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A description of the egg and mature larva (L₃) of *Aploderus caesus* (ERICHSON, 1839) (Coleoptera: Staphylinidae)

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ABSTRACT. The egg and third instar larva of *Aploderus caesus* (ERICHSON) are described for the first time, the illustrations of structural features provided. Diagnostic characters of the *Aploderus* larva are listed. Some differences in morphological structure between the larvae of *A. caesus* and *A. caelatus* (GRAVENHORST) are also mentioned and illustrated.

Key words: Entomology, morphology, egg, larva, *Coleoptera*, *Staphylinidae*, *Aploderus caesus*.

INTRODUCTION

Aploderus caesus is a European species. Generally, it is distributed in Central Europe. The species was also recorded from northern Italy, Romania, Denmark and southern Finland. In Poland it is rare, known from a few localities. However, only records from the Wyżyna Małopolska Upland are up to data (BURAKOWSKI at al. 1979, LUCHT 1987, KUBISZ & MELKE 1993). KOCH (1989) defined it as a stenotopic, hygrophilous and phytodetricolous species. It occurs from spring till autumn in shaded swampy forests meadows, shores of water reservoirs, on peat-bogs, in rotten plant remains, leaf litter and under moss (BURAKOWSKI at al. 1979, KOCH 1989).

The egg and larva of *A. caesus* have not been described previously. Besides *A. caesus*, the only other European member of the genus *Aploderus* is *A. caelatus* (GRAVENHORST, 1802). Its egg, larva, pupa and biology were described in detail by

STANIEC (1997, 1998). The morphology of larvae of closely related genera was described by HINTON (1944), KASULE (1968), LEGNER & MOORE (1977), PAULIAN (1941), PIERRE (1944), POTOSKAYA (1967), STANIEC (1992, 1993, 1997 a, 1997 b) and TOPP (1978).

MATERIAL AND METHODS

The egg and third (last) larval instar of *A. caesus* were obtained from the adults identified by the author. They were collected in Garbatówka (UTM-FB49) near Łęczna (mid part of eastern Poland) on 22, 29 April, 29 May 1996 and 24 May 1997. They were collected by sifting leaf litter in a shaded swampy forest together with a few dozen adult individuals of *Oxytelus fulvipes* ERICHSON, 1939. It is another saprophagous member of the subfamily *Oxytelinae*. Both species live in similar habitats.

The adults of *A. caesus* were kept in dishes (10 cm diameter x 5 cm high) with moist soil (1-1.5 cm) and leaf litter (2-3 cm) as food; the soil and litter were collected in the study area. The eggs and larvae were preserved in a 1:1 solution of glycerine and alcohol. For microscopic slides the punctured larvae were leached in 5% KOH at room temperature for several hours. Then they were rinsed in distilled water and cleared in chloralphenol and chloralhydrate, and finally placed in Berlesy's liquid. The surface sculpture of the egg chorion was observed on slides with glycerine at 400 x magnification. The drawings were made using camera lucida.

Material examined: 10 eggs, 15 last larval instars (L_3) and about 30 adults.

DESCRIPTION

EGG:

Length 0.52-0.66 mm ($\bar{x} = 0.62$, $SD = \pm 0.040$), width 0.35-0.38 mm ($\bar{x} = 0.36$, ± 0.012) shape oval, colour white, chorion thin with characteristic micro-structure, surface rough, micropyle absent. Eggs always occur in clusters of four (Fig. 1).

Larva (third instar): Length 3.50-5.55 mm ($\bar{x} = 4.38$, $SD = \pm 0.61$), head width 0.62-0.67 ($\bar{x} = 0.63$ mm, ± 0.015). Body elongated, slightly dorso-ventrally flattened (Fig. 2). Head and antennae yellow-brown; pro-, meso-, metanotum, legs and foretergites (I-III) of abdomen yellow; central part of hind tergites (IV-X) gradually darkening toward posterior segments. Abdominal tergites VII-X brown, urogomphi black. Front and back of all tergites and sternites lighter and less sclerotized than their central parts. Microsculpture of abdominal tergites IX, X as in Fig. 26 c. All sclerites with simple setae of different length: short - yellow-brown, long - black.

Head prognathous, slightly dorso-ventrally flattened (Figs 3, 4). Width 0.62-0.67 mm (0.63 , ± 0.015), 1.2 broader than long, rounded on sides; with 1 black

stemma on each side, stemmata slightly protruding outside the outline. Head with delicate, indistinct reticulate microsculpture, visible only in some places (Fig. 3a). Antenna 3-segmented (Figs 5, 6); segments I-III length ratio 1.7 : 4.1 : 1.3; segment I with 1 pore, segment II with 3 setae, 1 pore and 3 various size, dome-shaped sensory appendages latero-apically; segment III with 6 (3 short) setae and 1 finger-shaped sensory appendage. Labrum (Figs 7, 8) approximately trapeziform, its base about twice broader than anterior margin. Dorsal surface with 12 setae (2 foresetae blunt) and 2 pores. Besides, labrum at anterior margin with 2 pairs of short, thick and sharp teeth. Mandible (Figs 10, 11) relatively short and stout, with 3 apical teeth, 2 pores and 2 setae. Their surface near to longer seta with tiny protuberances (Fig. 10a). Maxilla (Fig. 12) consists of triangular cardo (cdo), stipes (stp), wide mala (ma) and maxillary palp (pm). Cardo with 1 seta; stipes with 2 setae and several dozen cuticular processes on dorsal side; mala and stipes grow into an almost uniform plate with 3 setae, 3 pores and several cuticular processes laterally. Adoral margin of mala with ctenidium of 15-18 long teeth and a few lower setae (Fig. 13). Maxillary palp 3-segmented with basal palpifer (pf), length ratio 3.2 : 1.5 : 3.1. Palpifer with 1 seta, segment I with 2 pores and 1 seta, II with 1 pore and 2 setae, III with 1 digital sensory appendage and 1 pore. Besides, segment I and II with a few cuticular processes apically. Hypopharynx (Fig. 14) with middle hollow, numerous triangular cuticular processes and 2 pores in the anterior part, two regular rows of cuticular processes laterally and a pair of pores in the central part. Labium (Fig. 15) consists of submentum (smnt), clypeate mentum (mnt), trapeziform prementum (pmnt) separated from ligula (lg) and a pair of 2-segmented labial palps (lp). Ligula, prementum, mentum, submentum length ratio 0.8 : 1.3 : 1.6 : 2.8 respectively. Submentum with 2 long setae; mentum with 4 long setae and reticulate basal area; prementum distinctly wider than long (in ratio 4 : 2.5), with 2 short setae and 2 pores in the posterior part, 4 setae (2 very short) and a few triangular cuticular processes in the anterior part. Ligula separated from prementum by basal, slightly sclerotized region; anterior margin of ligula sinuate (Fig. 16).

Thorax. Pro-, meso- and metanotum each with mid-longitudinal, light line (Figs. 2, 17, 18). Chaetotaxy of meso- and metanotum identical. Each thoracic pleurite with 1 seta. Sternites with short setae (Fig. 19). Chaetotaxy of meso- and metasternum identical. Leg: coxa (cx), trochanter (tr), femur (fm), tibia (tb), tarsungulus (tu) length ratio 3.7 : 2.2 : 3.9 : 4.4 : 1 (Fig. 20). Coxa with 12 setae; triangular trochanter with 7 setae and a few campaniform sensillae; femur with 9 setae and 2 pores; tibia with 9 setae. Foretibia with 8 spine-shaped and 1 thin and long seta; mid and hind tibia with 7 spine-shape and 2 thin and long setae each. Besides, tibia with 1 pore and 2 tiny spines apically. Tarsungulus slim, slightly curved with 2 thick, spine-shaped setae (Fig. 20a).

Abdomen widens gradually toward segment VII, widest segment of body. Segments I-VIII with tergites and sternites (Figs. 21-24). Tergites and sternites II-VIII similar in distribution of setae. Besides, segment I with binate pleurite (pl)

and binate laterosternite (ls) situated on sides (Fig. 25). Structure of segments IX and X different from that of other segments: their dorsal and ventral sclerites grow into uniform rings, surrounding segments with characteristic reticulate microsculpture (Figs 26-28). Urogomphus 3.3 times longer than wide at the base, with 9 setae (4 long, 5 short) and 1 pore (Fig. 29, 30). Urogomphus with 1 long seta apically.

The larva of *A. caesus* belongs to peripneustic type. Of 9 pairs of spiracles (sp), the first occurs on forepleurites of thorax, the remaining ones are on the lateral parts of the first 8 abdominal tergites (Figs 2, 25).

Each epimeron, pleurites of meso- and metathorax, first eight abdominal tergites, laterosternites and abdominal sternites II-VIII bear characteristic cuticular forms (cf), oval or nearly round with lightly reticulate surface (Figs 18, 21, 22, 24, 25). Besides, all tergites (except pronotum) with tiny pear-shaped sensilla anteriolaterally or posteriorly (only segment IX) (Fig. 18a, 26a).

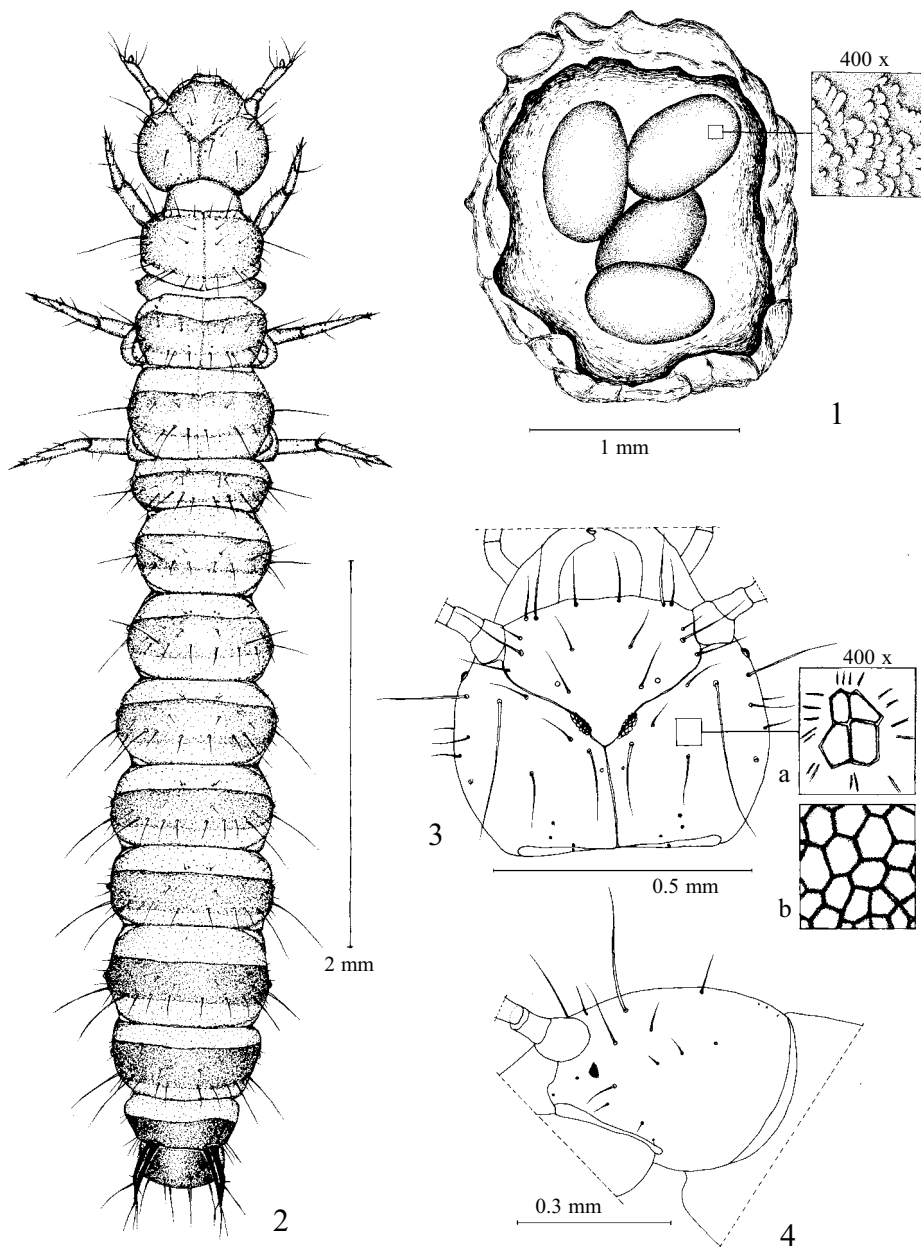
CONCLUSION

The following characters distinguish the larva of *Aploderus* STEPHENS, 1833 from known larvae of the other related genera of *Oxytelinae* (HERNANDEZ, 1993, KASULE 1968, KROGERUS 1925, PAULIAN 1941, POTOTSKAYA 1967, STANIEC 1992, 1993, 1997 a, 1997 b, TOPP 1978): (A) one stemma each side of head; (B) article II of antenna about three times longer than article III; (C) mandible stocky, with 3 blunt and broad teeth and tiny cuticular processes laterobasally; (D) mala with ctenidium of 15-18 large teeth and a few lower hair-like setae, however, without apical bunch of setae or hair; (E) articles I-III of maxillary palp length ratio approximately 1 : 0.5-0.7 : 1; (F) prementum trapeziform, distinctly broader (1.6-1.8 times) than long, separated from ligula, (G) tibia 1.1-1.2 times longer than femur; (H) tarsungulus with 2 spine-shaped setae; (I) urogomphus black, 3-4 times longer than wide at the base, with 9 setae (1 long setae apically).

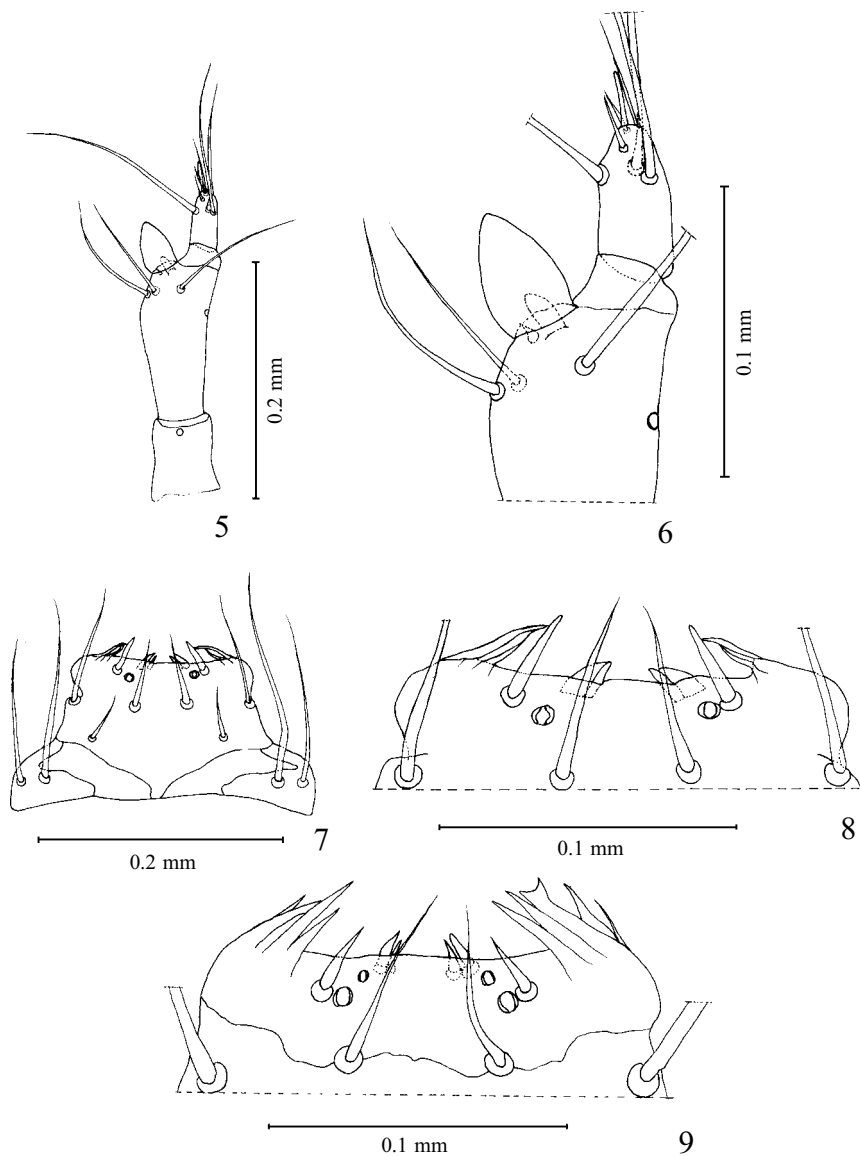
Some differences in morphological structure between the mature larva *A. caesus* and *A. caelatus* described by STANIEC (1997 b) are illustrated (Figs 3a, 3b, 8, 9, 10a, 10b, 17, 18a, 18b, 26a, 26b, 26c, 26d). They involve the following features: (1) microsculpture of head (3a, 3b); (2) detailed structure of anterior part of labrum (Figs 8, 9); (3) microsculpture of mandible near to longer seta (10a, 10b); (4) presence a pair of discal setae (da₁) on pronotum located between front and middle row of setae in *A. caesus* (Fig. 17), and absence of similarly located setae in *A. caelatus*; (5) shape of dorsal sensilla (Figs 18a, 18b, 26a, 26b); (6) microsculpture of dorsal side of segments IX and X (26c, 26d).

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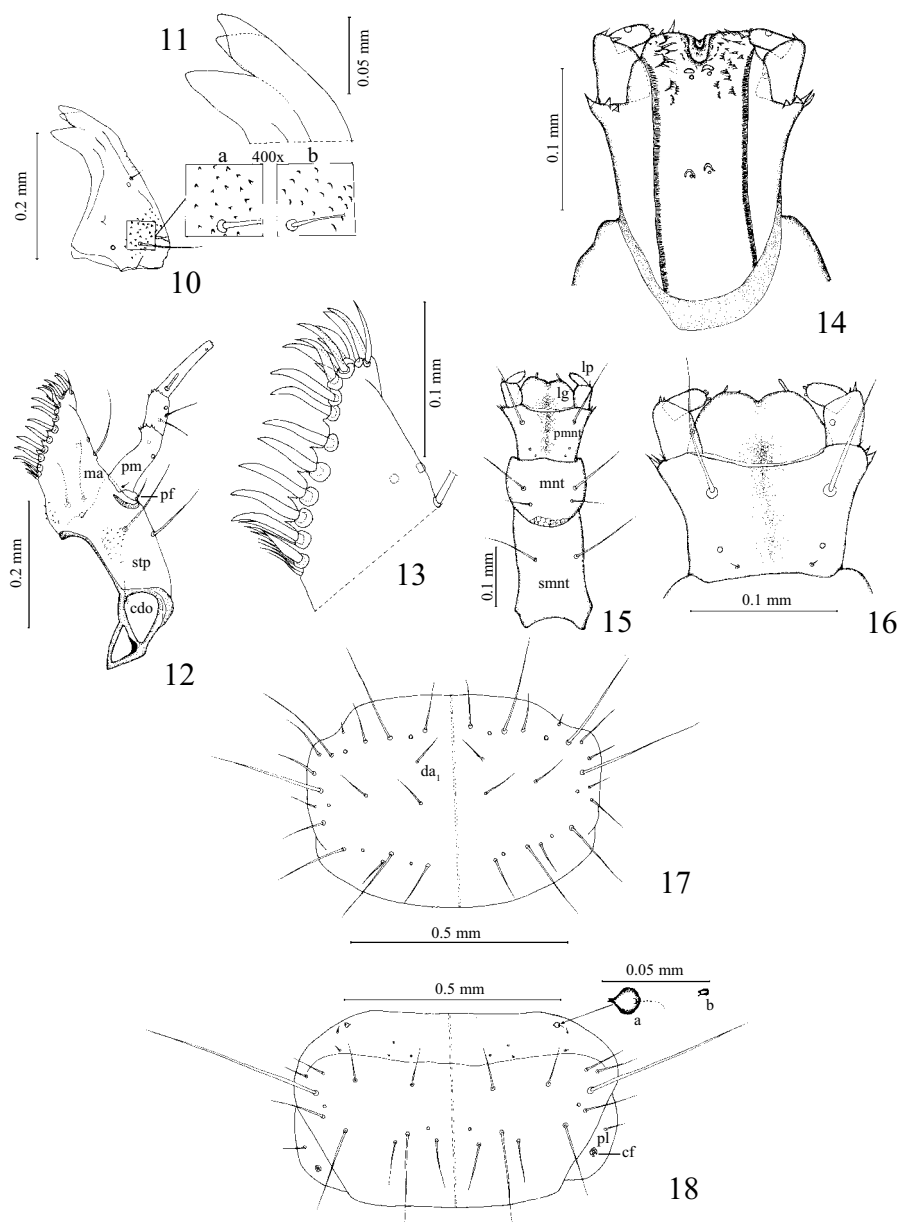
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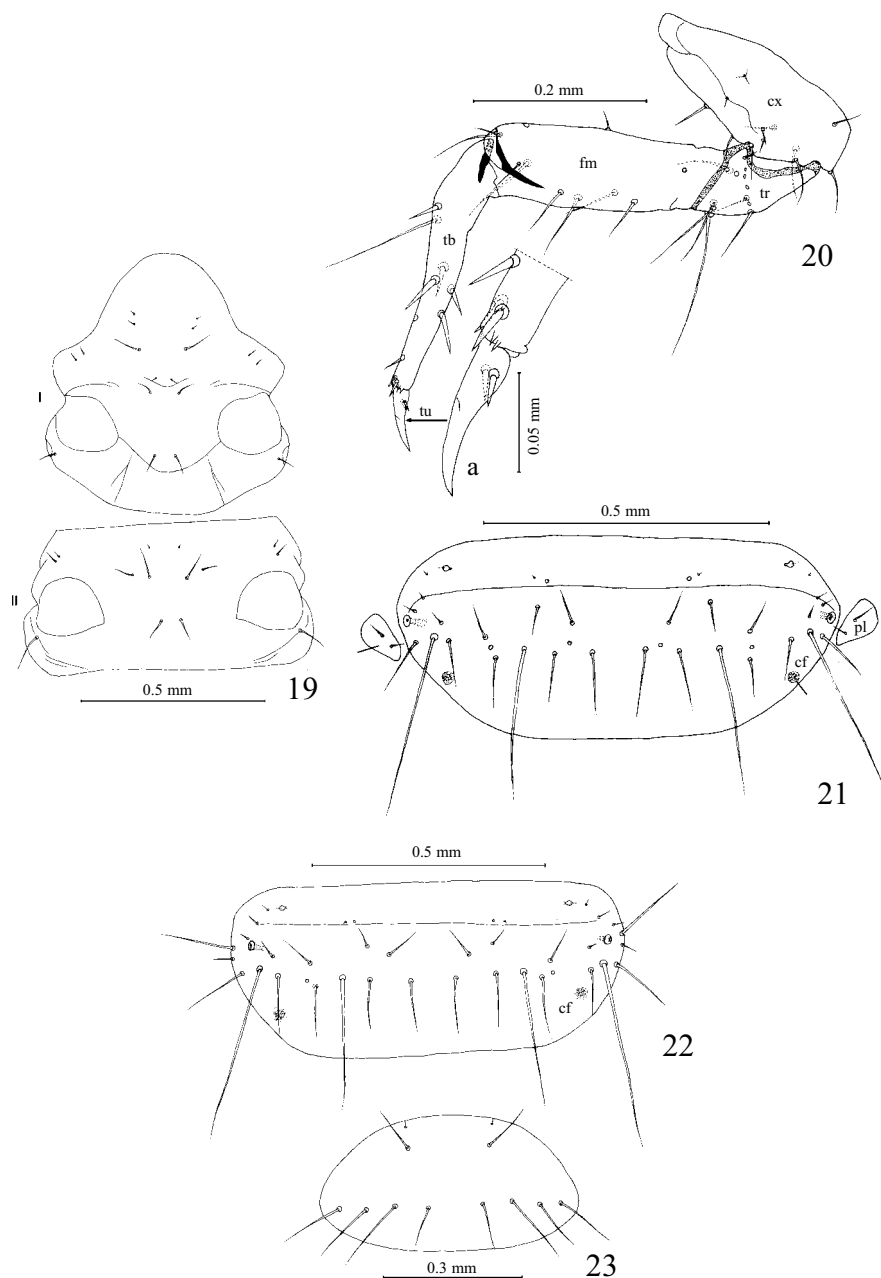
1-4. *Aploderus caesus*: 1 - egg chamber with cluster of four eggs; 2 - mature larva (L₃), dorsal aspect; 3, 4 - head of mature larva: 3 - dorsal aspect with microsculpture in *A. caesus* (3a) and in *A. caelatus* (3b); 4 - lateral aspect



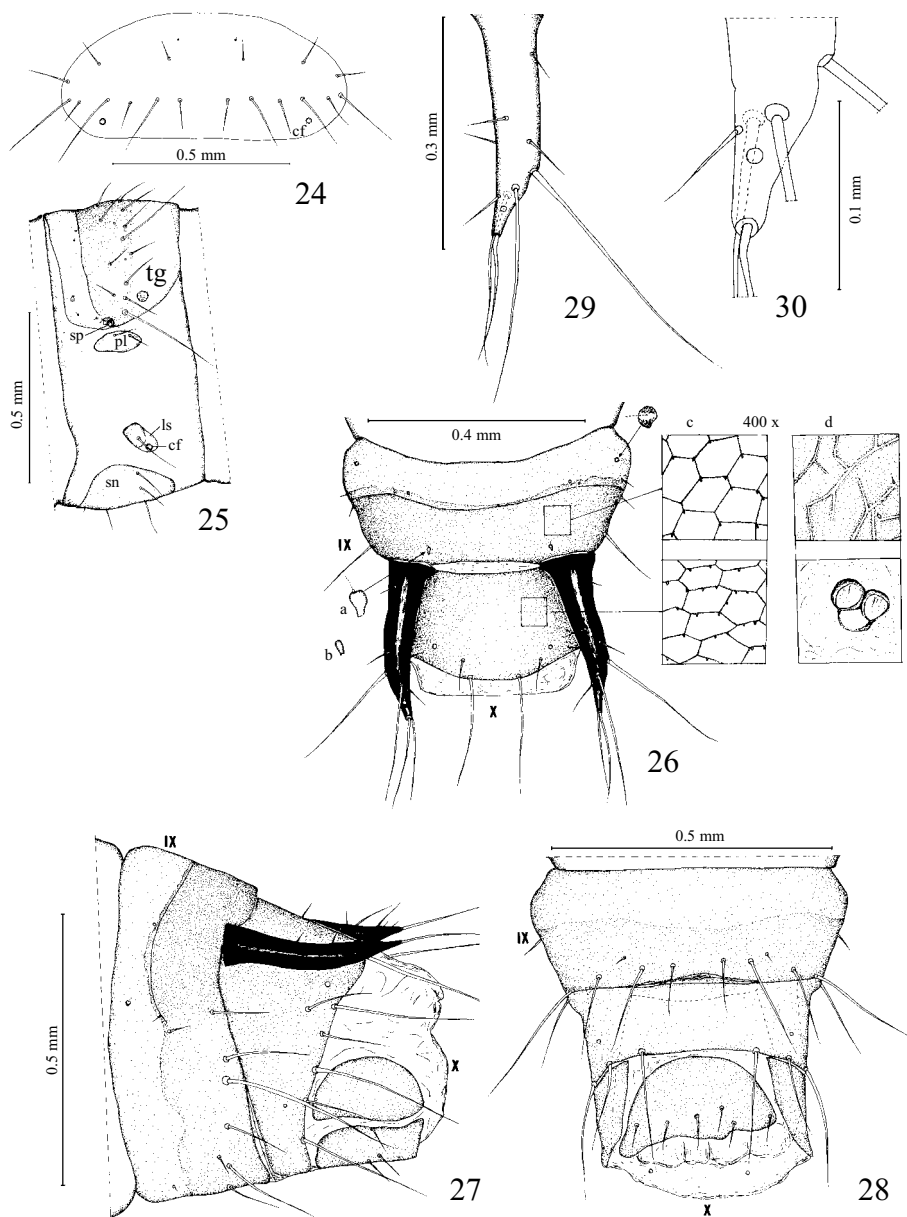
5-8. *Aploderus caesus*, mature larva: 5 - right antenna, dorsal aspect; 6 - apex of right antenna, dorsal aspect; 7 - labrum, dorsal aspect; 8 - anterior margin of labrum, dorsal aspect; 9 . *A. caelatus*, mature larva: anterior margin of labrum, dorsal aspect



10-13. *Aploderus caesus*, mature larva: 10 - right mandible, dorsal aspect with microsculpture in *A. caesus* (10a) and in *A. caelatus* (10b); 11 - apex of right mandible, dorsal aspect; 12 - right maxilla, dorsal aspect (cdo - cardo, stp - stipes, ma - mala, pf - palpifer, pm - maxillary palp); 13 - apex of right maxilla, dorsal aspect; 14 - hypopharynx, dorsal aspect; 15 - labium, ventral aspect (lg - ligula, lp - labial palp, pmnt - prementum, mnt - mentum, smnt - submentum); 16 - ligula and prementum, ventral aspect; 17 - pronotum (da₁ - a pair of discal setae); 18 - mesonotum with sensillum in *A. caesus* (18a) and in *A. caelatus* (18b) (cf - cuticular form, pl - pleurite)



19-23. *Aploderus caesus*, mature larva: 19 - thoracic segment I and II, ventral aspect; 20 - fore leg (cx - coxa, tr - trochanter, fm - femur, tb - tibia, tu - tarsungulus), apical part of tibia and tarsungulus (20a), anterior view; 21 - tergite and pleurites (pl) of abdominal segment I (cf - cuticular form); 22 - tergite of abdominal segment II (cf - cuticular form); 23 - sternite of abdominal segment I



24-27. *Aploderus caesus*, mature larva: 24 - sternite of abdominal segment II (cf - cuticular form); 25 - abdominal segment I (tg - tergite, pl - pleurite, ls - laterosternite, sn - sternite, cf - cuticular form, sp - spiracle), lateral aspect; 26 - abdomen, segments IX and X, sensillum and microsculpture in *A. caesus* (26a, 26c), sensillum and microsculpture in *A. caelatus* (26b, 26d), dorsal aspect; 27 - abdomen, segments IX and X, lateral aspect; 28 - abdomen, segments IX and X, ventral aspect; 29 - right urogomphus, dorsal aspect; 30 - apical part of urogomphus, dorsal aspect