

## Description of the pupa of *Mycetochara axillaris* (Paykull 1799) (Coleoptera, Tenebrionidae)

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The pupa of *Mycetochara axillaris* (Payk.) was described. The diagnostic features of the *Mycetochara axillaris* pupa were presented.

Key words: *Coleoptera*, *Tenebrionidae*, *Alleculinae*, *Mycetochara axillaris*, morphology, pupa.

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### INTRODUCTION

Among 22 species of the genus *Mycetochara* Berthold 1827 recorded in Europe 7 species have been reported from Poland: *Mycetochara axillaris* (Payk.); *M. flavipes* (Fabr.), *M. humeralis* (Fabr.), *M. linearis* (Illig.), *M. obscura* (Zett.), *M. pygmaea* (L. Redt.) and *M. roubali* Maqan (Audisio & Fattorini 2005; Burakowski et al. 1987, 2000). The beetles which belong to that genus possess flat, elongated body (4 - 9 mm in length). The *Mycetochara* species can be distinguished from other weevils which belong to the family *Tenebrionidae* by the presence of abridged sternum's appendix between coxas of the first pair. The preimaginal stages of these species are obligatory associated with necrotic, humid wood of many deciduous tree species, namely: oak, beech, maple, birch and poplar (Burakowski et al. 1987). They inhabit the same

biotopes as other mould-eating beetles e.g. weevils (Jonsell 2004). Some of the *Mycetochara* species can be regarded as rare and endangered, because their occurrence is connected with primeval forest and old parks.

The information about morphology of the preimaginal stages (especially about pupae) of *Mycetochara* is incomplete or outdated; see Bouché (1834) and Seidlitz (1899).

*Mycetochara axillaris* (Payk.) (Fig. 1) is an European species, recorded from a few localities in: Austria, Dania, Estonia, Finland, Germany, Italia, Lithuania, Norway, Poland, Sweden, and northern parts of Russia (Audisio & Fattorini 2005). Moreover, it has the status of an endangered species in Dania (Holm 2006) and Norway (Lier-Hansen 1988). The data about occurrence of this species in Poland is insufficient (Burakowski et

al. 1987). The following features enable differentiation of the imagines of *M. axillaris* from other *Mycetochara* species: punctulated, relatively wide pronotum and almost black color of elytra (Burakowski 1976). The life cycle of *Mycetochara axillaris* lasts two years and it was completely described. The larvae were found in hollow of many deciduous tree species. The adults were found in June and July (Burakowski 1976). Some information about larval stages of *Mycetochara axillaris* is given by Bouchč (1834). The later paper contains also one, small, are scanty drawing of the pupa of mentioned beetle. Moreover it is not followed by any precise description.

## MATERIAL AND METHODS

The pupae of *Mycetochara axillaris* were collected in Gołębie (KS91) near Kryłów (CE Poland) on the 8<sup>th</sup> of May 2006. They were obtained by sifting mould heap extracted from the old horsechestnut (*Aesculus hippocastanum* L.). In order to determine the development stage of *M. axillaris*, some pupae were kept alive until the emergence of adults in the laboratory conditions. During the experiment 4 pupae were placed in glass box (4 dm<sup>3</sup>) filled by wet, fragmented mould of horse-chestnut. After 12 days the adults beetles were observed. The specimens were very soft and atypically coloured directly after emergency, therefore they were kept alive for the next 14 days.

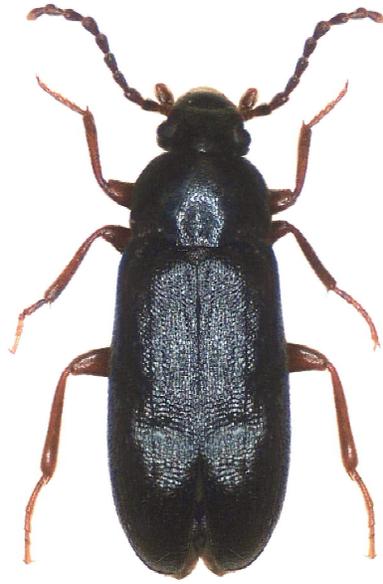
Remaining pupae were preserved in the glycerine and alcohol solution (1:1). The punctured specimens were rinsed in distilled water, cleared in chlorophenol, and finally placed in Berlesy's liquid to prepare microscopic slides. The drawings were made using camera lucida. The terminology of Burakowski (1976) were used in the morphological description of the pupae. The features of lobes of abdominal segments I-VII were used in determination of pupae belonging to subfamily *Alleculinae*. Therefore the following terms were used in the paper: em - external margin; lm - lateral margina; al - apex of lobem, see Figs 5e, 9a.

Material examined: pupae - 11 exx.

## DESCRIPTION

### Pupa (Figs 2-4)

Body length: 6.7-8.5 mm (on average 8.1 mm), body width in the widest place (between knees of the middle pair of legs) 2.9-3.7 mm (on average 3.3 mm). Body oblate dorsa-ventral, slightly curved, widest between middle knees. The colour of the body: white or light yellow (light brown before emergence of imago). Chaetotaxy of the body: mostly reduced, setae simply, rather short. Points on the surface of head rounded, similar size, regular distributed. Head regular, covered with fine, sharply pointed setae. Some longer setae are localized on labrum and clypeus. Prothorax covered with irregularly oval points larger than on head. Setae on prothorax longer than on head, densely distributed. Elytra regularly covered with many regularly oval points. Setae on elytra densely distributed, sharply pointed, with different length (the longest in the center, gradually, decreasing when approaching on edges of elytra). Chaetotaxy of head, thorax and elytra as in Figs 5a-d. Head and thorax with features characteristic for imago e. g.: head subglobose, oculus slightly convex, kidney-shaped; antenna abbreviata with 11 segments; mouthparts with mandibles. Prothorax almost as wide as long, with longitudinal, central furrow. Knee of first pair of legs with 4 pairs of setae; second pair with 3 pairs and third with 2 pairs. The tarsungulus with dens (Fig. 5f). Hind tarsi protrude behind posterior margin of the abdominal segment VI (Figs 2-4). Each tarsus of first and second pairs of legs consist of 5 segments, third pair of 4 segments. Abdomen with 9 segments: I-VI similar to each other, narrow, rectangular, distinctly as wider as long; segment VII almost semicircular. Lateral margins of tergites I-VII with lobes. External margin (em) of each lobes with two triangular, unequal tooth-like cuticular processes and with 1 - 3 very short, thin, sharp setae. The apex of lobes (al) with big, strongly curved hook-like cuticular processes. Lateral margina (lm) of lobes with 4-9



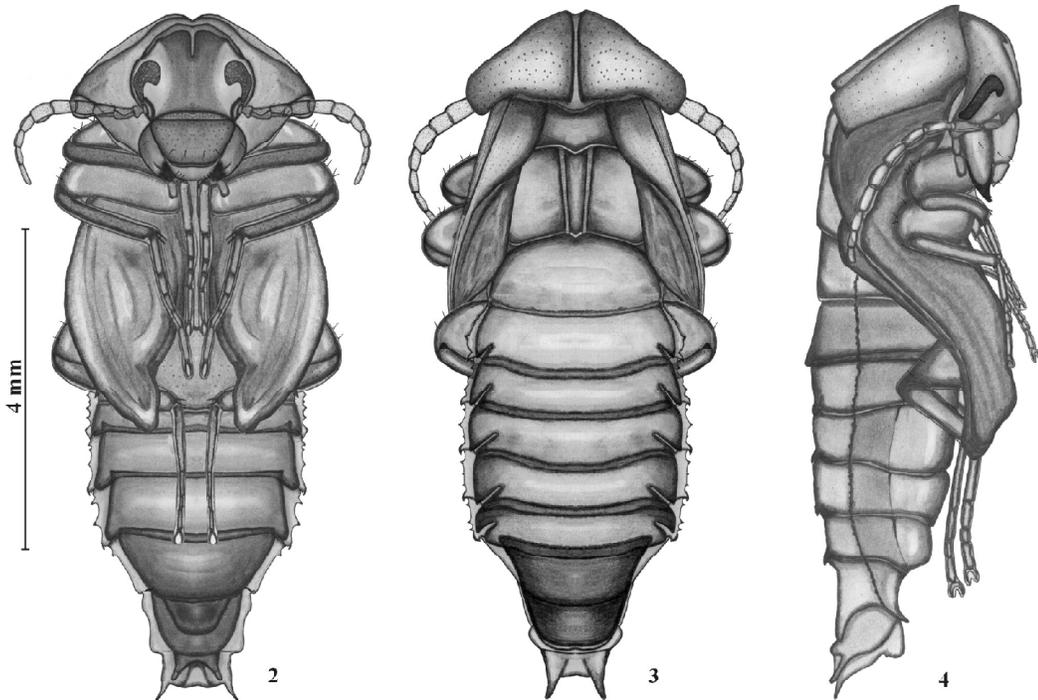
1

Fig. 1. *Mycetochara axillaris* (Payk.), imago.

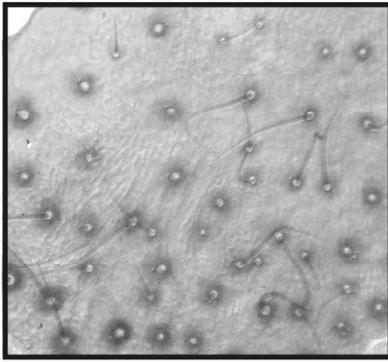
minute, sharp, unequal, tooth-like cuticular processes (Figs 5e, 9a). Segment VIII distinctly smaller than VII segment, with gonothec and setae. Posterior margin of segment IX with thorn-like, slightly curved pseudocerci and setae. The gonothec of male conical, long, localized parallelly to each other, backwards directed. The gonothec of female conical, very long, localized obliquely to each other, laterally directed. Sexual dimorphism in structure of VIII, IX sternite well-marked, as in Figs 9b, c.

## CONCLUSION

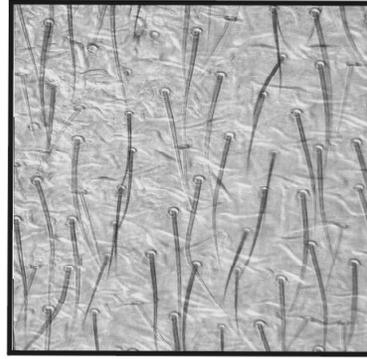
The pupa of *Mycetochara axillaris* possesses all the essential generic characters described by Burakowski (1976) for the pupae of *Alleculinae* namely: 1. body with features characteristic for imago; 2. abdomen with 9 segments; 3. abdomen segments: I-VI similar to each other; 4. tergites of abdomen segments I-VII with lobes; 5. segment



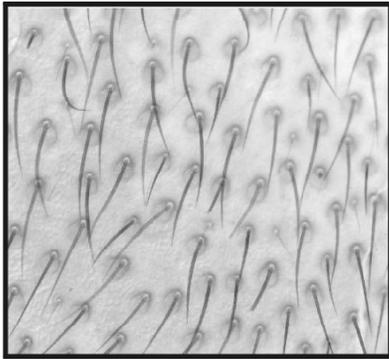
Figs 2 - 4. *Mycetochara axillaris* (Payk.), pupa, habitus. 2 – ventral aspect, 3 - dorsal aspect, 4 – lateral aspect.



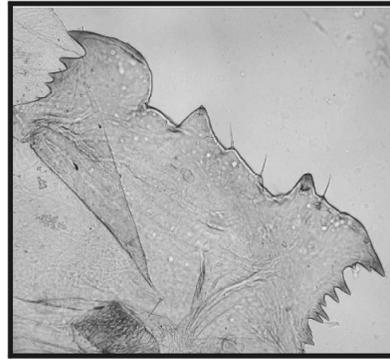
**a**



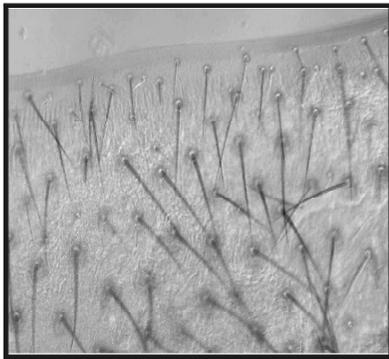
**d**



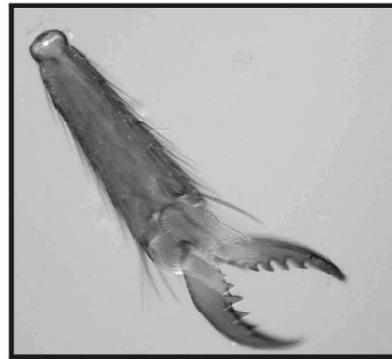
**b**



**e**



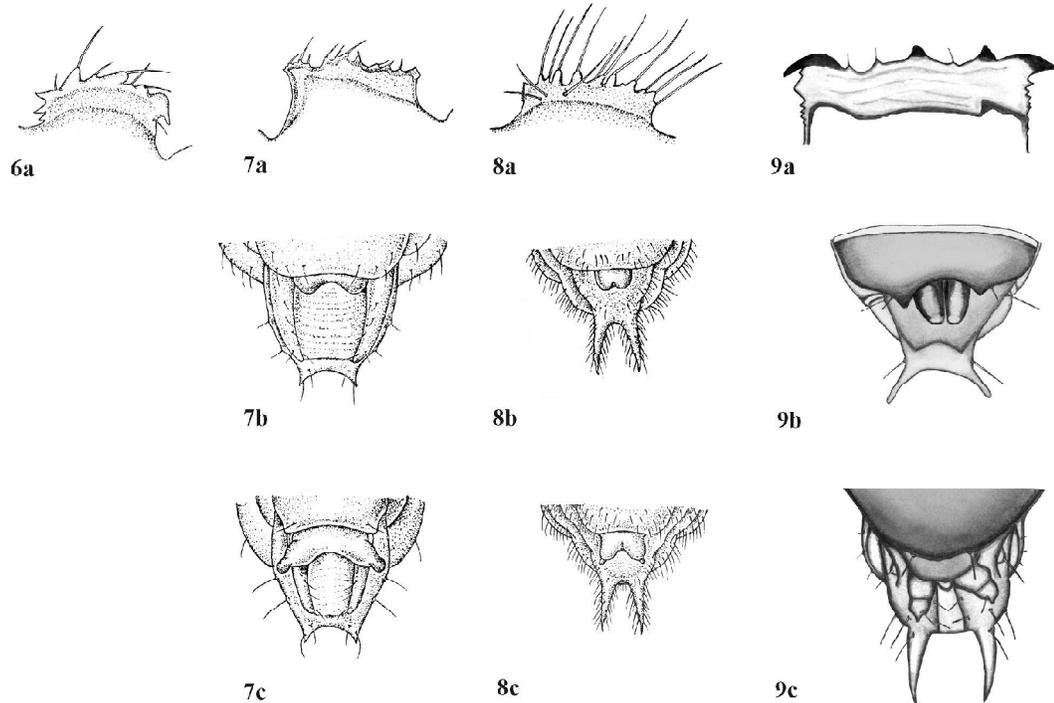
**c**



**f**

**5**

Fig 5. *Mycetochara axillaris* (Payk.), pupa, chaetotaxy and structure of cuticula. a – head, b; c – pronotum, d – elytra, e – lobes of tergite, f – last segment of tarsus with tarsungulus.



Figs 6 - 9. The comparison of some pupa's parts of some *Alleculinae* species. 6 – *Mycetochara linearis* (Illig.), 7 – *Prionychus ater* (Fabr.), 8 – *Hymenalia rufipes* (Fabr.), 9 – *Mycetochara axillaris* (Payk.), a - chaetotaxy and structure of cuticula on lobes of tergites of I-VII abdomen segments (em - external margin; lm - lateral margin; al - apex of lobes), b - terminal segment of male, c - terminal segment of female.

VII almost semicircular, very long; 6. posterior margin of segment IX with pseudocerci; 6. segment VIII and IX with sexual dimorphism in structure; 7. different localization and shape of gonothecs of male and female.

The following features of pupa of *Mycetochara axillaris* are different than in other species belong to subfamily *Alleculinae*: 1. tooth-like cuticular processes on margin of tergites lobes (a specially on lateral margin); 2. strong reduced chaetotaxy; 3. hook-like shape of apex of lobes; 4. gonothecs long and conical; 5. reduced chaetotaxy on VIII and IX abdomen segments.

According to Burakowski (1976) the crucial features used in determination of pupae belonging

to subfamily *Alleculinae* are: shape of lobes of tergites on abdominal segments I – VII and the shape of gonothecs. Those features are the basis of simple differentiation the pupae of *M. axillaris* from other pupae given by Burakowski (1976) (Figs 6-8a). However, a number of known, described pupae is very small. It is therefore possible that after description of next species new features should be found. Our knowledge is still insufficient to create the key to determination of pupae of *Alleculinae*. Further studies on morphology of developmental stages of *Tenebrionidae* are needed.

The Catalogue of Polish Fauna (Burakowski et al. 1987) give relatively large number of records of localities of *M. axillaris*. However, according

to the remarks of Gutowski et al. (2005), most of them are inaccurate (or/and) coming from over hundred of years. Therefore veritable distribution of this species in Poland is still unknown. In opposite to other rare mould-eating beetles, the specimens of *M. axillaris* were not found in another opportune localities in Eastern Poland. It may indicate that mentioned species is in fact rare and endangered. Therefore study about distribution, biology and morphology of *M. axillaris* is necessary.

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