длинные межсегментные спикулы и высокая хвостовая пластинка с вогнутым постмукрональным краем позволяют легко отличить его от видов того же рода. Помимо этого, на основе нового материала мы смогли увеличить число видов хитонов, известных для Шри-Ланки до 24, хотя три из них нуждаются в дальнейшем изучении. Приведены известные ранее для Шри-Ланки виды. Среди них мы перевели *Tonicia pectinoides* Sykes, 1903 и *Tonicia ceylonica* Leloup, 1936 в род *Lucilina*, следуя концепции Schwabe *et al.* [2008]. Кроме нового вида два, *Rhyssoplax maldivensis* (E. A. Smith in Gardiner, 1903) и *Acanthochitona leopoldi* (Leloup, 1933), впервые отмечаются для Шри-Ланки. Сравнение фаун хитонов Андаманского моря и Мальдивских островов демонстрирует минимальное перекрытие фаун, хотя число видов и сходно в упомянутых районах.

This paper is published on a CD-ROM to comply with the Article 8.6 of the International Code of Zoological Nomenclature. The copies of the CD-ROM were mailed on the date mentioned on the front page to: Department of biological literature of the Library on Natural Sciences of Russian Ac. Sci., Library of Zoological Institution of Russian Ac. Sci., Malacology library of Muséum National d'Histoire Naturelle (Paris, France), Malacology library of the Natural History Museum (London, UK), Library of the National Museum of Natural History, Smithsonian Institution (Washington, DC, USA); Thomson Reuters (publishers of Zoological Record).

Эта статья опубликована на CD-ROM, что соответствует требованиям статьи 8.6 Международного Кодекса Зоологической номенклатуры. Копии CD-ROM разосланы в день, указанный на первой странице в следующие библиотеки: Библиотеку биологической литературы РАН (Москва), которая является отделом Библиотеки по естественным наукам Российской академии наук (БЕН РАН); библиотеку Зоологического института РАН; малакологическую библиотеку Muséum National d'Histoire Naturelle (Париж, Франция); малакологическую библиотеку Natural History Museum (London, UK), библиотеку National Museum of Natural History, Smithsonian Institution (Washington, DC, USA); Thomson Reuters (издатели Zoological Record).