

**Description of the larva of *Cylindrinotus gibbicollis* Faldermann, 1837
and notes on the classification of the subtribe
Cylindrinotina Español, 1956
(Coleoptera: Tenebrionidae: Helopini)**

**Описание личинки *Cylindrinotus gibbicollis* Faldermann, 1837 и
замечания по классификации подтрибы *Cylindrinotina* Español, 1956
(Coleoptera: Tenebrionidae: Helopini)**

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Ключевые слова: Tenebrionidae, Helopini, *Cylindrinotus gibbicollis*, личинка, подтриба *Cylindrinotina*, классификация

Abstract. The larva of *Cylindrinotus gibbicollis* Faldermann, 1837 is described in this paper. It is the first larval description for the genus *Cylindrinotus* Faldermann, 1837. The larva belongs to the cylindrinotoid type and has 10 marginal and 2 discal setae on the labium. It differs from the other described larvae of the tribe Helopini in tribe by the structure of urogomphi which having a large dent on the internal part. Position of the genus *Cylindrinotus* within the system of the subtribe *Cylindrinotina* is discussed. Inclusion of the representatives of cylindrinotoid genera in the group with nalassoid genera is proved to be incorrect.

Резюме. В работе впервые описана личинка представителя рода *Cylindrinotus* Faldermann, 1837: *C. gibbicollis* Faldermann, 1837. Личинка относится к цилиндротойдному типу и имеет 10 краевых и 2 дискальные хеты на верхней губе. Отличается от других описанных личинок трибы Helopini строением урогомф, имеющих крупный зубец на внутренней стороне. Обсуждается положение рода *Cylindrinotus* в системе подтрибы *Cylindrinotina*. Подтверждается необоснованность включения представителей цилиндротойдных родов в налассоидные.

Introduction

The first larva of the tribe Helopini had been described for *Helops* (s. str.) *caeruleus* Fabricius, 1775 [Waterhouse, 1836]. Later, it was redescribed by other authors several times over [Westwood, 1839; Perris, 1840; Mulsant, 1854; Schiödt, 1877-1878; Emden, 1957]. In 1837 [Blanchard, 1837] the structure and ecotope of larva of *Helops lanipes* Linnaeus, 1771 (now a junior synonym of *Stenomax aeneus* (Scopoli, 1763)) was made, with the following redescription by Mulsant [1854]. The major contribution in the study of the larvae of European Helopini species' has been

made by French researcher Perris [1840, 1857, 1876] who described the larvae of *Helops caeruleus*, *Nalassus* (s. str.) *laevioctostriatus* (Goeze, 1777), *N. (Helopondrus) assimilis* (Küster, 1850), *Xanthomus pellucidus* (Mulsant & Rey, 1856). The papers of Ghilarov with co-authors are also of great significance for the study of the larvae of Helopini [Byzova, Ghilarov, 1956; Ghilarov, Svetova, 1963]. In the first paper they have described larvae of 7 species: *Helops caeruleus stevenii* (Krynicky, 1834), *Probaticus (Pelorinus) subrugosus* (Duftschmidt, 1812), *Nalassus* (s. str.) *brevicollis* (Steven in Krynicky, 1832), *N. (Helopocerothes) faldermanni* (Dejean in Faldermann, 1837), *Odocnemis (Heloponotus) douei* (Allard, 1876), *O. (Heloponotus) perplexus* (Ménétriés, 1848). In this paper the locality of these larvae were described in detail and the identification keys were presented. In the 2nd paper the authors gave the description and comparative analysis of the larva of *Hedyphanes seidlitzi* Reitter, 1913 and additional information on the larvae from other genera, described by them earlier.

In the present paper the larva of the genus *Cylindrinotus* s. str. is described for the first time. Thus, for the tribe Helopini larvae of 11 species from 9 genera (including *Cylindrinotus gibbicollis*) are known at present.

Materials and methods

Material of the Institute of Zoology, Georgian Academy of Sciences, and the Zoological Institute of Russian Academy of Sciences, as well as specimens from the collection of M.V. Nabozhenko has been used in the paper. Larva of *Cylindrinotus gibbicollis* of the third instar was collected on the mountain meadows (black soil) of the South-Georgian upland in the vicinity of Dmanisi settlement. Only one representative of the tribe Helopini, *Cylindrinotus gibbicollis* [Gurgenedze, 1987], is known from that area.

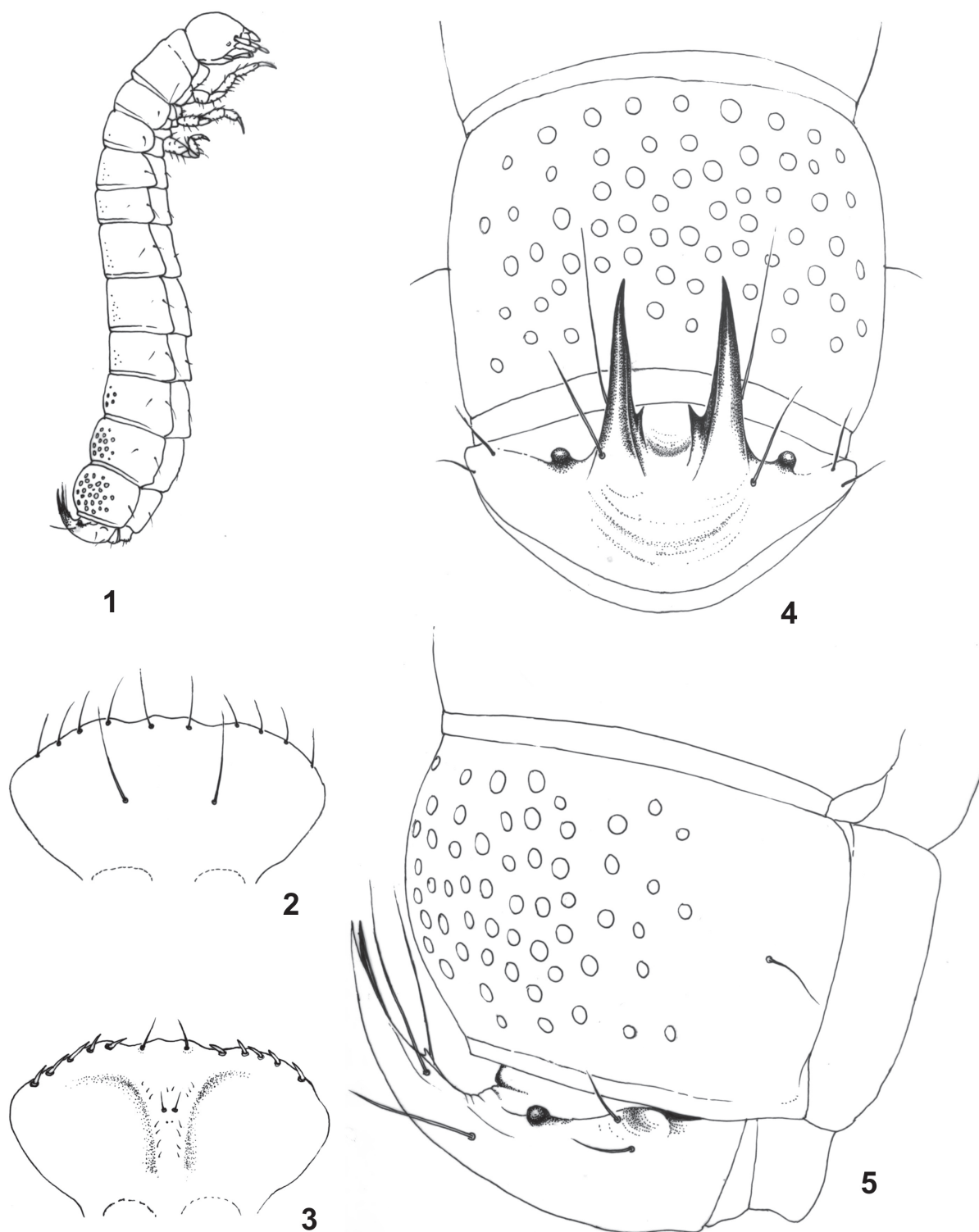


Рис. 1-5. Личинка III возраста *Cylindrinotus gibbicollis*.
1 – габитус, вид сбоку; 2 – лабиум, вид сверху; 3 – лабиум, вид снизу; 4 – VIII-IX сегменты брюшка, вид сверху; 5 – VIII-IX сегменты брюшка, вид сбоку.

Fig. 1-5. Larva (third instar) of *Cylindrinotus gibbicollis*.
1 – gabitus, lateral view; 2 – labium, dorsal view; 3 – labium, ventral view; 4 – VIII-IX abdominal segments, dorsal view; 5 – VIII-IX abdominal segments, lateral view.

Description of the larva of *Cylindrinotus gibbicollis*, third instar (Fig. 1-5)

Cuticle strongly sclerotized, with faint shine and thin rugose sculpture on tergites and sternites. Tergites having barely visible smooth edge on basal margin, separating roughly 1/10 of the segment's length. Tergites of the abdomen's VI-VIII segments with big deep round holes, which are mostly dense on VII and VIII segments. Segment VI with only several shallow holes among rugae. Abdominal tergites with long seta on each side. Abdominal sternites I-II carry 3 setae on each side. Other sternites have 1 seta. The body is covered of yellow-brownish color.

Head oval, slightly tilted relative to the body's axis. Seams faintly noticeable, forehead with barely noticeable, very short erect hairs.

The front side of clypeus slightly hollowed. Connecting membrane between clypeus and labium carries 2 long setae on each side. Dorsal surface of labium convex, with 10 marginal and 2 discal setae. Marginal setae form 3 groups (4+2+4). Discal setae considerably longer than marginal. Inner surface of labium with 12 sclerotized marginal and 2 short discal setae. 2 central marginal setae separated from other setae. Discal setae approached and located on the longitudinal roller.

Mandibles strongly sclerotized apically and at molar part. Additional dent at the apical part of mandibles barely distinct (apical part of mandibles of the studied specimens are rather worn out).

Maxilla consisting of primary cardo, stipes, 3-segmented maxillary palpus and lacinia. Two rows of thick short sclerotized setae located on the inner margin of lacinia. Labium is on the outer surface of submentum, mentum and praementum with 1 pair of long setae.

Anterior legs slightly larger than middle and posterior. On the external side legs armed with long and thin setae, on the internal side they are with spine-like, denser setae grouped into two rows.

Abdominal segment IX transversal, with large rounded side near apex. Urogomphi strongly approached, slightly bent upward and to the dorsal margin of tergite VII. Small rounded apex located on the sides of each urogomphus base. Highly sclerotized sharp dent is located on the inner margin of urogomphus base with long directed upward setae near this dent. Segment IX without recess-shaped hollows.

Comparative analysis. Larva of the genus *Cylindrinotus* (as of the genus *Odocnemis*) has 10 marginal and 2 discal setae on the labrum. It differs from other representatives of the tribe Helopini by texture of the urogomphi, which have a big dent on the inner margin.

Discussion

The larva of *Cylindrinotus gibbicollis* belongs to the cylindronotoid type of the larvae from the tribe Helopini. It possesses labral armature characteristic for this group: 12 setae, 10 of which are marginal and 2 discal. Chaetotaxy of the labrum is one of the key taxonomic features, used in the

diagnostics of larval Helopini. For the first time taxonomic value on these organs was discussed by Gilyarov with co-authors [Byzova, Gilayrov, 1956; Ghilarov, Svetova, 1963].

In our previous papers [Nabozhenko, 2001, 2005] the tribal system of Helopini, based on the structure of imago and larvae, as well as the concept of two evolutionary lineages (nalassoid and cylindrinotoid; based on the structure of male genitalia and female sexual ducts) of the subtribe Cylindrinotina has been proposed. The structure of the cylindrinotoid larvae of 2 species of the subgenus *Heloponotus* Reitter, 1922 of the genus *Odocnemis* Allard, 1876 confirms the separation of cylindrinotoid genera from nalassoid genera. Male genitalia (highly sclerotized and dorsoventrally flat parameres) and female sexual ducts (length of spermathecal gland exceeds that of spermatheca 2 or more times, short lateral branches located in the basal part of spermatheca) are stable characters with Cylindritina. However, as regard the structure of female sexual ducts, there are exceptions in among nalassoid taxa (*Pseudoprobaticus* Nabozhenko, 2001, *Caucasohelops* Nabozhenko, in litt.). These 2 mentioned genera have sexual ducts with complex spermatheca, which combines helopiod type of its structure with reservoirs and several channels. Structure of sexual ducts of cylindrinotoid types, on the contrary, serves as a good diagnostic feature to separate 2 groups of the subtribe Cylindrinotina (nalassoid and cylindrinotoid groups). However, a complex approach using all possible adult and larval features is needed to construct a natural tribal system. Morphology of the larva of *Cylindrinotus* s. str. confirms a separate status of cylindrinotoid lineage.

Key to subtribes and generic groups of the tribe Helopini based on larvae

- 1(4). IX abdominal segment with small cylinder-shaped or cone-shaped protuberances at base of urogomphae subtribe Cylindrinotina
- 2(3). Labium with 8 marginal and 2 discal setae on dorsal side..... *Nalassus* group of genera [*Nalassus*, *Zophohelops*, *Xanthomus*]
- 3(2). Labium with 10 marginal and 2 discal setae on dorsal sideCylindrinotus group of genera [*Odocnemis* (*Heloponotus*), *Cylindrinotus*]
- 4(1). IX abdominal segment without small cylinder-shaped or cone-shaped protuberances at base of urogomphae..... subtribe Helopina
- 5(6). VIII abdominal tergite without shaft-shaped apices and large appendix near basal margin of sternite..... *Hedyphanes*
- 6(5). VIII abdominal tergite with 2 directed back shaft-shaped apices and large unpaired apex near hind margin of sternite..... *Probaticus*, *Helops*

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