

A description of the larval stages of *Megacephala (Grammognatha) euphratica armeniaca* CASTELNAU (Coleoptera: Cicindelidae)

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Abstract

Larvae of all instars of *M.(G.) euphratica armeniaca* are described. Short ecological data and morphological discussion in comparison with other known larvae of the genus *Megacephala* are given.

The tiger beetle *Megacephala (Grammognatha) euphratica* LATR. & DEJ. is unique species of subgenus and occur in south part of Palearctic. HAMILTON (1925) described its larva but third instar only and without indication of the subspecies status. Moreover in this description have not been presented some of characters which are using now in larval taxonomy of Cicindelidae.

The aim of this paper is to describe all larval instars of *M.(G.) euphratica armeniaca* CASTELNAU. The description is based on series of larvae collected during the years 1988, 1989 and 1992 in South and West Turkmenia (Central Asia). Terms of morphology and chaetotaxy as defined by KNISLEY & PEARSON (1984) and additionally by PUTCHKOV & CASSOLA (1994), PUTCHKOV & ARNDT (1994) have been used in this study. Besides larval materials of other subgenera of *Megacephala* from collections of German Entomological Institute (Eberswalde) were also studied. The following abbreviations have been used:

| | | | |
|----|---|-----|---------------------------|
| TL | = total length (mm) | PNL | = length of pronotum (mm) |
| FL | = length of fronto-clypeal-labral area (mm) | PNW | = width of pronotum (mm) |
| FW | = width of fronto-clypeal-labral area (mm) | | |

Materials: South Turkmenia - 30km south of Tedzhen, October 1988, 5L3; 30 km east of Ashkhabad, Gijours, October 1988, 4L3; East Kara-Kum, Repetek, November 1988, 2L3; Kugitang, Charshanga, Karljuk, May 1989, 2L2; West Turkmenia - Kzyl-Atrek, Deleli, May 1992, 3L3, 2L2, 1L1; Kzyl-Atrek, Chatly, May 1992, 2L2.

Third instar larva

Measurements: TL - 42,4-50,6 (aver. 46,4), FL - 3,25-3,50 (aver. 3,35), FW - 2,65-2,92 (aver. 2,82), PNL - 3,30-3,60 (aver. 3,40), PNW - 5,00-5,30 (aver. 5,14).

Color: Head (above) dark brown, sometimes nearly black (especially near eyes) with slight bronzed luster; mandibles almost black apically; other appendages (and head below) light brown; pronotum light brown, but its cephalolateral angles nearly yellow without metallic luster; mesothorax and legs light brown; tergites of abdomen yellow-grey; setae of head and pronotum, hooks and spines of hump brown, those of abdomen light brown.

Head: Setae long and thin; U-shaped ridge with 3 setae; antennomere 1 with no less than 20 setae; antennomere 2 with 12 - 15 setae (most of theirs long); first maxillary palpus with long

Fig. 1: Pronotum of third instar larva. Scale 1mm.

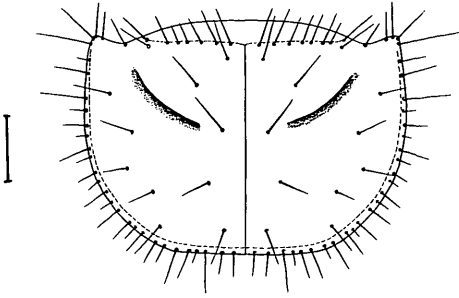


Fig. 2: Pronotum of first instar larva. Scale 1mm.

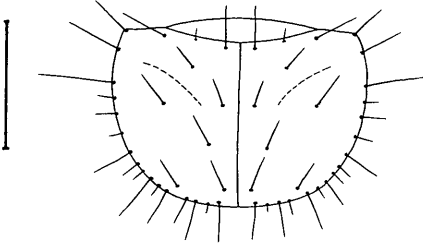
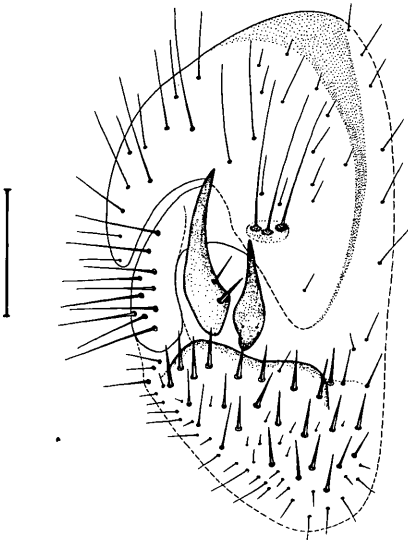


Fig. 3: Hump of third instar larva (left side). Scale 1mm.



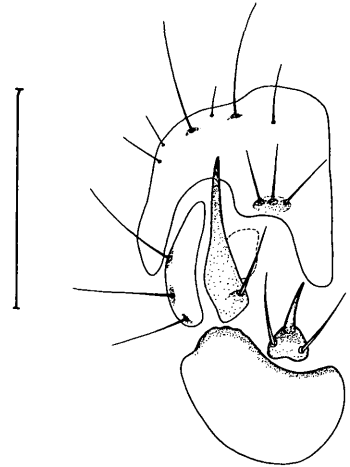
spine; length of this spine is equal to length of second maxillary palpus; first labial palpus with 2 thin setae; second labial palpus with one seta based midlength; stipes no longer than galea.

Pronotum: Setae thin; cephalolateral angles small, slightly rounded and directed forward; anterior margin nearly even; callous elevations slightly distinct and restricted in front by furrows; pronotum with 10-12 setae on each half; along medial suture 4-5 setae; cephalolateral angles with one seta basally (fig. 1).

Abdomen: Sclerotized areas very slightly distinct; tergite 3 with 22-26 setae; type I hypopleuron (fig.7); tergites of segment 5 large and fused; caudal tergite of hump with 24-28 stout setae; caudolateral tergite long with 9 - 10 setae; distal tergite with small tubercle and 3

Fig. 4: Hump of first instar larva (left side). Scale 1mm.

Fig. 4: Hump of first instar larva (left side). Scale 1mm.



(rarely 2) long setae in lower part (near the top of medial hook); hooks almost even, widened basally; medial hooks with 2 (rarely 1) stout setae in lower part; its top reached the margin of distal tergite (fig. 3); total length of medial hooks almost 2 times larger than that of inner hook; inner hooks with 2 very small setae basally; posterior margin of sternite 9 with 10-11 long setae; epipleuron 9 with 7-8 long setae; top of pygopod with 22-26 stout short setae (fig. 6).

Second instar larva

Measurements: TL - 24,8-28,2 (aver. 26,5), FL - 1,93-2,13 (aver. 2,00), FW - 1,63-1,75 (aver. 1,69), PNL - 1,90-2,02 (aver. 1,97), PNW - 2,80-3,08 (aver. 2,98).

Head: Antennomere 1 with 7-8 setae; antennomere 2 with 10-12 (7-9 of those long) setae.

Pronotum: Anterior margin slightly concaved; cephalolateral angles very small; pronotum with 9-10 setae on each half; anterior margin with 16-18 setae.

Abdomen: Tergite 3 with 11-14 setae; caudal tergite with 20-25 stout setae; cephalolateral tergite with 4-5 long setae; medial hook with 2 setae usually (but only lower seta is stout); inner hook with 2 short setae; posterior margin of sternite 9 with 8-10 setae; top of pygopod with 17-20 setae.

First instar larva

Measurements: TL - 16,1, FL - 1,43, FW - 1,25, PNL - 1,30, PNW - 2,05.

Color: Head, mandibles and pronotum brown (near eyes and distal part of mandibles nearly black); other appendages of head, legs, sclerites of thorax and abdomen light brown; setae of head and pronotum brown, those on the abdomen reddish.

Head: Antennomere 1 without setae; antennomere 2 with 2 setae near top; first labium palpus without setae; second labium palpus with 1 seta hardly lower middle.

Pronotum: Cephalolateral angles undistinct; anterior margin of pronotum slightly concaved with 6 setae; pronotum with 7-8 setae on each half (fig. 2).

Abdomen: Sclerotized areas distinct, tergite 3 with 4 (rarely 5) setae (fig. 5); caudal tergite of hump naked; caudolateral tergite with 3 setae, caudal and distal tergites separated; distal tergite with 3 long setae basally and with 5-6 setae on anterior margin (fig.4); medial hooks slightly curved apically and with 1 stout seta basally; inner hook with long central spine and two Fig. 5: 9th segment and pygopod of abdomen of third instar larva (ventral part).

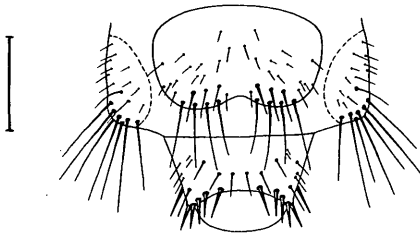


Fig. 5: 9th segment and pygopod of abdomen of third instar larva (ventral part). Scale 1mm.

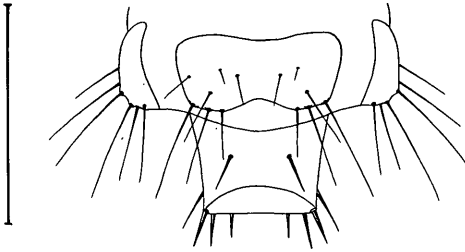


Fig. 6: 9th segment and pygopod of abdomen of first instar larva (ventral part). Scale 1mm.

lateral long setae (fig. 4); posterior margin of sternite 9 with 6 setae; epipleuron 9 with 5 setae; top of pygopod with 8 stout setae (fig. 8).

Comparative remarks

Preliminary study of larvae of the genus *Megacephala* confirms likeness for most of subgenera by some major characters (chaetotaxy and form of the head, hump and pygopod etc.). Still, larva *Grammognatha* is more similar morphologically to representatives of subgenera *Tetracha* and *Pseudotetracha* than to the known larvae of *Megacephala* s.str. and, especially, *Phaeoxantha*. In spite of that the larval characters vary, especially within the similar subgenera, the 2-3 larval stages *Grammognatha* can be easily distinguished by the following characters:

- ◆ first labium palpus with 2 setae;
- ◆ relatively few setae on each half of pronotum;
- ◆ medial hooks usually with 2 setae;
- ◆ small tubercles with group of 3 (rarely 2) long setae in lower part of distal tergite of hump;
- ◆ size, form and coloration of pronotum and head;

Sometimes can be used chaetotaxy of hump, ninth sclerites and pygopod. The determination of the first instar is impossible, because it is known now only for *Grammognatha*. Reliable differences are not found too between subspecies of *M.(G.) euphratica*.

Ecology

Larvae occur in slightly saline or hemisaline loam or sandy-loam soils. Larvae have been collected no far from any water basins (rivers, lakes, sand-pits etc.) or on relatively moist lots of ground (depth of ground water near 2-4 m). The depth of burrows for 2-3 larval instars 75-90 cm (rarely more than 100 cm). The larva of first stage had been found near 45 cm depth. Diameter of burrows for 3 instar 6,2-7,0, mm for 2 instar - 3,5-4,0 mm, for 1 instar - 2,6 mm.

Fig. 7: 3rd abdominal segments of third instar larva (lateral aspect). Scale 1 mm.

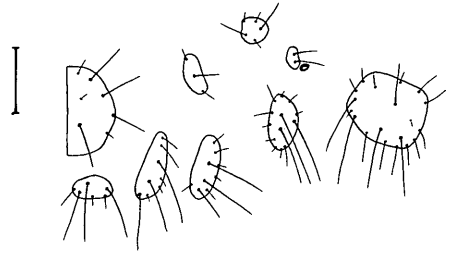
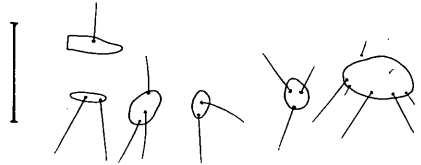


Fig. 8: 3rd abdominal segment of third instar larva (lateral aspect). Scale 1mm.



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