

Redescription of the third larval instar of *Anisotoma humeralis* (F.)\*  
(Coleoptera: Leiodidae)

ALEKSANDRA RATAJCZAK

Zoological Institute, University of Wrocław, Sienkiewicza 21, 50-335 Wrocław, Poland

**ABSTRACT.** A detailed redescription of the third instar larva of *Anisotoma humeralis* (F.) is given, according to WHEELER'S standard of description of larval morphology in the tribe *Agathidiini*.

**Key words:** entomology, morphology, larva, *Coleoptera*, *Leiodidae*, *Anisotoma humeralis*.

INTRODUCTION

Larvae of the tribe *Agathidiini* are poorly known. WHEELER (1990) listed all papers containing descriptions of larval stage of these beetles, but only two of them (WHEELER 1990, ANGELINI and DE MARZO 1984) conform to the recent standard. The genus *Anisotoma* PANZER, 1797 comprises 35 species (WHEELER 1979), five of them are known from Europe, but larva of only one New World species *A. basalis* (LECONTE), was described in detail (WHEELER 1990). Old descriptions of some European species (*Anisotoma castanea* (HERBST), *Anisotoma glabra* KUGEL., *Anisotoma humeralis* F.) are not useful for phylogenetic study.

*Anisotoma humeralis* (F.) is a well known member of the tribe *Agathidiini*. Even though it is one of the most common species of the family *Leiodidae*, recorded from many regions in Europe and Siberia (it is also the commonest species in Poland - BURAKOWSKI et al. 1978; WANAT 1990), the most recent description of its larva comes from PAULIAN (1941). The earliest description of larvae of *Anisotoma humeralis* was made by ERICHSON (1847), who was the author of the first systematics based on morphology of beetle larvae. Next information about the larvae of the family

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*Leiodidae* was given by CHAPUIS and CANDÈZE (1853), LACORDAIRE (1854) and HENRIKSEN (1922).

Species of *Anisotoma*, either from the Holarctic or Palaearctic, feed on slime molds (*Myxomycetes*) so collecting them is the most fruitful during slime mold propagation (early spring to late autumn). Time of fructification of *Myxomycetes* is short and needs special conditions (MARTIN and ALEXOPOULUS, 1969); thus it is not easy to find and rear these beetle and especially their larvae. For this reason collections of larvae feeding on slime molds are valuable and rare.

A general rule in larval chaetotaxy of the *Staphylinoidea* is addition of setae during ontogeny. Thus, the third larval instar has the most complete setal pattern and the terminology is based on its chaetotaxy (ASHE and WATROUS 1984, WHEELER 1990).

In this paper I give the first modern redescription of morphology of the third larval instar of this species.

#### ACKNOWLEDGMENTS

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#### MATERIALS AND METHODS

All the specimens were loaned from the collection of the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw. They were collected or reared and stored in 75% ethanol by Dr. Bolesław BURAKOWSKI.

#### Label data:

Nizina Mazowiecka: Warszawa-Bielany, 20 V 1960, larvae found on a fallen alder trunk, 180 exx.

Beskid Zachodni: Mt Wielka Czantoria, 13 VII 1962 larvae found, 23 VII cons., 3 exx.

Nizina Mazowiecka: Warszawa-Wawer, 6 V 1970 imagines, 13 V larvae, 20 V pupae, imagines, inside of fruit body on a log of wild apple tree, 14 exx.

Nizina Mazowiecka: Grodzisk Mazowiecki-Piaskowa, 27 VIII, 3 IX 1987 larvae found, ascocarp, 29 IX cons., 30 exx.

#### Preparation:

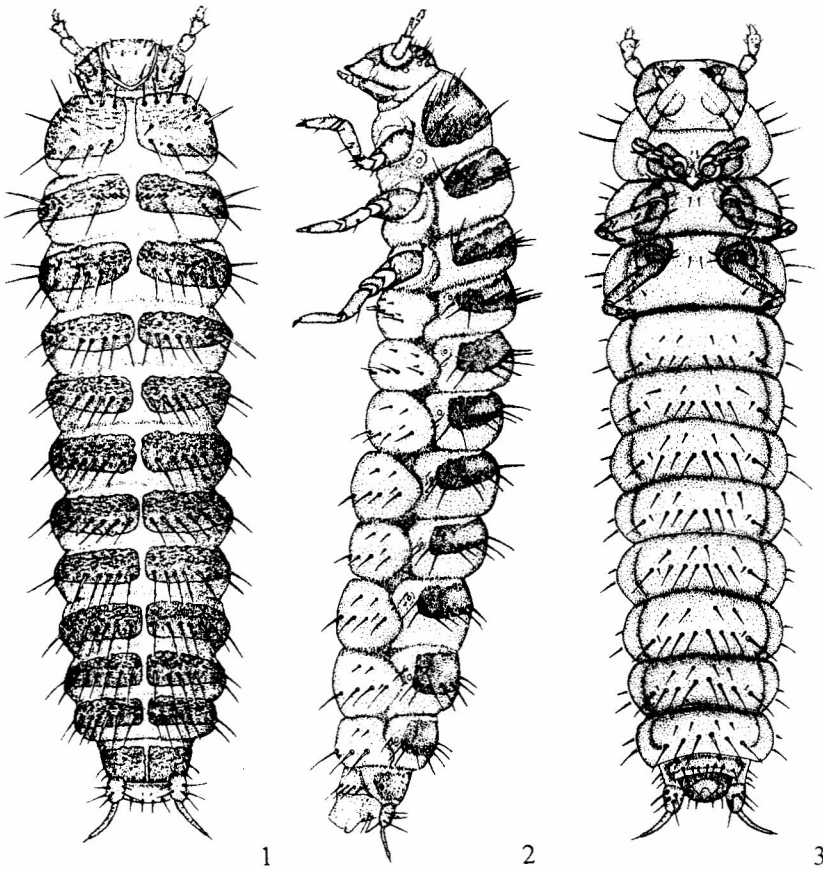
I examined 65 specimens.

All detailed comparisons were made of slide-mounted larvae, mainly in glycerine:

Specimens were removed from 75% ethanol, boiled in 10% KOH solution, cleared in distilled water and mounted in glycerine. A few slides were made with the method proposed by POMORSKI and SKARŻYŃSKI (1990): larvae were boiled in 100% ethanol, cleared in 10% KOH solution, next put into chloralphenol and then mounted in Swan's medium. Head, mouthparts and legs were prepared in glycerine.

The larvae were examined at magnifications up to 840, using Phase Contrast "Jenaval" microscope.

Chaetotaxy system, morphometrics, abbreviations and designations of chaetae positions are given by WHEELER (1990).



1-3. *Anisotoma humeralis*, larval habitus: 1 - dorsal, 2 - lateral, 3 - ventral

*Anisotoma humeralis* (FABRICIUS, 1792)

*Sphaeridium humerale* FABRICIUS, 1792: 79.

## DIAGNOSIS

Three solenidia at base of digitiform organ of antennomere II. Digitiform solenidium large, undivided. Two stemmata. Mola of mandible with rows of sclerotized dense asperities. Dorsal integument with dense asperities arranged into distinct transverse rows, especially in anterior part of segments, sparse in mid part and changed in posterior part of integument into granulation. Seta Da3 on metanotum large, shifted to posterior transverse row (between P2/P3). Abdominal segments with seta Db1 large, shifted to posterior transverse row (between P3/P4). Seta P3 present.

## DESCRIPTION

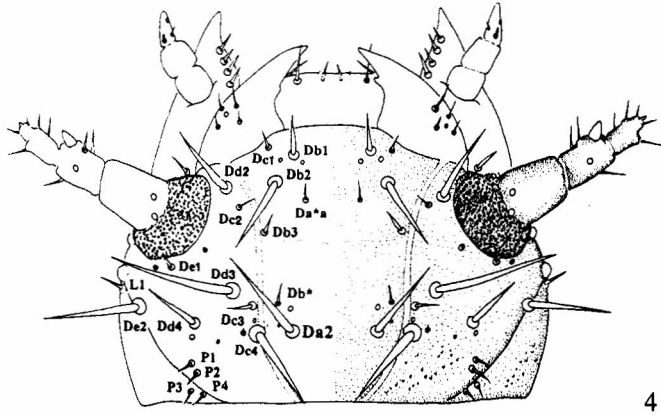
**Body:** Cylindrical, narrowed posteriorly, widest at metanotum. Total body length 3.7-7.7 mm (average: 5.7 mm). Average metanotal width: 1.1 mm.

**Head** (figs 4-6): Cranium wider than long; HW/HL= 1.26; average head width: 0.66 mm. Chaetotaxy as follows: row Da with 2 setae: small seta Da\*a and Da2; row Db with 4 setae (Db1- Db3, Db\*); row Dc with 5 setae (Dc1-Dc4, Dc\*p - left to Dc4); row Dd with 3 setae (Dd2, Dd3, Dd4); row De with 2 setae (De1, De2); 4 posterior setae (P1-P4); campaniform sensilla include: 2 between Db\* and Da2, 1 between Dc3 and Dc4, 2 below Dd4, 1 anterior to De1, 1 lateral to De1; lateral row with 2 setae (L1, L2); ventral side of head with 3 ventrolateral setae (V11-V13) and 4 or less posterior small setae (P1-P4). Integument on dorsum of cranium with sparse minute asperities posteriorly and posterolaterally. Stemmata 2, lateral.

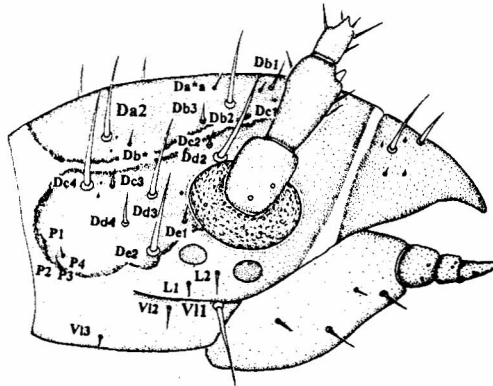
**Antenna** (figs 13-14): Antennal formula= 4.5:5.7:2.7:1; length antennomere II/ digitiform solenidium length= 5.7; length antennomere II/III= 2.1; antennomere I with 2 dorsal campaniform sensilla and 2 campaniform sensilla on the ventral side of apex; antennomere II with one large, undivided, thumb-like digitiform solenidium on the internal, lateral edge; 3 solenidia in membranous area at base of digitiform organ; 2 setae (one ventral, one lateral) basal and near digitiform solenidium, 2 dorsal campaniform sensilla, 1 ventral seta; antennomere III small, with 3 subapical setae, 2 subapical pointed processes, 2 accicuate peg-like sensilla.

**Mouthparts** (figs 7-12, 15-21):

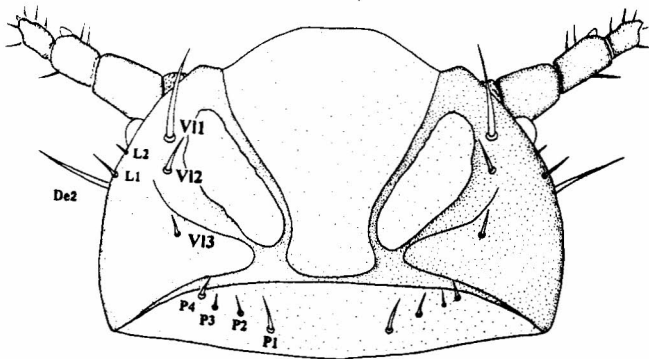
**Labrum:** Rounded marginally; epipharynx with median, transverse row of c. 12-17 campaniform sensilla preceded by 2 or 3 pairs of campaniform sensilla, all of them surrounded by pair of lobes with microtrichiae, surface between lobes also with microtrichiae, lateral to these structures sparse asperities; margin of labrum with 5 pairs of apical setae and 1 lateroapical; dorsal view of labrum with 1 pair of setae, 1 pair of campaniform sensilla in the mid part and 2 pairs of marginal setae.



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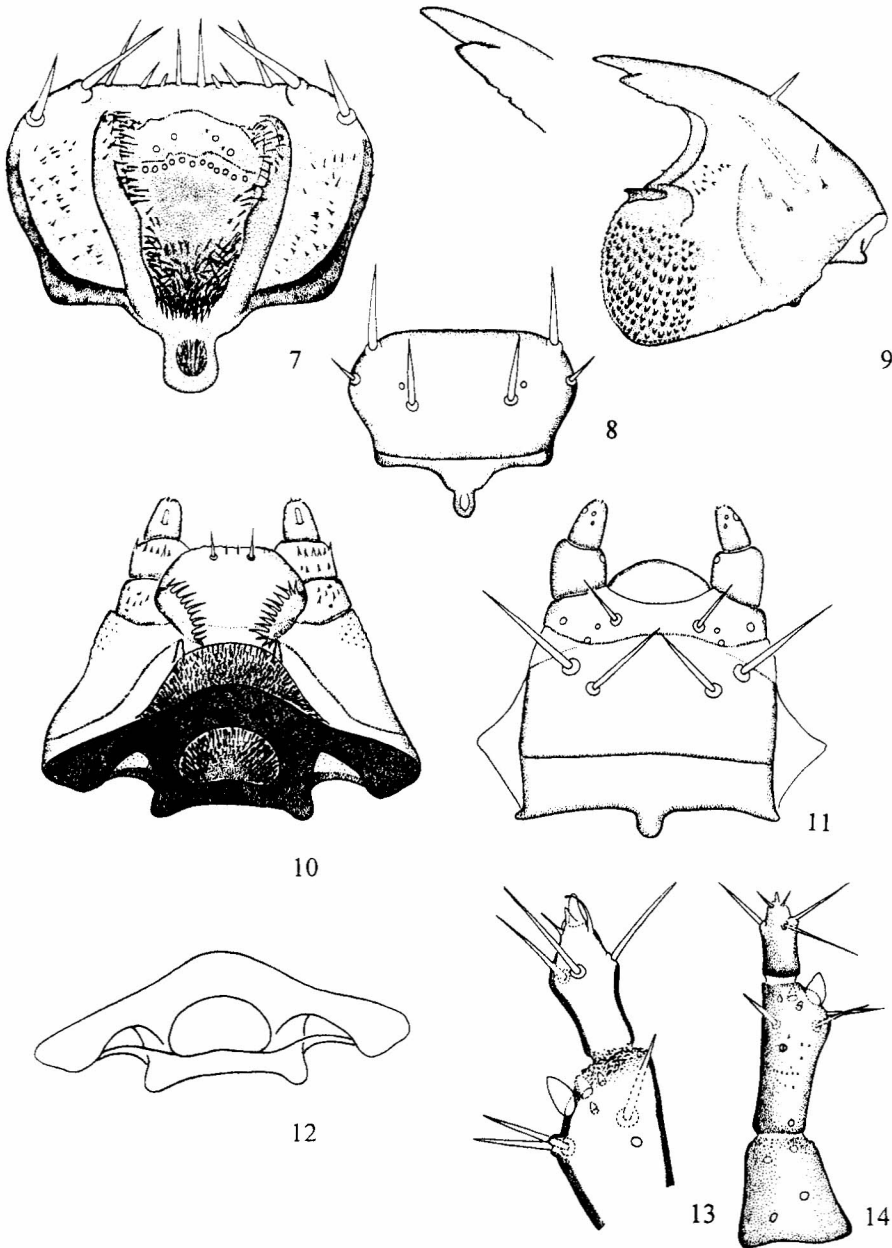


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4-6. *Anisotoma humeralis*, head: 4 - dorsal, 5 - lateral, 6 - ventral

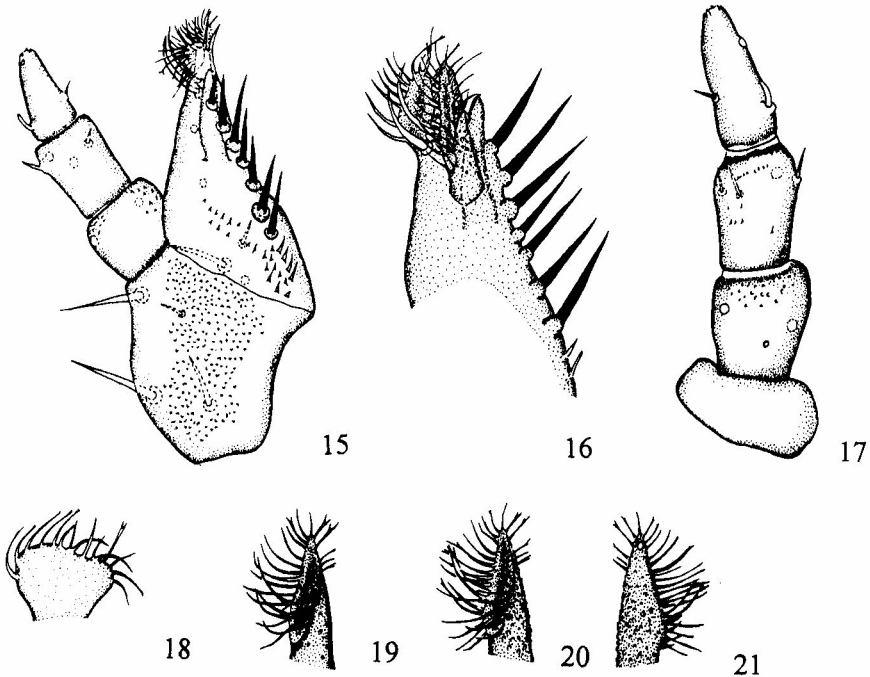


7-14. *Anisotoma humeralis*; 7-9 - labrum: 7 - ventral, 8 - dorsal; 9 - mandible; 10-12 - labium: 10 - ventral, 11 - dorsal, 12 - hyphopharyngeal bridge; 13-14 - antenna

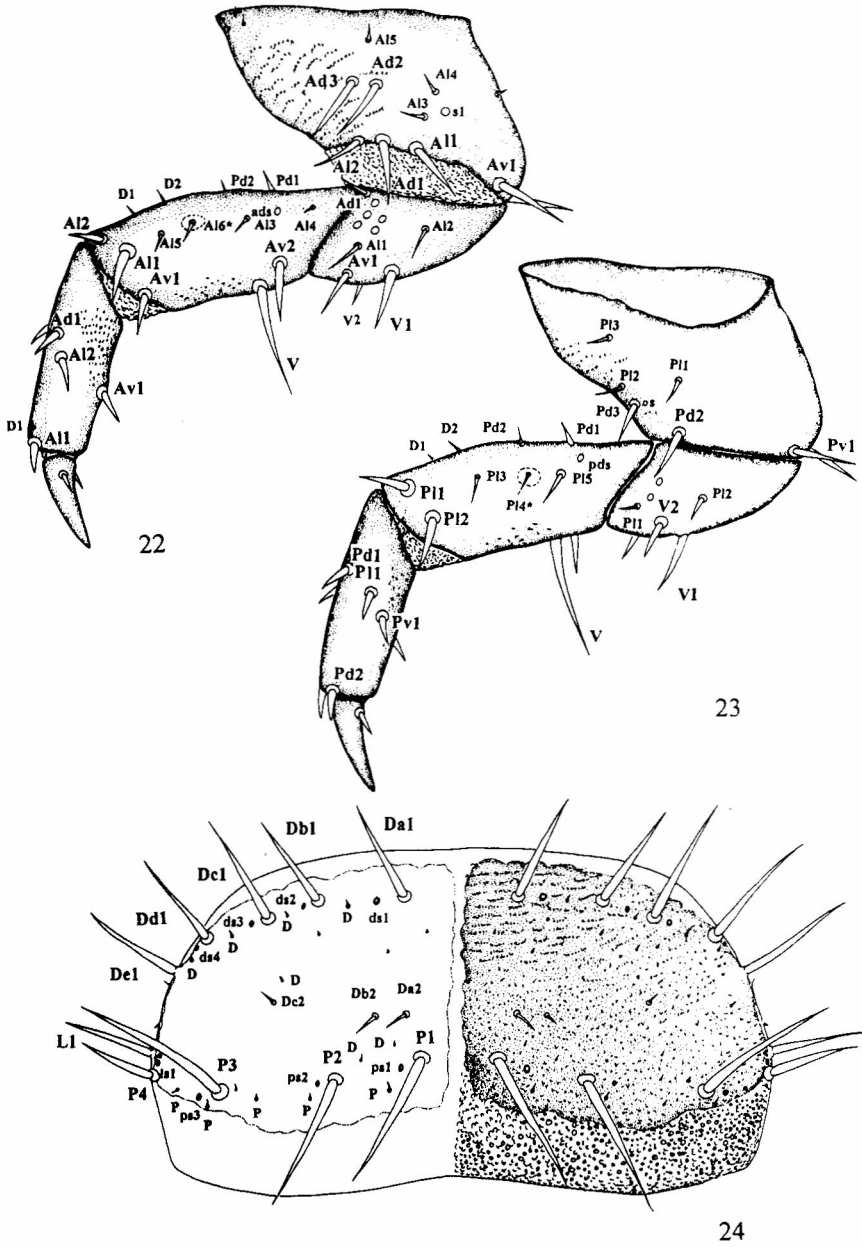
**Mandible:** Apically bidentate, prosthema short, pointed, sclerotized, with sparse asperities, mola with c. 100 visible, sclerotized teeth, 1 lateral seta, 1 ventral seta, 4 small ventral setae, 2 ventral campaniform sensilla, apical part of mandible as in fig. 9.

**Maxilla:** Lanceolate lacinia with 7-8 mesal spines and group of small spines below; galea with fimbriate, bibranching apex, 2 setae between branches; maxillary palp as in fig. 17.

**Labium:** Dorsal side of labium with 1 pair of subapical setae, 2 pairs of medial setae and 3 pairs of campaniform sensilla; labial palpus segment I with lateral subapical campaniform sensillum and dentate trichiae on ventral side; segment II also with trichiae, apical small peg-like sensilla and 3 subapical dorsal campaniform sensilla; ligula on ventral side with pair of serrate lobes and 2 pairs of subapical setae; hyphopharyngeal sclerome as in fig. 12, with complete anterior and posterior bridges, haevily sclerotized.



15-21. *Anisotoma humeralis*, maxilla: 15 - total, 16 - lacinia and galea; 17 - maxillary palp, 18-21 - elements of bibranching galea

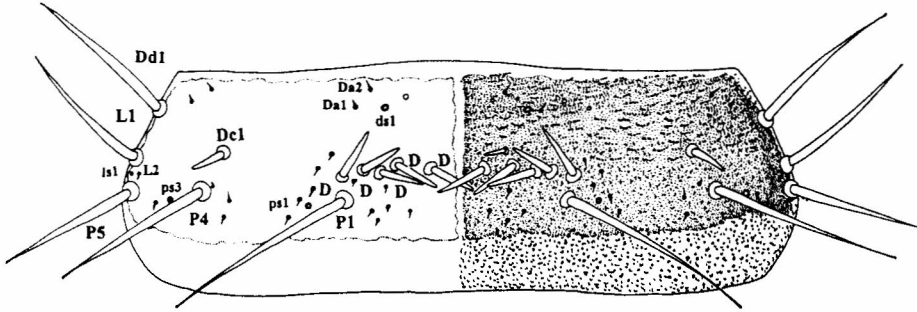


22-24. *Anisotoma humeralis*; 22-23 - leg: 22 - anterior, 23 - posterior; 24 - pronotum

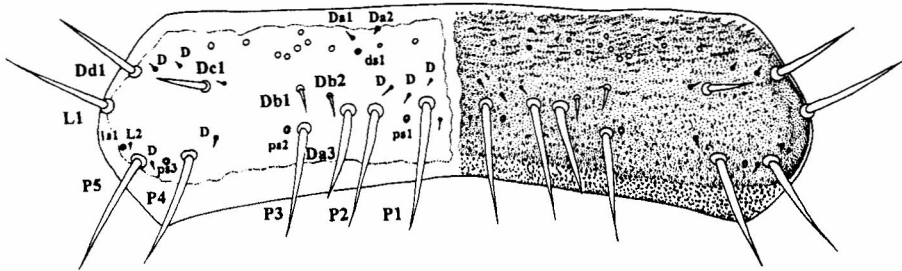


**Leg (figs 22-23):**

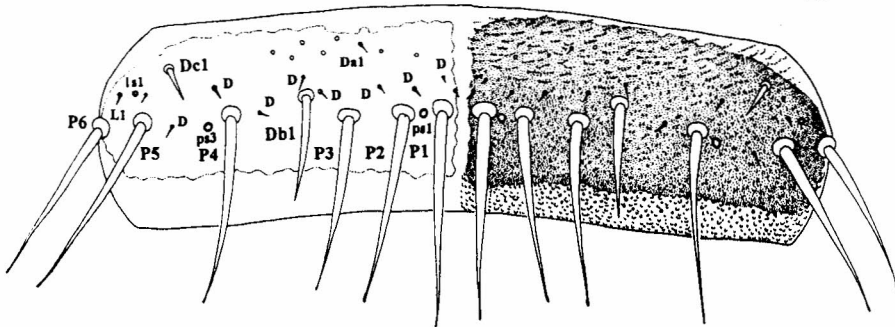
**Coxa:** Large, with 14 anterior setae: 1 seta anteroventral (Av1), 5 setae anterolateral (Al1-Al5), 3 setae anterodorsal (Ad1-Ad3), 4 basal setae, 1 additional anteroventral seta, 1 campaniform sensillum (s1); 6 posterior setae: 1 posteroventral (Pv1), 2 posterodorsal (Pd2, Pd3), 3 posterolateral (Pl1-Pl3), 1 campaniform sensillum (s).



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**Trochanter:** Triangular, with 2 posterolateral setae (P11, P12), 2 posterior campaniform sensilla; anterior side with 1 anteroventral seta (Av1), 2 anterolateral setae (A11, A12), 1 anterodorsal seta (Ad1), 2 ventral setae (V1, V2 shifted to posterior side) and 5 campaniform sensilla.

**Femur:** Short, broad, with single ventral seta (V1), 2 posterodorsal setae (Pd1, Pd2), 2 dorsal small setae (D1, D2), 2 anteroventral setae (Av1, Av2), 5-6 anterolateral setae (A11-A15, A16\* additional), 3-4 posterolateral setae (P11- P15, P14\* additional), 1 posterodorsal campaniform sensillum (pds), 1 anterodorsal campaniform sensillum (ads).

**Tibia:** Short, broad, with 1 anteroventral seta (Av1), 1 anterodorsal (Ad1), 2 anterolateral (A11, A12), 1 subapical dorsal seta (D1), 2 posterodorsal (Pd1, Pd2), 1 posterolateral (P11), 1 posteroventral seta (Pv1).

**Tarsungulus:** Long, pointed, with single pair of setae.

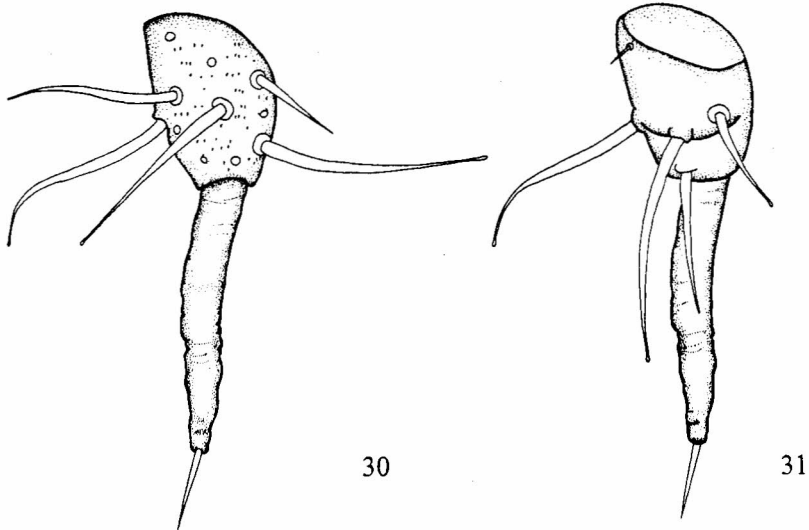
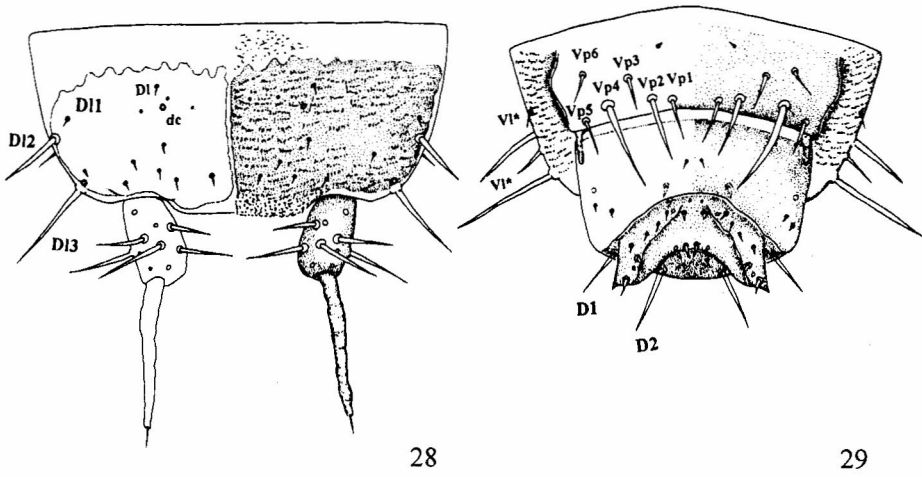
**Pronotum** (fig. 24): Transverse;  $N1L/N1W = 0.57$ . Chaetotaxy on dorsal surface as follows: Row Da with 2 setae (Da1, Da2); row Db with 2 setae (Db1, Db2); row Dc with 2 setae (Dc1, Dc2); row Dd with 1 seta (Dd1); row De with 1 seta (De1); row L with 1 seta (L1); posterior transverse row with 4 setae (P1-P4). Campaniform sensilla include 1 between Da1/Db1 (ds1), 1 between Db1/Dc1 (ds2), 1 between Dc1/Dd1 (ds3), 1 between Dd1/De1 (ds4), 1 between P1/P2 (ps1), 1 between P2/P3 (ps2), 1 between P3/P4 (ps3), 1 between P4/L (ls1). About 15 small, additional setae (P, D) and 3 lateral small setae. Dorsal surface anteromedially with sparse minute asperities, arranged in transverse rows.

**Mesonotum** (fig. 25): Transverse; chaetotaxy as follows: Row Da with 2 small setae (Da1, Da2); row Dc with 1 seta (Dc1); row Dd with 1 seta (Dd1); row L with 2 setae (L1, L2); posterior transverse row with 3 setae (P1, P4, P5); dorsal transverse row with various number of setae (D) 4-9, number of setae on both halves of segment also can vary (asymmetrical, symmetrical); c. 20 small additional setae; campaniform sensilla include: 1 left to P1 (ps1), 1 between P4/P5 (ps3), 1 between P5/L1 (ls1), 1 near Da1 and Da2 (ds1).

**Metanotum** (fig. 26): Transverse;  $N3L/N3W = 0.46$ ; chaetotaxy as follows: Row Da with 3 setae (2 small: Da1, Da2; Da3 shifted to posterior transverse row); row Db with 2 setae (Db1, Db2); row Dc with single seta (Dc1); row Dd with single seta (Dd1); posterior transverse row with 6 setae (P1-P5 and Da3); lateral row with 2 setae (L1, L2); campaniform sensilla include: 1 between P3/P4 (ps2), 1 between P4/P5 (ps3), 1 between P5/L1 (ls1), 1 near Da1 and Da2 (ds1); c. 8 additional small setae.

**Abdominal Segment I** (fig. 27):  $A1L/A1W = 0.41$ ; chaetotaxy as follows: row Da with single seta (Da1); row Db with single seta (Db1 shifted to posterior transverse row between P3/P4); row Dc with single seta (Dc1); posterior transverse row with 7 setae (P1-P6 and Db1); lateral row with 1 seta (L1); additional minute

setae: about 9; campaniform sensilla include: 1 between P1/P2 (ps1), 1 between P4/P5 (ps3), 1 right to L1 (ls1).



28-31. *Anisotoma humeralis*; 28 - abdominal tergum IX; 29 - abdominal sternum IX and anal membrane; 30-31 - urogomphus: 30 - dorsal, 31 - ventral

**Abdominal Tergum IX** (fig. 28): 4 dorsolateral setae (D11-D13, D1), c. 8 small setae and 2 campaniform sensilla.

**Urogomphus** (figs 30-31): Comparatively short; formula UR1:UR2:UR3 = 2.9:4.9:1; length URII/URIII= 4.9; length URI/URII= 0.6; urogomphus segment I with 9 setae (4 ventral, 4 dorsal, 1 lateral); urogomphus segment II with 1 apical seta; sparse asperities at dorsal side of segment I.

**Abdominal Sternum IX and Anal Membrane** (fig. 29): With 6 pairs of setae (Vp1-Vp6), 1 pair of small setae, 2 pairs of ventrolateral setae (VI\*); anal membrane with 2 dorsolateral setae in its posterior part (D1, D2), c. 13 pairs of small setae and 5 pairs of campaniform sensilla.

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