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LARVAL MORPHOLOGY OF THE SUBGENUS *MEGACEPHALA* S. STR. (COLEOPTERA, CICINDELIDAE)

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Larval Morphology of the Subgenus *Megacephala* s. str. (Coleoptera, Cicindelidae). Putchkov A. V., Werner K. — General morphological characteristic of larvae in the subgenus *Megacephala* s. str. and their differences from larvae in other subgenera are given. The III instar larva of *M. regalis* Bohemann, 1848 is described. Some morphological characters allow to distinguish the larvae of certain taxa in *Megacephala* s. str.

Key words: Coleoptera, Cicindelidae, *Megacephala* s. str., larva, description, characters.

Морфология личинок жуков-скакунов подрода *Megacephala* s. str. (Coleoptera, Cicindelidae). Пучков А. В., Вернер К. — Приведена общая морфологическая характеристика личинок подрода *Megacephala* s. str. и даны их отличия от личинок других подродов. Описана личинка III возраста *M. regalis* Bohemann, 1848. Выделены основные морфологические признаки, позволяющие различать личинок в отдельных таксонах номинативного подрода.

Ключевые слова: Coleoptera, Cicindelidae, *Megacephala* s. str., личинка, описание, признаки.

Introduction

Almost 90 species of the 6 subgenera of the genus *Megacephala* Latreille, 1802 are known currently (Wiesner, 1992). The knowledge of *Megacephala* larvae is relatively poor compared to adults. A brief general review of larvae in the genus *Megacephala* has been given by Hamilton (1925), Knisley and Pearson (1984) (but based on the single subgenus only). Some larval characters are known for 5 subgenera of the genus (Hamilton, 1925; Zikan, 1929; Putchkov, 1995; Putchkov, Arndt, 1997), as follows: *Megacephala* s. str. (1 species), *Tetracha* Hope, 1838 (6), *Phaeoxantha* Chd., 1850 (1), *Grammognatha* Motschulsky, 1850 (1), *Pseudotetracha* Fleutiaux, 1894 (1). Rather complete characteristics of larvae of certain subgenera exist only for *Tetracha* (for 3th instar) and *Grammognatha* (for all instars). For larvae of the other subgenera, some morphological data have been given so far in the keys to larvae (Putchkov, Arndt, 1997; Adis et al., 1998). Moreover, unlike the other species of subgenera, the larva of *Megacephala* (s. str.) sp. is not identified yet; it might belong to several taxa of the subgenus, which includes 10 species and 53 subspecies.

The aim of this paper is to present complete larval characteristic of the subgenus *Megacephala* s. str. and describe the larva of *M. (s. str.) regalis* Bohemann, 1848 in details, with comparative analysis.

Material and methods

This study is based on the III instar larvae of *Megacephala* s. str., collected by the second author in Africa and 1 species of *Megacephala* s. str. deposited in the Deutsche Entomological Institute (Germany, Münchenberg). The following taxa were examined: *Megacephala* sp. (1 ex., Togo, Mandu, 01.19.03), *M. regalis regalis* Bohemann (2 ex., Botswana, 100 km S Nata, 31.10.02), *M. regalis citernii* W. Horn, 1912 (4 ex., 30 km W Gavisna, 11.05.01), *M. regalis catenulata* Basilewsky, 1950 (2 ex., Zambia, 50–100 km W Solwezi, 4.11.02; 1 ex., same region, near Solwezi, 3.11.02; 3 ex., same region, Ncala., Gaine res., Ikengele, 6–8.11.01). For comparison, the larvae of *Megacephala* tiger beetles of the other subgenera were examined. Terminology of morphology and chaetotaxy generally follow C. B. Knisley and D. L. Pearson (1984),

A. V. Putschkov and F. Cassola (1994), and A. V. Putschkov and E. Arndt (1997). In the general description, only specific larval characters of the subgenus *Megacephala* s. str. are given.

Subgenus *Megacephala* Latreille, 1802 s. str.

Description

III instar larva

Head transverse, black or dark-brown. Appendages of head brown. Anterior margin of nasale smooth, trapezoid and limited on outer sides by two large teeth (adnasalia). Width of nasale slightly wider than basal part of mandible. Basal part of nasale with relatively deep strips. Antennomere I with 10–14, II with 10–16 setae; each of these antennomeres 3–4 times as wide as antennomeres III–IV. Inner margin of stipes with 2–3 spines basally and without elevation on anterior part. Maxillary palpomere II with 3–4 setae, galeomere II with 8–10 stout setae dorso-apically. Labial palpomere I with 4–8 thin setae apically; palpomere II with 1 long seta below middle. Coronal suture very short or absent. One or two distinctive tubercles, each with 2–3 long setae, between stemmata. Vertex ridge with distinct tubercles near stemmata 1, frontal ridge with distinct tubercles among 3 long setae. Frontal plate distinctly scoop-shaped with longitudinal ridge and small transverse “pseudotubercles”.

Pronotum wider than head, usually brown. Cephalolateral angles widened and rounded. Swellings of cephalolateral angles indistinct. Anterior margin of pronotum almost even or slightly concaved. Pronotum with 26–35 setae per half (mostly red or white; some black). Callous elevations restricted by deep slanting strips in front and near medial line.

Legs shortened and massive in compared to those in other subgenera. Tibia not more than 1.5 times as long as wide.

Abdomen. Each epipleuron, hypopleuron and coxal lobe consisting of two parts. Tergites of hump indistinctly fused on external and inner sides. Medial and inner hooks almost even and widened basally with two small setae. Medial hooks no more than 1.6 times as long as inner hooks. Posterior margin of sternite IX with 11–16 long setae. Apical margin of pygopod with 20–24 short stout setae.

***Megacephala* (s. str.) *regalis* (fig. 1)**

Description

III instar larva

Measurements (mm). Body length 42–48; head length 4.2–4.3; head width 6.20–6.35; frontal width 3.9–4.1; pronotum length 3.6–3.9; pronotum width 6.62–6.84.

Coloration. Head black, sometimes with metallic luster; stemmata transparently white; mandibles black apically but brown basally; other appendages light-brown, but darkened apically. Most setae of head white, some of those black. Setae on maxilla, labium and antennomere III–IV brown. Other setae of head reddish or white. Pronotum light brown or brown with more light lateral and anterior (before slanting depressions) margins. Setae of pronotum transparently white, sometimes part of those black (especially on disk). Abdominal sclerites yellow-brown, setae and hooks of hump brown.

Head. Vertex ridge with 4–5 long setae near stemmata I (fig. 1, 4). Antennomere I with 10–12, II with 12–16 setae (fig. 1, 1). Labial palpomere I with 4–6 thin setae apically and almost 1.5 times as short as palpomere II (fig. 1, 2) Cardo longitudinal-triangular with 2–3 setae apically. Stipes with 2 spines on inner margin at base, 1.6–1.8

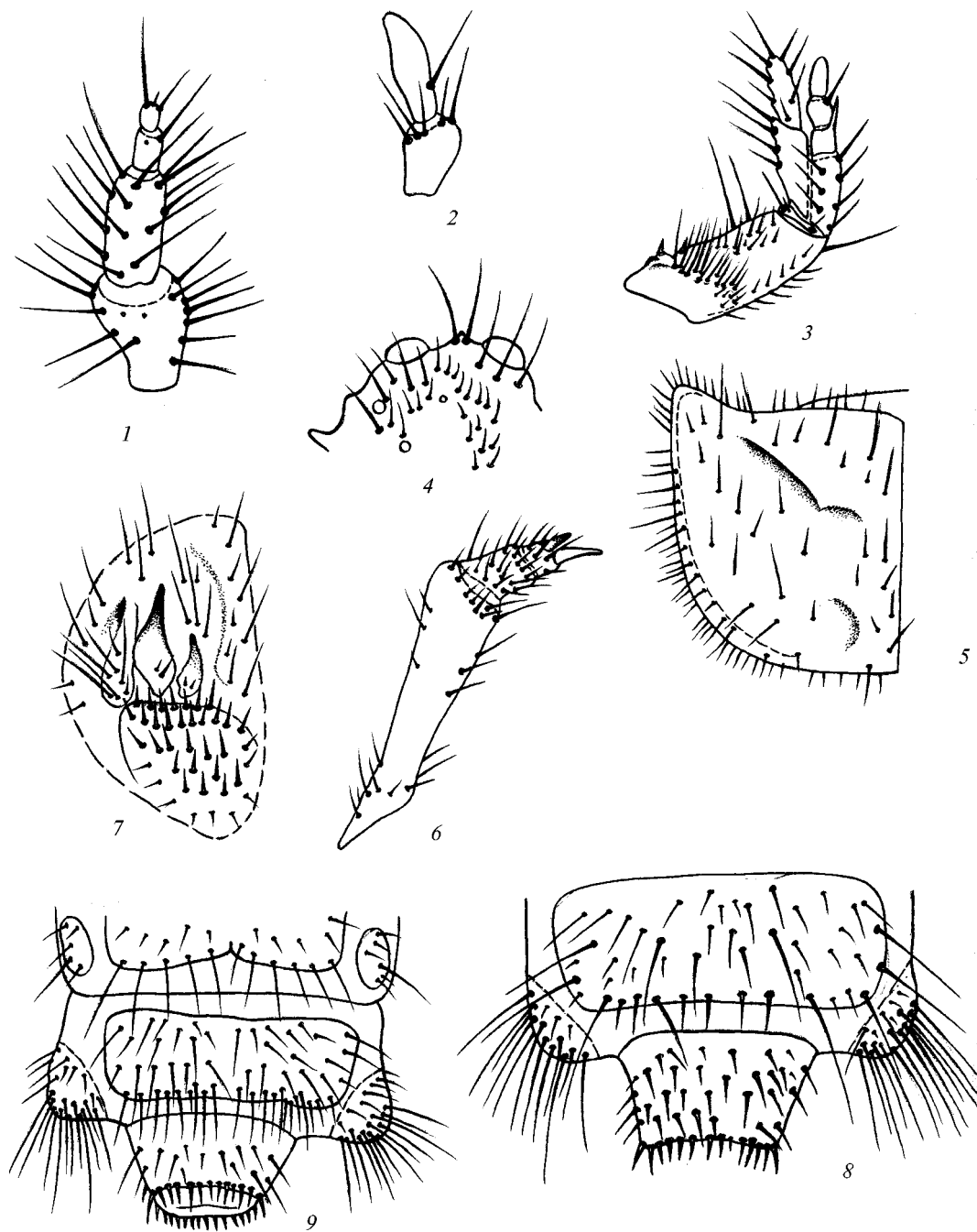


Fig. 1. Larva of *Megacephala regalis*, III instar: 1 — left antennomere (left, above); 2 — palpomere of labium (right, below); 3 — maxilla (right, dorsal view); 4 — upper part of head with stemmata (lateral view, left side); 5 — pronotum (left side); 6 — mid leg (right, dorsal view); 7 — V abdominal segment (left side); 8 — IX segment of abdomen and pygopod (dorsal view); 9 — IX segment of abdomen and pygopod (ventral view).

Рис. 1. Личинка *Megacephala regalis*, III возраст: 1 — усик (левая сторона, сверху); 2 — нижнегубные щупики (правая сторона, снизу); 3 — максилла (правая сторона, дорсально); 4 — верхняя часть головы с глазками (сбоку, левая сторона); 5 — переднеспинка (левая сторона); 6 — средняя нога (правая сторона, дорсально); 7 — 5-й брюшной сегмент (левая сторона); 8 — 9-й брюшной сегмент и пигопод (дорсально); 9 — 9-й брюшной сегмент и пигопод (вентрально).

times as long as wide. Galeomere I with 4–5, II with 7–8 setae; palpifer with 6–7 setae (2–3 of those attached dorsally). Spine on maxillary palpomere I reaching base of outer seta on palpomere II (fig. 1, 3).

Pronotum slightly narrowed to base only (fig. 1, 5). Cephalolateral angles slightly directed outside or forwards without distinct swellings at base. Callous elevations higher in anterior part. Disk with 26–30 setae per half. Posterolateral edges relatively narrow, with 30–36 setae (fig. 1, 5). Five to six setae near medial line. Legs massive and shortened (fig. 1, 6).

Abdomen. Tergites I–IV with 10–14 setae, most of those on posterior margin. Caudal tergites of hump with 26–46 stout setae on anterior half and near 10 thin setae at base (fig. 1, 7). Caudolateral tergites with 6–8 long setae. Medial and inner hooks almost straight (or slightly curved), widened basally and with two small setae. Inner hooks 1.4–1.6 times as short as medial hooks (fig. 1, 7). Posterior margin of tergite VIII with 10–12 setae; most of those shortened. Posterior margin of sternite IX with 20–24 long setae. Pygopod shortened but wide and with 20–34 short stout setae apically (fig. 1, 8). Pygopod bearing more than 20–25 setae dorsally and 10–14 setae ventrally (fig. 1, 8, 9).

Discussion

Larval characters of *Megacephala* s. str. show that this subgenus is similar to the other subgenera of *Megacephala* in the morphology of appendages of the head, shape of pronotum and hump, differing well from the other subgenera by several specific morphological structures. In *Megacephala* s. str., larvae have narrower nasale, more distinct and long tubercles on vertex and frontal ridges, more numerous setae on the lateral part of the head (below stemmata 1–2). Medial hooks of the hump more shortened and widened basally, and the legs, especially tibiae and tarsi are conspicuously shorter in *Megacephala* s. str. larvae, compared to other subgenera.

Furthermore, *Megacephala* s. str. larvae differ by the longer (in transverse direction) frontal ridge, distinct strips on nasale and wider lateral part of paraclypeus from the larvae in the other subgenera. Numerous long setae on posterior margin of tergite VIII and sternite IX of abdomen are very specific feature of larvae of the nominative subgenus. Some reliable differences between the larvae of *M. regalis* and of the unnamed species of *Megacephala* s. str. from Togo (possibly, *M. bocandei* Guerin, 1849, *M. denticollis schultzeorum* W. Horn, 1904 or *M. quadrisignata* Dejean, 1829 according to geographical distribution) are as follows:

| <i>Megacephala regalis</i> | <i>Megacephala</i> sp. |
|---|-------------------------|
| coronal suture very short | absent |
| black setae on head present | absent |
| labial palpomere I with 4–6 setae | with 7–8 setae |
| tergite III of abdomen with 10–14 setae | with 7–10 setae |
| posterior margin of sternite IX with 20–24 long setae | with more than 26 setae |
| pygopod apically with 22–26 setae | with more than 30 setae |

The larvae of some subspecies of *M. regalis* differ rather well from each other. For example, caudal tergites of the hump of larva of the nominative subspecies bears more than 40 stout setae on each half, whereas in the other subspecies there are 26–40 setae only. About 40% of setae on the head and pronotum are black in the larva of *M. regalis regalis*. But in the larvae of *M. regalis catenulata* and *M. regalis citernii*, the numbers of black setae on the head and pronotum are at most 20%. The number of setae on caudal tergite of hump is 26–28 in *M. regalis catenulata*, whereas 32–40 in *M. regalis*

citernii. Further studies of additional larval material would allow to provide more sound classification of the subgenus *Megacephala*.

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