

Far Eastern Entomologist

Дальневосточный энтомолог

Journal published by Far East Branch
of the Russian Entomological Society
and Laboratory of Entomology, Federal
Scientific Center of the East Asia
Terrestrial Biodiversity, Vladivostok

Number 373: 1-7

ISSN 1026-051X

December 2018

<https://doi.org/10.25221/fee.373.1>

<http://urn:lsid:zoobank.org:pub:E3EFBD10-5FC7-49AB-B805-4E16D38BBDA7>

DESCRIPTION OF THE LARVA OF *ACANTHOBODILUS* *LANGUIDULUS* (SCHMIDT, 1916) (COLEOPTERA: SCARABAEIDAE)

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Summary. The larva of *Acanthobodilus languidulus* (Schmidt, 1916) is described and illustrated for the first time. The larva of *A. languidulus* differs from larva of *A. immundus* (Creutzer, 1799) by chaetotaxy of head capsule and number of setae in the row in palidia. The larvae of the genus *Acanthobodilus* Dellacasa, 1983, similar to larvae of the genera *Bodilus* Mulsant et Rey, 1870 and *Melinopterus* Mulsant, 1842. Larvae of the genera *Acanthobodilus* and *Melinopterus* have lateral abdominal extension with 3 setae, but larvae of the genus *Bodilus* have four setae. The larvae of the genus *Acanthobodilus* have lacinia dorsally with a row of 7 long setae near the mesal edge, the larvae of *Bodilus* with a row of 6 long setae, and the larva of *Melinopterus* with a row of 5 long setae. A key to larvae of the genus *Acanthobodilus* is provided.

Key words: beetles, Coleoptera, Scarabaeidae, Aphodiini, larva, morphology, Russian Far East.

С. А. Шабалин. Описание личинки *Acanthobodilus languidulus* (Schmidt, 1916) (Coleoptera: Scarabaeidae) // Дальневосточный энтомолог. 2018. N 373. С. 1-7.

Резюме. Впервые описана и проиллюстрирована личинка *Acanthobodilus languidulus* (Schmidt, 1916). Личинка *A. languidulus* отличается от личинки *A. immundus* (Creutzer, 1799) хетотаксией головной капсулы, числом шипиков в симметричных рядах на анальном стерните. Личинки рода *Acanthobodilus* Dellacasa, 1983 сходны с личинками родов *Bodilus* Mulsant et Rey, 1870 и *Melinopterus* Mulsant, 1842. У личинок родов *Acanthobodilus* и *Melinopterus* боковые склериты брюшных сегментов несут по три щетинки, у рода *Bodilus* – по четыре щетинки. У личинок рода *Acanthobodilus* боковой край лациния (сверху) с рядом из 7 длинных щетинок, у личинок рода *Bodilus* – с рядом из 6 длинных щетинок, а личинки рода *Melinopterus* с рядом из 5 длинных щетинок. Приведена определительная таблица личинок рода *Acanthobodilus*.

INTRODUCTION

This publication is a continuation of our investigation on the morphology of the dung-beetles larvae of the Russian Far East (Shabalin, 2018). Two species of the genus *Acanthobodilus* Dellacasa, 1983 (type species: *Aphodius immundus* Creutzer, 1799, by original designation) are known in Palaearctic region. The type species of the genus *Acanthobodilus* is characterized by widespread distribution in the Palearctic, while *A. languidulus* (Schmidt, 1916) is known in the East Asian region. The larva of *A. immundus* was described from Donetsk (Martynov, 1999). In this study the third larval instar of *A. languidulus* is described for the first time. The beetles of *A. languidulus* were collected in vicinity of Dubovyi Klyuch (Primorskii krai). It was contained in the laboratory and we could examine the morphology of the larvae. The morphological terminology follows by Böving (1936). All examined material is deposited in Federal Scientific Center of the East Asia Terrestrial Biodiversity (Vladivostok).

DESCRIPTION OF LARVA

Acanthobodilus languidulus (Schmidt, 1916)

Figs 1 – 9

Aphodius obsoletus Waterhouse, 1875: 88. Type locality: "Shanghai; Japan, Nagasaki" [China: Shanghai; Japan: Kyushu]; nom. preocc., nec *Aphodius obsoletus* Fabricius, 1801.

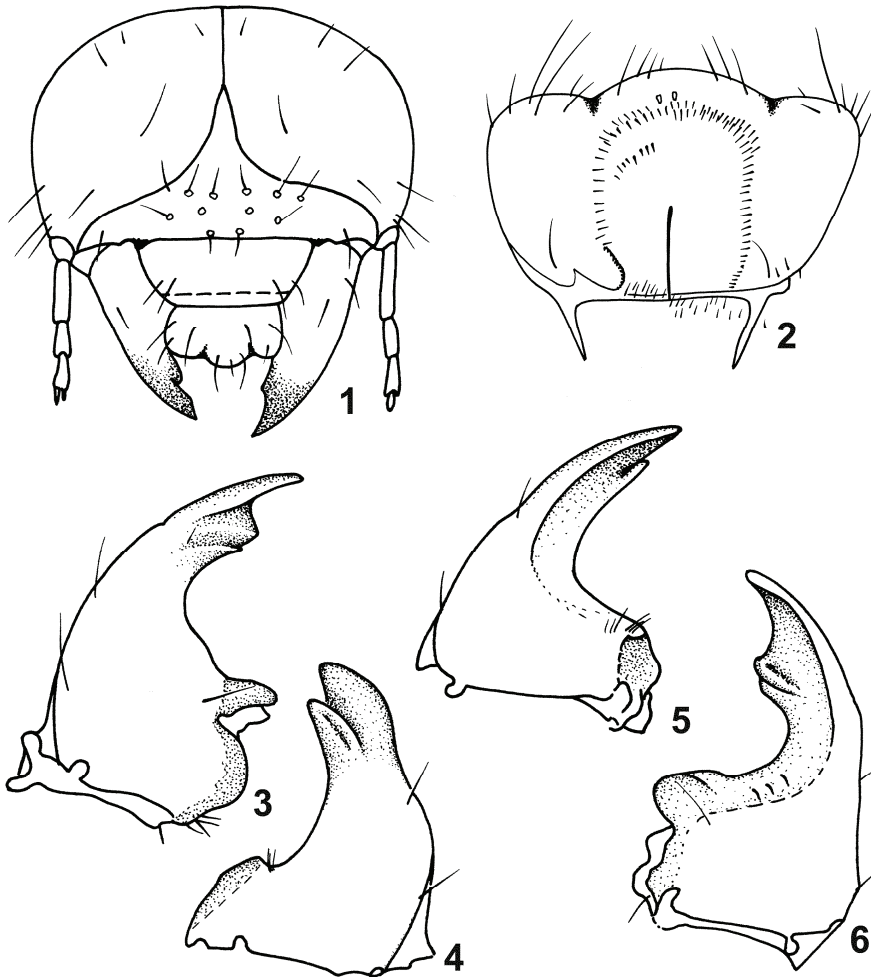
Aphodius languidulus Schmidt, 1916: 98. Replacement name for *Aphodius obsoletus* Waterhouse, 1875.

Acanthobodilus languidulus: Dellacasa et al., 2016a: 2; Dellacasa et al., 2016b, 99.

Aphodius (Bodilus) languidulus: Schmidt, 1922: 303; Nakane, 1961: 50; Balthasar, 1964: 404; Stebnicka, 1980: 244.

Aphodius (Acanthobodilus) languidulus: Dellacasa, 1983: 107; Berlov, 1989: 401; Dellacasa, Dellacasa, 2006: 105; Kim, 2012: 133; Shabalin, Bezborodov, 2012: 253; Akhmetova, Frolov, 2014: 405; Bezborodov, 2014: 36.

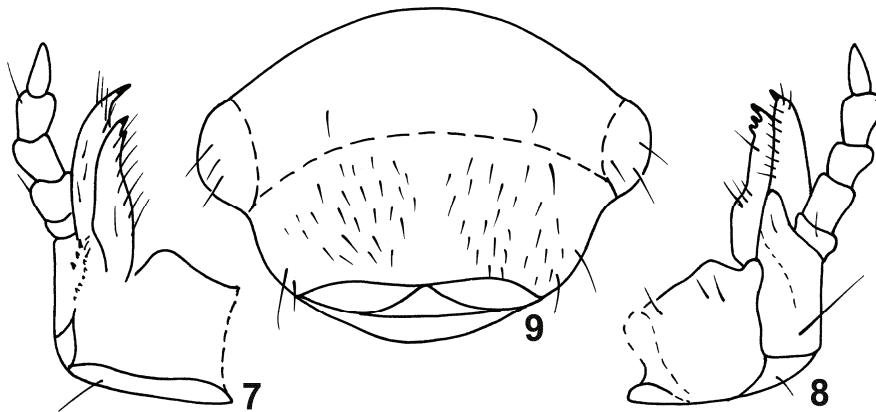
MATERIAL. Russia: Primorskii krai, vicinity of Dubovyi Klyuch, 3 third-instar larvae, 2 second-instar larvae reared from the eggs laid by the beetles collected in the cow dung 29.VII 2017 by S.A. Shabalin.



Figs 1–6. Larva of *Acanthobodilus languidulus* (Schmidt, 1916): 1 – head capsula, 2 – epipharynx, 3 – left mandible, dorsal view; 4 – right mandible, dorsal view; 5 – right mandible, ventral view; 6 – left mandible, ventral view.

DESCRIPTION. Larva of typical C-shape form. Head surface smooth, except for ten depressions on the frons, shiny, light yellow ochre. Medial part of pleural sclerites, and base of frons a bit darker than remaining part of the head capsule. Head width of third-instar larva 1.8 mm, length (without clypeus and labrum) 1.30 mm.

Head width of second-instar larva 1.5 mm, length 0.9 mm. Epicranial suture is short, narrowly dark, dark brown, slightly convex. Frontal sutures visible, as fine light lines. The length of the epicranial suture is about one and a half times shorter than the height of the frons. Each pleural sclerite with 8 setae: 4 dorsoepicranial setae, 4 basiantenal setae. Frons with pair rounded depression in central part, surrounded by 6 seta in depressions above frontal suture, and pair seta in depressions above fronto-clypeal suture; with pair exterior frontal setae, and four shorten setae of anterior frontal angle. Ocelli absent. Clypeus trapezoidal, with four of setae laterally. Basal part of clypeus (2/3 length of clypeus) is darker than apical quarter. Labrum three-lobed, with 2 posterior setae; 2 central setae; and 4 lateral setae (Fig. 1). Corypha with 4 marginal setae. Right and left clithrum being present, its surface thinly sclerotized. Epizygum and zygum absent. Haptomerum with 2 rounded sencillae. Plegmatium and proplegmatium absent. Right acantoparia with 5 marginal setae. Left acantoparia with 4 setae. Phoba in laterals parts with 1 setae row, in apical part protophoba with 2 setae row. Pedium rounded, it occupying between one-five epipharengial surface. Epitorma narrow, long; its apical part slightly thickened. Dexiotorma and laeotorma



Figs 7–9. Larva of *Acanthobodilus languidulus* (Schmidt, 1916): 7 – left maxilla, dorsal view) 8 – the same, ventral view; 9 – raster.

not similar in size and shape; only dexiotorma produced cephalid caudal. Haptolachus complete, but crepis absent. Nesium being present, its surface thinly sclerotized (Fig. 2). Mandibles triangular, asymmetrical. Left mandible slightly longer than right one, its scissorial part wider. Base of mandibles light brown, scissorial and molar part almost black. Right mandible with 1 apical, acute scissorial tooth followed by 1 wide, scissorial blade. Without stridulatory area. Lateral part of right mandible with two setae. Molar area complex of right mandibula, bilobed, with apical depression, basal molar lobe wide, dorso-longitudinally compressed (Figs 4, 5). Left mandible

with 1 apical, acute scissorial tooth and 2 wide scissorial blade. Without stridulatory area. Lateral part of left mandible with two setae dorsally. Molar area complex of left mandibula, bilobed, apical molar lobe with subtriangular shorter teeth, basal molar lobe wide, dorso-longitudinally compressed (Figs 3–6). A well developed brush of bristles at base of both right and left molar parts (Figs 3–5). Maxillae symmetrical. Dorsal side of cardo with one long basal seta, ventral side with one long and three distal setae. Ventral side of stipes with one long basal and one short distal setae; dorsal side with two rows of 11 conical stridulatory teeth. Palpifer without stridulatory teeth, with 1 short seta ventrally. Maxillary palp 4-segmented. Ventral side of galea with longitudinal row of short setae. Dorsal side of galea with 4 long setae apically and two shorter setae basally; ventral side with row of 8 setae and 2 longer setae apically; uncus with well developed apical tooth. Dorsal side of lacinia with row of 7 long thick setae, ventral side with 4 long thick setae basally. Uncus of lacinia 3-dentate (Figs 7, 8) ventrally. Claw rather short, practically cylindrical in basal half, with two setae strong basally. Lateral abdominal extension with 3 setae. The caudal part of anal sternite with 2 rounded sections of setae. Median part of anal sternite without setae. Medial setae of each part with 5 – 7 setae in the row, lacinate apically. The following to the outside the rows consists of the same setae. Rows removed caudally and becoming closer to each other basally. Anal sternite also with smaller 13–16 setae at each side of medial rows (Fig. 9). Lateral abdominal extension with 3 setae.

NOTES. The larvae of the genus *Acanthobodilus* are similar to larvae of the genera *Bodilus* Mulsant et Rey, 1870 and *Melinopterus* Mulsant, 1842 (Krell, 1997; Martynov, 1999) by have a bare section in the medial part of the anal sternite dividing the symmetrical rows of spines and setae into two fields and these fields do not overlap in the basal part of the anal sternite. Like the larvae of the *Bodilus*, the larvae of the genus *Acanthobodilus* have a shiny yellow-ocherous head capsule; while the larvae of *Melinopterus* have a frosted dark reddish-brown head capsule. The larvae of the genus *Acanthobodilus* have lacinia dorsally with a row of 7 long setae near the mesal edge, while larvae of *Bodilus* with a row of 6 long setae, and the larvae of *Melinopterus* with a row of 5 long setae. Larvae of the genus *Acanthobodilus* as a larva of the genus *Melinopterus* have lateral abdominal extension with 3 setae, but larvae of the genus *Bodilus* have four setae.

The larva of *Acanthobodilus languidulus* differs from larva of *Acanthobodilus immundus* by chaetotaxy of head capsule and number of setae in the row in palidia.

DISTRIBUTION. Russia: Primorskii krai, Khabarovskii krai, Jewish autonomous region, Amurskaya oblast, Sakhalin, Kunashir. – China (Heilongjiang, Liaoning, Beijing, Shandong, Shanxi, Gansu, Shanghai, Sichuan, Taiwan), North Korea (Yanggang-do, Hamgyeongnam-do, Pyeonganbuk-do, Pyeongannam-do), South Korea (Gangwon-do, Gyeonggi-do, Chungcheongbuk-do, Chungcheongnam-do, Jeonlabuk-do, Jeonlanam-do), Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Key to larvae of the genus *Acanthobodilus*

1. Each pleural sclerite with 4 dorsoepicranial setae. Clypeus with four of setae laterally. Palidia with 5–7 setae in the row *A. languidulus*
- Each pleural sclerite with 8 dorsoepicranial setae. Clypeus with four of setae laterally and two setae basally. Palidia with 7–11 setae in the row *A. immundus*

ACKNOWLEDGEMENTS

I thank to Dr. V.V. Martynov (Botanical garden, Donetsk) for the providing important consultations on morphology and photographs of the mouthparts of *Acanthobodilus immundus*.

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