

Genus	Vol. 23(3): 363-366	Wrocław, 15 X 2012
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Morphology of pupa of *Scydmaenus tarsatus* MÜLLER & KUNZE (Coleoptera: Staphylinidae: Scydmaeninae)

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ABSTRACT. The pupa of the European species *Scydmaenus* (s. str.) *tarsatus* MÜLLER & KUNZE is described and illustrated. This is the first known pupa of the supertribe Scydmaenitae of ant-like stone beetles. Differences and similarities to the pupa of *Palaeostigus pilifer* (KRAATZ), hitherto the only pupa described for Scydmaeninae, are discussed.

Key words: entomology, morphology, Staphylinidae, Scydmaeninae, Scydmaenini, *Scydmaenus*, preimaginal stages, pupa.

INTRODUCTION

Immature stages of Scydmaeninae are exceptionally poorly studied. The larvae are known for less than 0.5% of all described species (reviewed by JAŁOSZYŃSKI & KILIAN 2012). The pupa was described and illustrated only for a single species, *Palaeostigus pilifer* (KRAATZ) (as *Mastigus*) (DE MARZO 1984), and it shows a remarkable pattern of extremely long setiform cuticular projections on the head, pronotum and abdominal segments.

The author carried out several attempts to obtain pupae from larvae of *Scydmaenus tarsatus* MÜLLER & KUNZE in the course of previously published behavioral studies (JAŁOSZYŃSKI 2012a, 2012b; JAŁOSZYŃSKI & KILIAN 2012). This common European species is associated with a decaying plant matter and can be commonly encountered in garden compost heaps. Larvae and adults of *S. tarsatus* can be maintained in laboratory for weeks and fed with soft-bodied arthropods, as springtails (JAŁOSZYŃSKI 2012a, 2012b; JAŁOSZYŃSKI & KILIAN 2012). However, in previous rearing attempts all mature larvae collected from a compost died before pupation. A recent continuation of these experiments resulted in obtaining a pupa, which is described below.

The specimen, preserved in FAE ((3.4 vol. 35% formalin, 1 vol. acetic acid, 6.7 vol. ethanol) is deposited in the author's collection (Wrocław, Poland). The description is based on a pupa illustrated while still alive.

PUPA OF *SCYDMAENUS TARSATUS* MÜLLER & KUNZE

MATERIAL EXAMINED

Numerous larvae of *Scydmaenus* (s. str.) *tarsatus* MÜLLER & KUNZE, 1822 were collected at the end of August by sifting a large compost heap in Włocławek, Central Poland. Larvae were transported to the laboratory together with a sample of sifted substrate and individually placed on 35-mm vented plastic Petri dishes half-filled with plaster of Paris, preconditioned as described previously (JAŁOSZYŃSKI & KILIAN 2012). About 1/3 of the surface of each arena was covered with a thin layer of freshly sifted compost substrate. One larva nearly immediately burrowed into the substrate; an inspection 24 hours later revealed a pupa laying on the plaster under the compost, in a small oval chamber. The pupa was illustrated and described on the same day, before placing in FAE.

DESCRIPTION

Body (Figs. 1-3) moderately slender, creamy-white, with slightly darker distal parts of setiform projections and nearly black eyes; body length (from anterior margin of pronotum to posterior margin of abdomen) 1.57 mm, width at the broadest place across elytra 0.75 mm; length of head 0.33 mm, width 0.40 mm; length of pronotum 0.69 mm, width 0.55 mm.

Frons between eyes with two pairs of long setiform projections; single ocellus visible at each side of head. Antennae bent over profemora and reaching to about half of elytra, with transverse rows of indistinct protuberances.

Pronotum large, oval, with nearly straight basal margin, bearing four lateral pairs of long setiform projections.

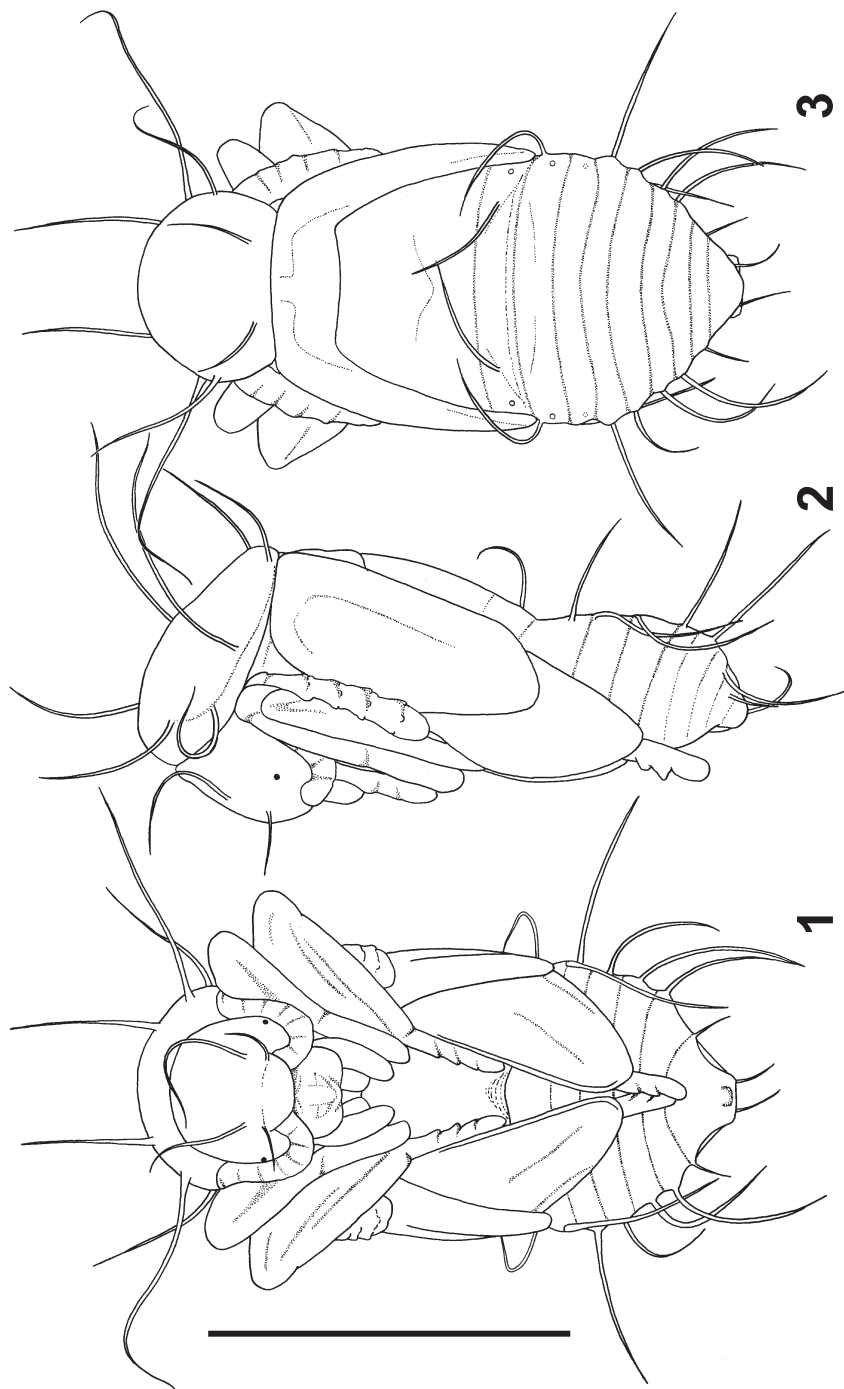
Elytra oval, distinctly longer than half length of hind wings protruding from under elytra and in ventral view reaching to middle of abdomen.

Abdominal segments with lateral setiform projections; six sternites and nine tergites visible; apex of abdomen without appendages; spiracles indistinct, not protruding and lightly sclerotized.

Legs long, fore and middle legs largely visible in ventral view, hind legs hidden under wings and only metatarsi visible.

REMARKS

The only previously known pupa of Scydmaeninae was illustrated and described by DE MARZO (1984); it was obtained by rearing larvae of *Palaeostigus pilifer* (KRAATZ, 1879), a large endemic Italian species of the tribe Mastigini. Although the adults and especially larvae of *Scydmaenus* LATREILLE (Scydmaenitae) and *Palaeostigus* NEWTON (Mastigitae) strikingly differ in a number of characters (JAŁOSZYŃSKI & KILIAN 2012; DE MARZO 1984), their pupae show remarkable similarities. The number and placement



1-3. Pupa of *Scydmaenus tarsatus* in ventral (1), lateral (2) and dorsal (3) views (scale bar: 1 mm)

of the long setiform projections on the head and pronotum of *S. tarsatus* is nearly the same as in *P. pilifer*. Only the projections on abdominal segments differ markedly: nine pairs of various lengths in *S. tarsatus* and seven pairs of projections gradually shortening towards the abdominal apex in *P. pilifer*. Moreover, the pupa of *P. pilifer* has distinct appendages on the terminal abdominal segment, absent in *S. tarsatus*. Other characters reflect differences between adults, especially the strongly elongate, massive scape in *P. pilifer* is an unmistakable feature of Mastigini, while the scape in the pupa of *Scydmaenus* is unremarkable.

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