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Morphology of the larva of *Phloeophagus turbatus* SCHOENHERR, 1845 (Coleoptera: Curculionidae)

RAFAŁ GOSIK
Department of Zoology, Maria Curie-Skłodowska University, Akademicka 19, 20-033 Lublin, Poland, phone: e-mail: rgosik@op.pl, phone: 0815375019

ABSTRACT. The mature larva of *Phloeophagus turbatus* SCHOENH. has been described for the first time. The diagnostic features of the *Phloeophagus turbatus* larva are presented.

Key words: entomology, morphology, *Coleoptera*, *Curculionidae*, *Phloeophagus turbatus,* larva.

Among four species of the genus *Phloeophagus* SCHOENHERR 1838 recorded in Europe 3 species have been reported from Poland so far: *Phloeophagus lignarius* (MARSHAM, 1802); *Ph. turbatus* SCHOENHERR, 1845 and *Ph. thomsoni* (GRILL, 1896) (ALONSO-ZARAZAGA 2005; WANAT and MOKRZYCKI 2005). The beetles belonging to that genus possess flat body and are medium sized (2.9- 3.8 mm long). The *Phloeophagus* species can be distinguished from other weevils belonging to the tribe *Rhyncolini* by the presence of cylindrical rostrum. All of those mould-eating species are obligatorily associated with necrotic, humid wood of many deciduous tree species or rarely with coniferous trees (BUCHHOLZ and OSSOWSKA 1995). They occur in forests, old park trees, orchards and alleys. The *Phloeophagus* species can be regarded as rare and endangered. The biology and morphology of preimaginal stages of the mentioned weevils have been only partly described so far (BURAKOWSKI et all. 1993). A little, laconic information on the larvae of the genus *Phloeophagus* was provided by SCHERF (1964).

Phloeophagus turbatus SCHOENH. has been so far recorded from: North and East Europe (Estonia, Finland, Latvia, Norway, Sweden, Ukraine), and West Siberia (BURAKOWSKI et all. 1993; ALONSO-ZARAZAGA 2005). Its west border of the

range of geographic distribution runs in the eastern Poland. The species has been reported from Białowieża, Bug River Valley, as well as from a few localities in the Wyżyna Lubelska Upland and Podlasie (ŁĘTOWSKI and STANIEC 1997; WANAT 1994; WANAT and GOSIK 2003).

The characters that distinguish the adult of *Ph. turbatus* from adults of the other *Phloeophagus* species are: relatively long elytra and characteristic sculpture of pronotum (SMRECZYŃSKI 1972). The life cycle of *Phloeophagus turbatus* is still poorly known. The larvae were found in September (SCHERF 1964). Its imagines were found in the humid wood of: oak-tree (*Quercus* L.), horse-chestnut *(Aesculus hippocastanum L.*), lime-tree (*Tilia cordata* L.), willow-tree (*Salix* L.), and maple-tree (*Acer pseudoplantanus* L.) - unpublished data of author.

MATERIAL AND METHODS

The larvae of *Ph. turbatus* were collected in Zbereże (FB89) near Sobibór (CE Poland) on the 11th of October 2002. They were obtained by sifting mould heap extracted from the old maple-tree (*Acer pseudoplantanus* L.). A total of imagines (98 specimens) and larvae (58 specimens) were collected. The larvae possess all the diagnostic features of *Cossoninae* given by SCHERF (1964) and MAY (1994). Only one specimen of other mould-eating weevil (*Ph. lignarius*) was collected together with *Ph. turbatus* during the whole study period (3 years) in that locality. Therefore I can assume that the collected larvae belonged to the species *Ph. turbatus*. However, they did not survive until pupation in the laboratory conditions.

The preimaginal stages were preserved in a glycerine and alcohol solution (1:1). The punctured larvae and pupae were rinsed in distilled water, cleared in chlorophenol, and finally placed in Berlesy's liquid to prepare microscopic slides. The drawings were made using camera lucida. The terminology of SCHERF (1964) and MAY (1994) was used in the morphological description of the larva.

Material examined: L_1 – 11 exx.; L_2 – 26 exx.; L_3 – 21 exx.

DESCRIPTION

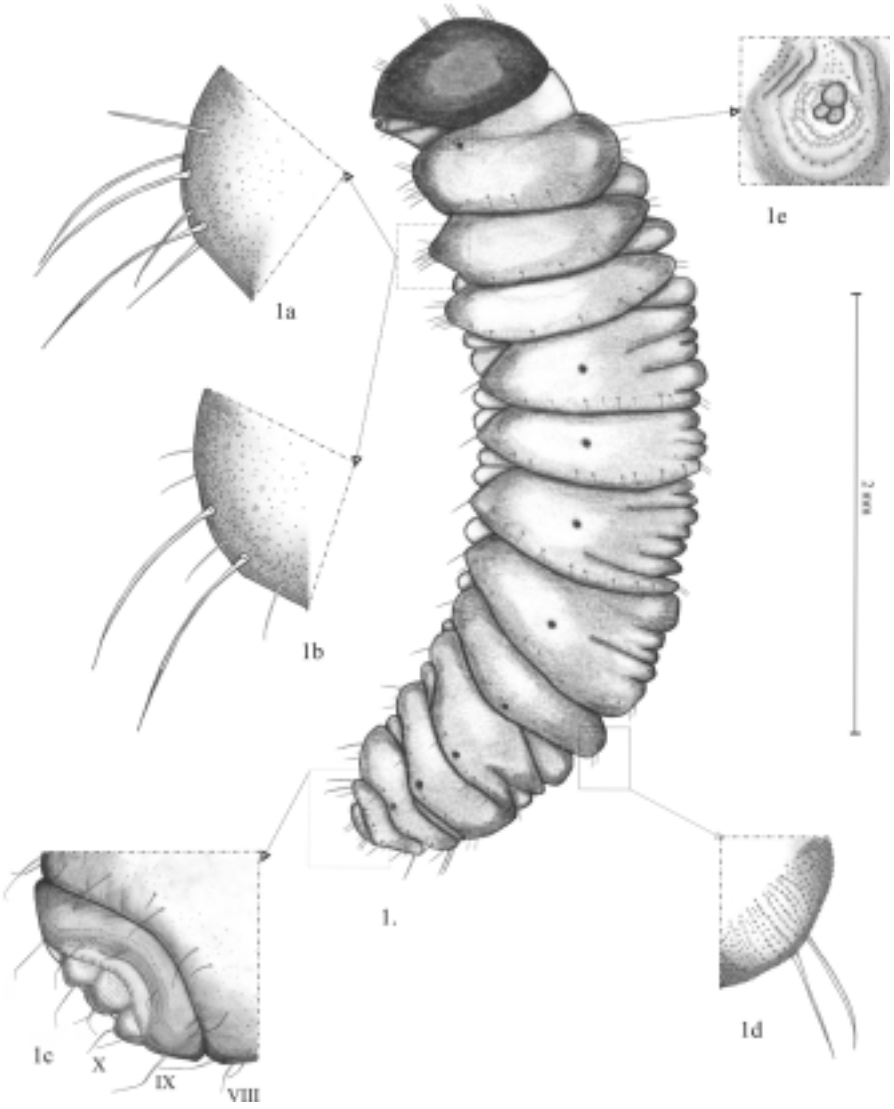
Measurements

	L_1	L_2	L_3
body length	1.56 - 2 mm (mean 1.8 mm)	1.9 - 3.24 mm (mean 3 mm)	2.78 - 5.07 mm (mean 4.2 mm)
head width	0.43 mm	0.58 mm	0.89 mm

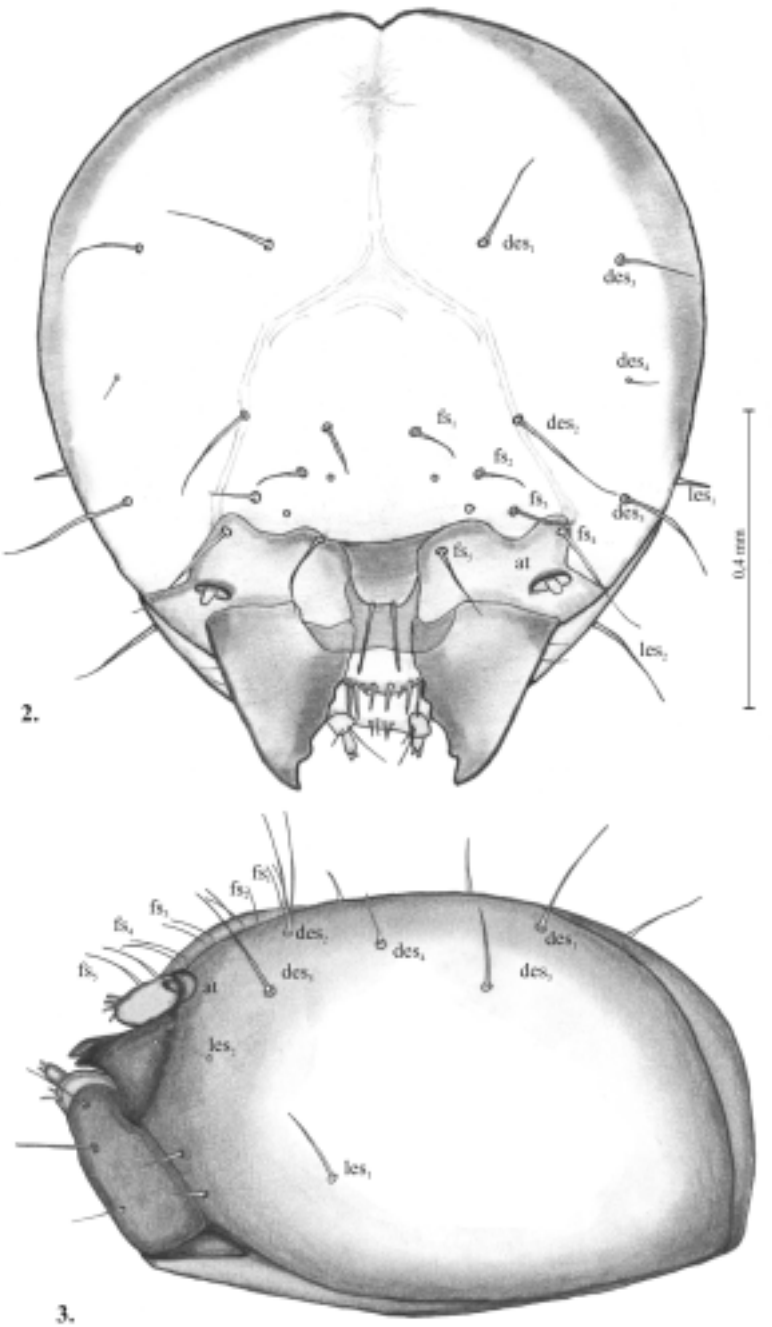
Mature larva

Body moderately slender, slightly curved, light yellow. Head light brown, pronotum grayish-brown, setae yellowish – brown. Chaetotaxy of the body as in Fig. 1. Pedal area with 6 macro setae (Fig. 1a); in L_1 with 2 macro setae and 4

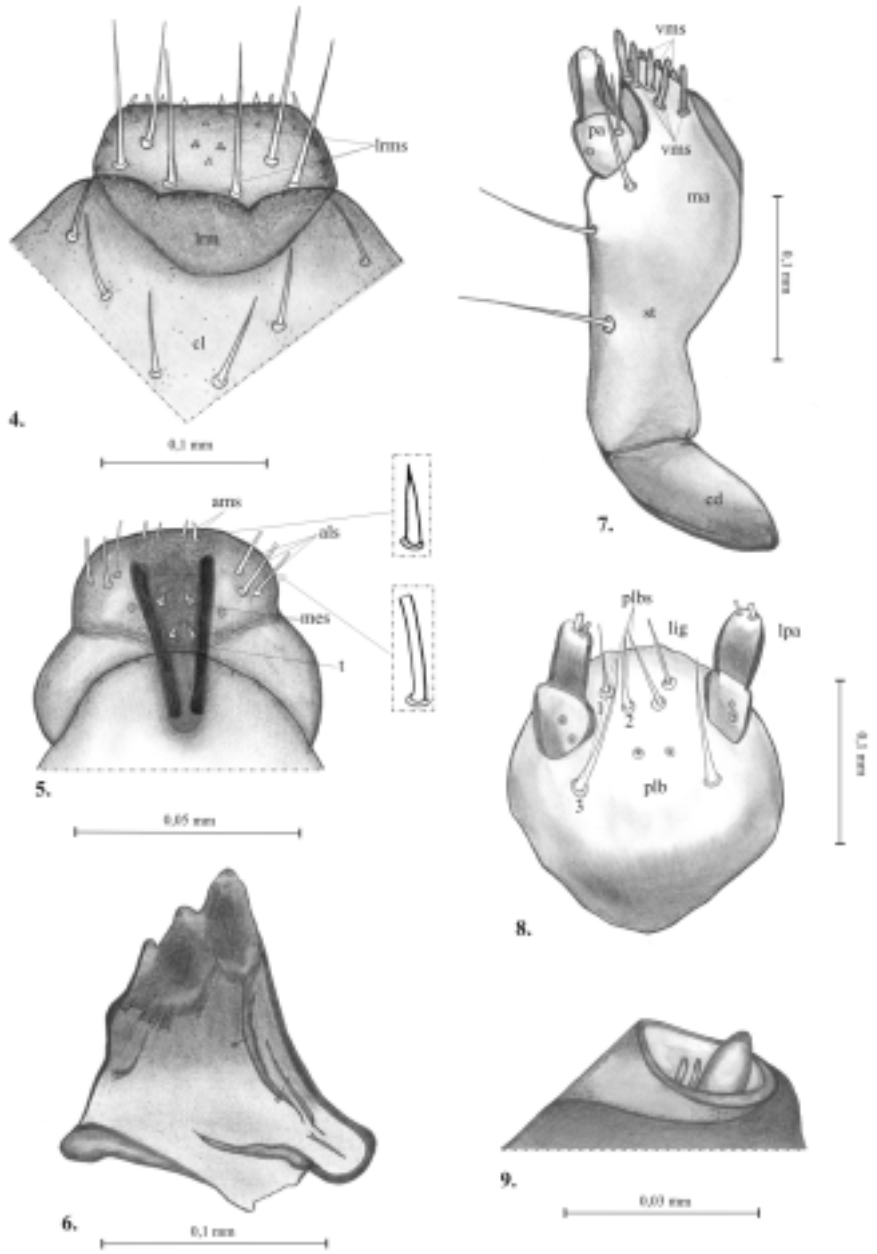
micro setae (Fig. 1b). The structure and chaetotaxy of abdominal segments VIII - X as in Fig. 1c. Cuticule minutely speculate (Fig. 1d). Structure of spiracle of the first pair as in Fig. 1e. Head (Figs 2, 3): subglobose, setae simple, elongate and slender, light yellow, ocelli absent; sutura coronalis and sutura frontalis indistinct, poorly visible. Chaetotaxy: 10 dorsal epicranial setae (2 des_1, 2 des_2, 2 des_3, 2 des_4,



1. *Phloeopagus turbatus*, mature larva (except of Fig. 1b); pedal area (1a - L_3, 1b - L_1); abdominal segments VIII – X (lateral aspect) (1c); structure of cuticule (1d); spiracle of first pair (1e)



2, 3. *Phloeopagus turbatus*, mature larva, head. 2 - dorsal aspect, 3 - lateral aspect (des_1- des_5 dorsal epicranial setae, fs_1-fs_5 frontal setae, les_1- les_2 lateral epicranial setae, at - antenna)



4-9. *Phloeopagus turbatus*, mature larva. 4 - labrum and clypeus (cl - clypeus, lrm - labrum, lrms - labial setae), 5 - epipharynax (als - anteriolateral setae, ams - anteromedial setae, mes - median setae, t - torma), 6 - right mandible (dorsal aspect), 7 - left maxilla (cd - cardo, st - stipes, ma - mala, pa - palpus), 8 - apex of labium (praelabium - plb, lig - ligula, lpa – labial palp), 9 – right antenna

2 des_5), des_4 half as long as other dorsal epicranial setae; 10 frontal setae (2 fs_1, 2 fs_2, 2 fs_3, 2 fs_4, 2 fs_5), fs_{1-3} shorter than $fs_{4,5}$; 4 lateral epicranial setae (2 les_1, 2 les_2). Clypeus and labrum (Fig. 4): clypeus (cl) 2.4 x as wide as long with 6 long setae; labrum (lrm) about 2.9 x as wide as long with 6 elongate, slender labial setae (lrms) Medial part of labrum with a dozen or so groups (each of 3) pores (as in Fig. 4). Epipharynx (Fig. 5) with 4 short, thick, slightly curved antero-median setae (ams); 6 slightly curved; truncate antero-lateral setae (als); 4 short, median setae (mes) and 2 pairs of pores medially; tormae (t) distinctly convergent. Mandible (Fig. 6) bifid, with 2 micro setae dorsally; subapical teeth smaller than the apical one; surface rugose. Maxilla (Fig. 7) consists of triangular cardo (cd), stipes (st), mala (ma) and maxillary palp. Stipes and mala fused, stipes with 3 elongate, slender setae dorsally. Mala with 5 straight, blunt dorso-apically setae (dms); 5 straight, pointed ventro-apically setae (vms). Maxillary palp 2-segmented; segment I with 1 pore and 1 seta, slightly shorter and distinctly wider than segment II, length ratio of segment I and II: 1 : 1.2. Segment II with 10 conical cuticular processes apically. Praelabium (plb) with 3 pairs of macro setae (plbs) and 2 pores medially (Fig. 8). Posterior pair of setae (3) distinctly longer and wider apart than median pairs (1, 2). Labial palps (lpa) consists of two segments; length ratio of segment I and II: 1.2 : 1; segment I with 2 pores; segment II with 2 truncate micro setae apically. Antenna: basal membranous area with 2 sensory appendages (Fig. 9).

CONCLUSION

The observed term of the larvae collection was similar to that described by SCHERF (1964). The larva of *Ph. turbatus* possesses some characteristic of the subfamily *Cossoninae* given by MAY (1994): (1) presence of seta des_3; (2) IX bearing 2 dorsal setae; (3) labral tormae separate; (4) mandibular setae longitudinal; (5) spiracles of VIII abdominal segment located laterally; (6) anus with 4 lobes of equal size. However, the described larva does not possess all the essential characters provided by MAY (1994) for the tribe *Rhyncolini.* The larvae of *Phloeophagus turbatus* are similar to the larvae of *Phleophagosoma thoracicum* WOLL. - tribe *Rhyncolini* (body length, head width, structure of mandible and labrum) and to the larvae of *Mesites pallidipennis* BOH. - tribe *Cossonini* (oval shape and chaetotaxy of head). Some similarities and differences between the mentioned species are listed in Tab. 1.

Thus, it is necessary to describe more larvae of other *Phloeophagus* species to determine the diagnostic features that could be regarded as characteristic both for the tribe *Rhyncolini* and the genus *Phloeophagus.*

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Tab. 1. Comparison of the known morphological larval characters of *Phloeophagus turbatus*, *Phleophagosoma thoracicum* and *Mesites pallidipennis*.

	Phloeophagus turbatus (tribe *Rhyncolini*)	*Phleophagosoma thoracicum* (tribe *Rhyncolini*)	*Mesites pallidipennis* (tribe *Cossonini*)
maximum size	2.78 - 5.07 mm	1.3 – 5.0 mm	2.0 – 7.0 mm
head width	0.89 mm	1.0 mm	1.5 mm
body shape	moderately slender, slightly curved	moderately slender	slender, truncate posteriorly, expanded ventrally
head shape	subglobose	subspherical	subglobose
chaetotaxy of head	10 des, des_4 half as long as other	10 des, all dorsal epicranial setae of similar length	10 des, des_4 half as long as $des_{1, 2, 3, 5}$
	10 fs, fs_{1-3} shorter than $fs_{4, 5}$	4 fs, all of similar length	10 fs, fs_{1-3} not much shorter than $fs_{4, 5}$
	4 les	4 les	4 les
mandible	bifid, subapical teeth smaller than the apical one	subapical tooth distinctly smaller than the apical one	bifid, subapical teeth similar to the apical one
chaetotaxy of maxilla	5 dms, 5 vms	5 dms, 5 vms	7 dms, 5 vms
tormea	distinctly convergent	strongly convergent	subparallel
pedal area	6 setae	6 setae	6 setae

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