Arthropoda Selecta 7 (3): 175–178

A new species of the barnacle genus *Lithoglyptes* Aurivillius, 1892 from the tidal waters of Java, Indian Ocean (Cirripedia: Acrothoracica)

Новый вид усоногих рода *Lithoglyptes* Aurivillius, 1892 из приливно-отливной зоны острова Ява (Индийский океан) (Cirripedia: Acrothoracica)

Kolbasov G.A.
Колбасов Г.А.

Biological Faculty, Moscow State University, Moscow 119899 Russia.
Биологический факультет МГУ, Москва 119899 Россия.

KEY WORDS: Acrothoracica, *Lithoglyptes*, new species, classification.
КЛЮЧЕВЫЕ СЛОВА: Acrothoracica, *Lithoglyptes,* новый вид, классификация.

ABSTRACT: A new species of *Lithoglyptes* is described from a burrow in a dead gastropod shell occupied by a hermit crab in the tidal waters of Java, Indonesia, Indian Ocean as based on the collection of the Zoological Museum of the Moscow State University: *L. ivanovi* sp.n. Four seemingly natural groups of *Lithoglyptes* species are delimited on the basis of a morphological analysis. In the future, each of these groups could be recognized as a separate genus.

РЕЗЮМЕ: Из коллекции Зоологического Музея МГУ описан новый вид сверлящих усоногих рода *Lithoglyptes*: *L. ivanovi* sp.n., обитающий в норке, проложенной в мертвой раковине брюхоногого моллюска, занятого раком-отшельником из приливно-отливной зоны острова Ява (Индонезия, Индийский океан). На основе морфологического анализа в составе рода выделены четыре предположительно естественные группы видов таксономических группы, которым в будущем, вероятно, следует придать родовые ранги.

Introduction

Together with two other orders, the Rhizocephala and the Thoracica, the burrowing barnacles of the order Acrothoracica compose the class Cirripedia. Although acrothoracicans were first discovered by Hancock as far back as 1849, their structure and taxonomic scope within the Cirripedia still remain unclear. The point is, that acrothoracicans are small-sized and of endolithic way of life, their exterior consisting of a sac-like mantle. The mantle forms an aperture on top surrounded by opercular bars, an attachment disk is situated dorsally, while the exterior of the mantle is armed with various teeth, setae and scales. The body lies inside the mantle sac and is distinguished from thoracican barnacles in having all but the first pair of mouth cirri clustered at the posterior end of the thorax.

All acrothoracicans are dioecious, the female bearing one or more dwarf males on the mantle exterior.

Material and methods

A lot of acrothoracicans were found in the mollusk shell collection of the Zoological Museum of the Moscow State University during a survey of tropical material. One of the gastropod shells taken up by a hermit crab happened to contain a burrow which attracted our attention as containing a barnacle. The margins of the burrow were treated with 2% HCl, then the burrow was mechanically destroyed for removal of the animal. Such a method allowed to save the calcareous plates known to be characteristic of some lithoglyptid species. All material was preserved in 70 % alcohol. We used KOH-treated material transferred in glycerine for light microscopy [Tomlinson, 1969].

Taxonomy

CLASS CIRRIPEDIA BURMEISTER, 1834

ORDER ACROTHORACICA GRUVEL, 1905

Family Lithoglyptidae Aurivillius, 1892

Genus *Lithoglyptes* Aurivillius, 1892

DIAGNOSIS: Lithoglyptids with four pairs of terminal cirri (III–VI) and a pair of caudal appendages.

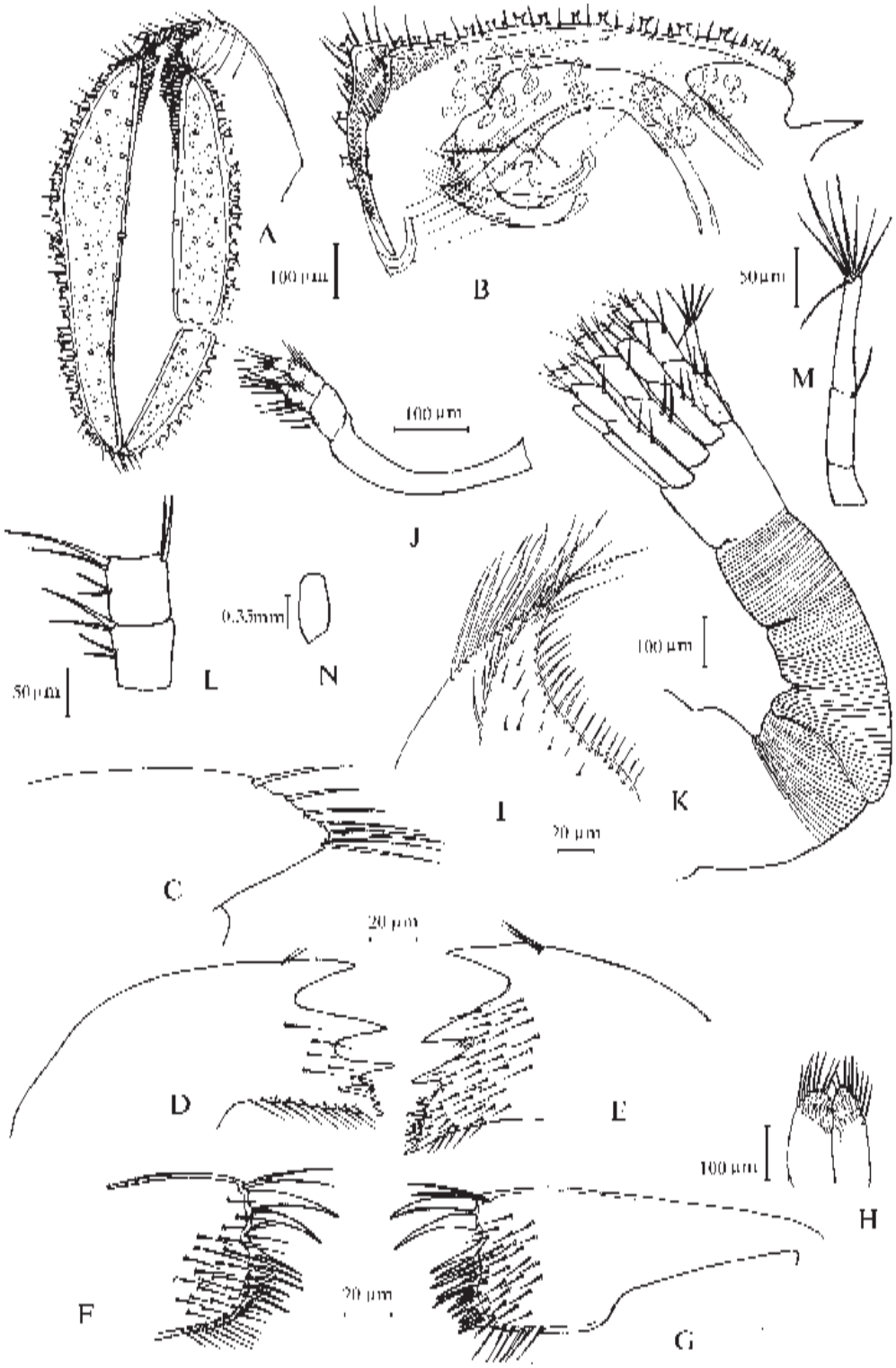

Figure. *Lithoglyptes ivanovi* sp.n. A — operculum, upper view; B — operculum, lateral view; C — mandibular palp; D, E — mandibles; F, G — maxillae I; H — maxillae II, inner view; I — maxilla II, lateromesal view; J — mouth cirrus (I); K — posterior end of thorax with terminal cirri (III–VI); L — middle segments of posterior ramus of cirri V; M — caudal appendages; N — burrow aperture. Scale bars: A, B, H, J, K — 100 mm; C, D, E, F, G, I — 20 mm; L, M — 50 mm; N — 0.35 mm.

Рисунок. *Lithoglyptes ivanovi* sp.n.: A — оперкулюм, вид сверху; B — оперкулюм, вид сбоку; C — мандибулярный щупик; D,E — мандибулы; F, G — максиллы I; H — максилла II, вид изнутри; I — максилла II, внутренний вид; J — ротовая усоножка (I); K — задний конец торакса с терминальными усоножками (III–VI); L — срединные членики задней ветви V пары усоножек; M — каудальные придатки; N — отверстие норки. Масштаб: A, B, H, J, K — 100 mm; C, D, E, F, G, I — 20 mm; L,M — 50 mm; N – 0,35 мм.

Lithoglyptes ivanovi Kolbasov, **sp.n.**
Figure.

DIAGNOSIS: Opercular bars without processes, covered with bifid teeth laterally; carinal lobes rudimentary; caudal appendages 3-segmented; lateral bars and orificial knob absent.

MATERIAL. A single female holotype without dwarf male, together with two specimens of *Kochlorine hamata* Noll, 1872 (Acrothoracica: Lithoglyptidae), in a 50 mm long shell of the gastropod *Thais* sp. (Gastropoda: Thaitidae) occupied by a hermit-crab. The barnacle occupying the lower part of the burrow, we have managed to only extract the specimen in several pieces, all fragments examined separately.

Location. Indian Ocean, Java, Chilachap, ca. 7°45′S, 109°E, tidal zone. The holotype is deposited in the Zoological Museum of the Moscow State University, No. Mg-1139.

DESCRIPTION. Female: Operculum fusiform (Fig. A), 700 mm long, 250 mm wide, slightly wider toward carinal end than toward rostral one. Opercular bars without conical processes, outer lateral margins bearing bifid teeth (Figs A, B) interspersed with setae and sparse sharp denticles, inner lateral margin with sharp denticles, without any setae, faces with small scattered granulations.

A typical comb collar situated on ventral (= carinal) side. A pair of rudimentary soft lobes covered with setae hardly noticeable below carinal end of opercular bars (Figs A, B).

Mantle sac wrinkled, with longitudinal (mantle muscles) and transverse striations, studded with typical bifid teeth. Opercular area without lateral bars, apertural bar (= rod) reinforcing the mantle internally, posteriorly dorsal to head (Fig. B). Orificial knob absent, sharp attachment knob below operculum rostrally.

Internal structure similar to other lithoglyptid species. A shield-like labrum forming the top of oral cone in opercular area (Fig. B); mandibles with palps and two pairs of maxillae posteriorly. Labrum with a bunch of conspicuous setae near upper edge. Mandibles serrate (Figs D, E), with three stout teeth and numerous sharp spinules at inner angle; a small conspicuous thorn inserted below second stout tooth; distal part of blade with numerous setae on lateral sides and at inner edge. Mandibular palps (Fig. C) with trapezoid tips, covered with long setae at distal end. Superior angle of maxilla I (= maxillule) (Figs F, G) bearing two large spines; cutting edge with a row of numerous smaller sharp spines separated from superior angle by a distinct notch; faces setose distally; a pair of long setae above large spines; inner edge with a row of setae. Maxillae II (= maxillae) bean-shaped when viewed from inner faces (Fig. H) and triangular in lateromesal view (Fig. I); tip and posterior (= outer) edges with long setae; smaller ones at inner edges (median and inner in Fig. I); inner surface with scattered tiny setae.

Mouth cirri (Fig. J) with a 2-jointed protopod and two multisegmented rami. Arcuate coxae long; bases one-fifth as long as coxae, with two setae at posterior edge. Anterior ramus 3-segmented, posterior one 2-segmented, all segments armed with plumose setae.

Four pairs of broken terminal cirri; each segment with a pair of long setae at distal end of anterior edge and a pair of small middle setae; each second cirral segment with a pair of distal setae at posterior margin (Fig. L). Protopods with conspicuous setae posteriorly (Fig. K).

Terminal flexible part of thorax regularly covered with transverse rings of thoracic lappets, latter forming no pattern (Fig. K).

Caudal appendages 3-segmented, including a basal pedestal (Fig. M), almost reaching the ends of protopods of last cirrus; distal (= third) article longer than basal ones, with a tuft of eight pulmose, distal setae; second article with 1-2 setae.

Attached dwarf males not found.

Burrow fusiform, with a truncated rostral end; 0.7 mm long, situated on the corroded part of a gastropod shell, without any trails (Fig. N).

NAME. The new species is dedicated to Dr. D.L. Ivanov, the Russian malacologist who has provided me with the main part of acrothoracican material.

DiAGNOSIS. Most species of *Lithoglyptes* have prominent processes or hooks at the carinal edges of the opercular bars and, therefore, they differ easily from *L. ivanovi* n.sp. However, a group of lithoglyptid species can be outlined which shares with *L. ivanovi* n.sp. the following characters: absence of opercular processes, of an orificial knob and of lateral bars, and presence of developed or rudimentary carinal soft lobes and of 3-jointed caudal appendages. These are *L. indicus* Aurivillius, 1892 (from Indonesia and the Red Sea); *L. viatrix* Grygier & Newman, 1985 (from the deep waters off Hawaii), and *L. tectoscorbis* Grygier & Newman, 1985 (from the deep waters off Tonga). The opercular bars of these species are armed only with sharp, singularly pointed denticles, whereas the opercular bars of *L. ivanovi* n.sp. are covered with typical bifid teeth. These teeth are the main diagnostic character of *L. ivanovi* versus most of its congeners. Such bifid teeth are also characteristic of species with opercular processes (*L. mitis* Tomlinson, 1969, *L. habei* Tomlinson, 1963, *L. bicornis* Aurivillius, 1892, etc.).

Discussion

The family Lithoglyptidae is defined as the acrothoracicans with the alimentary canal without a gizzard; with well-developed mouth cirri; with normally developed mouthparts (including labrum); with tapered burrow apertures. Also, the majority of lithoglyptids possess caudal appendages [Tomlinson, 1969].

Grygier and Newman [1985] pointed out that all these characters are plesiomorphies, hence this family could be suspected for its being paraphyletic. Tomlinson [1969] defined the genus *Lithoglyptes* as the lithoglyptids with four pairs of terminal cirri plus a pair of caudal appendages. As only the armature of the opercular bars was used by many authors to distinguish lithoglyptid species, polyphyly of some genera could be suggested.

In our opinion, *Lithoglyptes* can be divided into four seemingly natural groups which might be recognised as separate genera.

The first group includes *L. indicus*, *L. viatrix*, *L. tectoscorbis,* and *L. ivanovi* sp.n. These species are characterised by the absence of opercular conical processes on the opercular bars, of lateral bars and of orificial knob; small or rudimentary soft lobes at the carinal edge below the opercular bars are present; caudal appendages are 3-jointed, including

a basal pedestal. We do not have a complete information on the structure of dwarf males, as only those of *L. indicus* and *L. viatrix* have been described.

The second group consists of only a single species, *L. bicornis* (= *L. ampula* Aurivillius, 1892, = *L. spinatus* Tomlinson & Newman, 1960). It is characterised by the presence of a conspicuous opercular hook-like process of the opercular bars; the ventrocarinal edge is equipped with a pair of long setigerous conical processes; both lateral bars and an orificial knob with thorns and setae are absent; the caudal appendages are 3-jointed. The structure of dwarf males varies, mature males having lateral projections, as a rule; the males are attached to the female by means of a very long filament-like stalk, including the antennules which are longer than the male body.

The third group includes *L. mitis*, *L. habei* and probably also *L. stirni* Turquier, 1987. All these species have opercular bars with well-developed processes, conspicuous lateral bars, and an orificial knob with distinct thorns and setae; the caudal appendages are 2-jointed. There are neither carinal lobes nor long processes ventrally to the opercular bars. The dwarf males do not possess any lateral projections; their antennules are of normal size, shorter than the body.

The last group includes *L. scaramborachis* Tomlinson, 1969, *L. wilsoni* Tomlinson, 1969, and a new species which will be described elsewhere. These species are characterised by the presence of opercular processes; lateral bars absent or poorly developed; orificial knob absent; caudal appendages 2-segmented; there are neither carinal lobes nor long processes below the opercular bars just like in the previous group. The dwarf males have antennules of normal size.

Acknowledgements. I would like to express my deep gratitude to Dr. D.L. Ivanov (Curator of the Mollusc Collection of the Zoological Museum of the Moscow State University), Dr. V.A. Spiridonov and R.V. Egorov for the opportunity to examine the collection of the Zoological Museum and the help in identifying the mollusc shell. This study was supported by the Russian Foundation for Basic Research (grant No. 97-04-49803).

References

Grygier, M.J. & W.A. Newman. 1985. Motility and calcareous parts in extant and fossil Acrothoracica (Crustacea: Cirripedia), based primarily upon new species burrowing in the deep-sea scleractinian coral *Enallopsammia* // Trans. San Diego Soc. Nat. Hist. Vol.21. P.1–22.

Hancock, A. 1849. Notice of the occurrence on the British coast of a burrowing barnacle belonging to a new order of the class Cirripedia // Ann. Mag. Nat. Hist. Vol.4, No2. P. 305–314.

Tomlinson, J.T. 1969. The burrowing barnacles (Cirripedia: Order Acrothoracica) // Bull. U.S. Natn. Mus. Vol. 296. P.1–162.