

DESCRIPTIONS OF LARVA AND PUPA OF *MYCETINA CRUCIATA* (SCHALLER) (COLEOPTERA, ENDOMYCHIDAE)¹

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Abstract. — The immature stages (first instar larva, mature larva and pupa) of the endomychid beetle *Mycetina cruciata* (Schaller) are described and illustrated.



Key words. — Coleoptera, Endomychidae, *Mycetina cruciata*, immature stages, biology.

INTRODUCTION

This paper contains descriptions of the immature stages of a rare, and little known species of fungus pleasing beetle, I collected in the Białowieża Primeval Forest in 1975. The adults of *Mycetina cruciata* (Schaller) and a number of unknown to me larvae were collected jointly once, sitting motionless on a white fungal mycelium covering bark at the base of a standing stump of spruce (*Picea excelsa*). Since then several field trips to the same spot were made, but they have failed to produce further specimens or observations. The collected larvae were transferred to a stoppered glass jars of 1 liter capacity, containing a number of pieces of decayed bark covered with a fungal mycelium taken with larvae. Mature larvae, pupae and adults were obtained from this culture making a precise larval association of larvae with the adult stage of *Mycetina cruciata*. The larva of *Mycetina* is described here for the first time, although Hayashi (1992) provided some diagnostic illustrations of *Mycetina* sp. in his paper on beetles in mouldy stored foods in Japan.

Mycetina Mulsant is currently classified in the large and very diverse endomychid subfamily Lycoperdininae (= Eumorphinae). Adults of Lycoperdininae are characterized by their stridulatory devices on vertex and along the anterior margin of pronotum, while no character has yet been found to unite a few known larvae of this group. The larvae may be grouped into the following morphological groups: (1) *Eumorphus* Weber and *Ancylopus* Costa — long, often dehiscent processes on thoracic and abdominal terga/pleura (Hayashi and Nakamura 1953, Bugnion 1909); (2) *Lycoperdina* Latreille — paired, acute, dorsal processes on abdominal terga 1–9, and 1-segmented labial

palps (Hayashi and Nakamura 1953, Pakaluk 1984, Lawrence 1991); (3) *Amphix* Laporte — broadly oval, onisciform body, long antennae, and U-shaped frontal arms (Böving and Craighead 1931, Costa *et. al.* 1988); (4) *Aphorista* Gorham and *Mycetina* Mulsant — short thoracic and abdominal lateral tergal lobes, vestiture of specialized fan-shaped setae, tergal plates with weak protuberances, tergum 9 weakly to deeply emarginate (Böving and Craighead 1931, Lawrence 1991, Hayashi 1992).

The larvae were preserved in 70 % ethanol. Larvae were cleared using potassium hydroxide solution and transferred to glycerine slides for observations and drawings. Morphological terminology follows Lawrence (1991), while the convention of the description follows the major scheme proposed by McHugh and Pakaluk (1997, this volume).

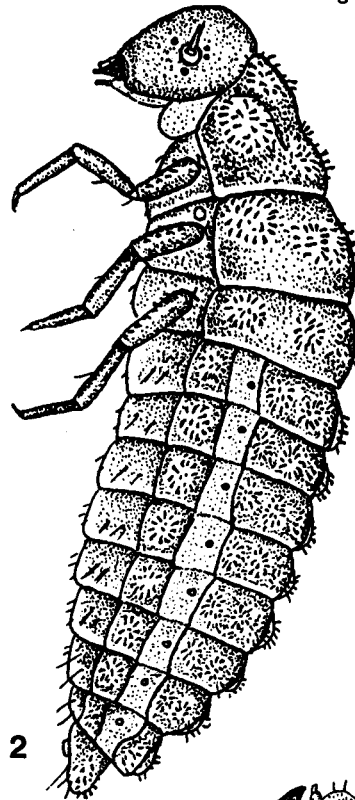
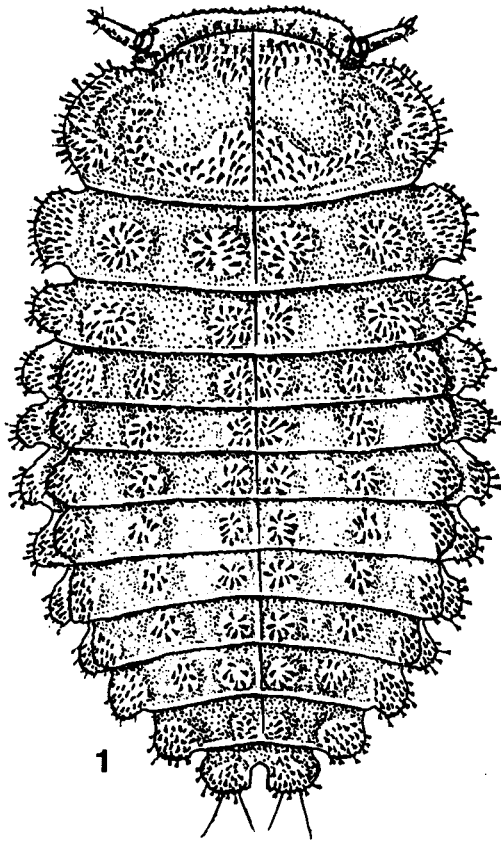
MATURE LARVA

(Figs 1–19)

Diagnosis. This larva is similar to *Aphorista vittata* (Fabricius) illustrated in Böving and Craighead (1931), but in *Aphorista vittata* the labrum is not serrate anteriorly, the caudal notch on the 9th abdominal tergite weakly emarginate, and the fan-shaped setae shorter. The illustrations provided by Hayashi (1992, Fig. 12, A–E) agree with the present larva, but the epicranial stem seems to be absent, the antenna shorter, the maxillary mala distinctly falcate and the mandibular prosthema distinctly prominent.

Description. Length 5.0 mm, width 2.5–2.7 mm. Body broadly ovate (Fig. 1), somewhat onisciform, constricted between segments, somewhat dorsoventrally flattened with dorsum more convex than venter (Fig. 2); color grayish yellow with reddish brown mandibles, mouth frame, frayed (fan-shaped) setae and tarsungulus; venter slightly paler than dorsum. Vestiture of head and trunk segments consisting of frayed setae (Figs 18, 19), long hairs and a few pointed setae (Fig. 3)

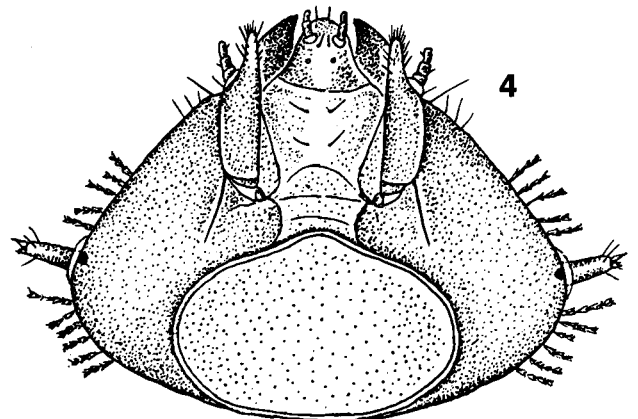
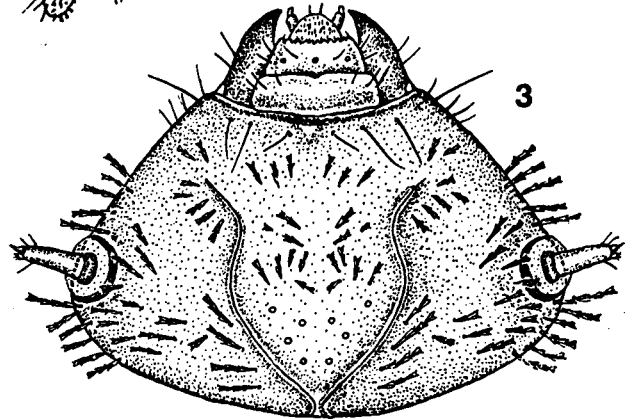
¹This paper is dedicated to Professor Maciej Mroczkowski on his 70th Birthday, and to commemorate our 45 years old friendship.



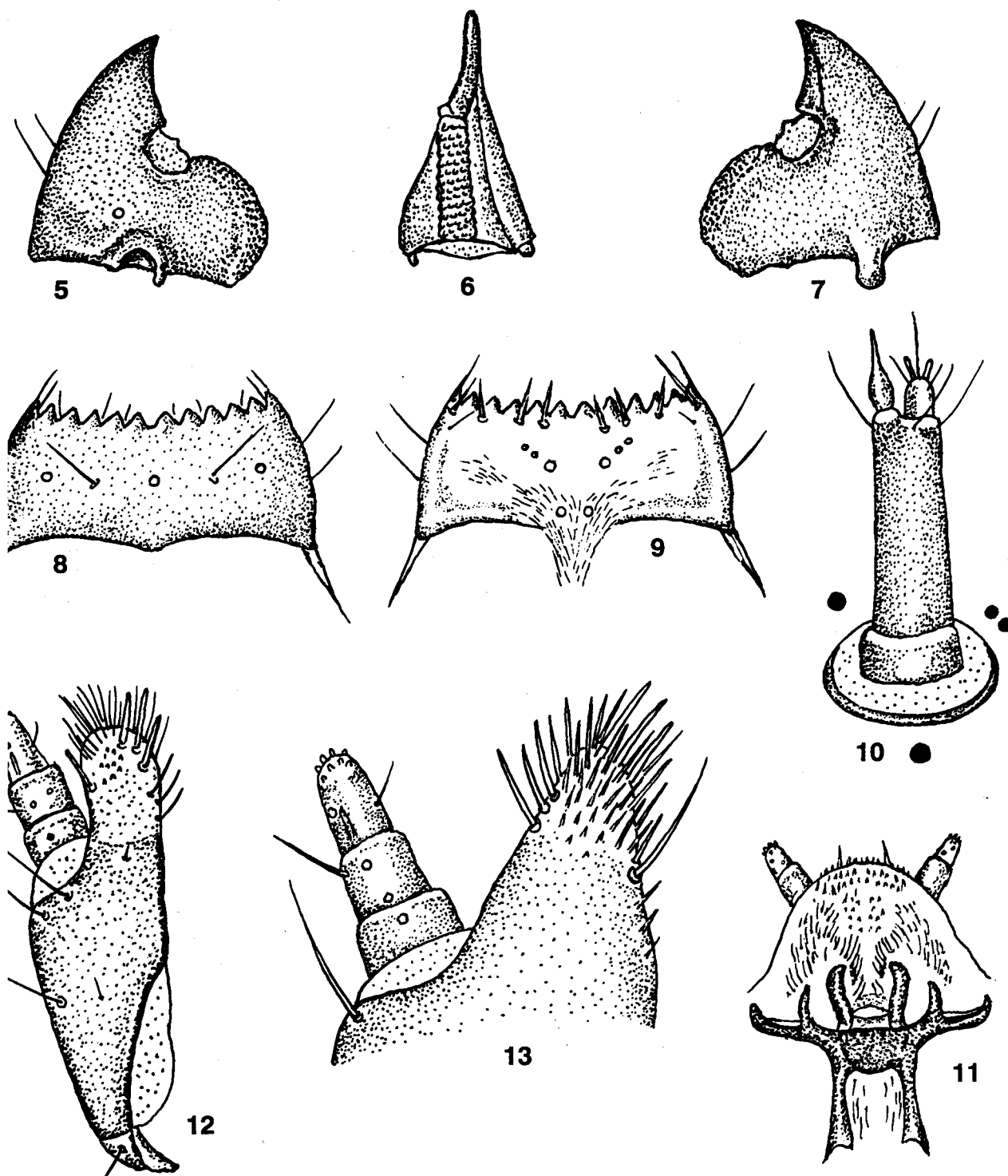
Figures 1, 2. *Mycetina cruciata*, larva: (1) dorsal view; (2) lateral view.

Head protracted, hypognathous, triangular (Figs 3, 4), moderately flattened dorsoventrally. Head maximum width 1.4 mm. Epicranial stem absent, frontal arms V-shaped, slightly sinuate anteriorly, incomplete; endocarinae absent; median endocarina absent. Stemmata black, 4 per side, placed around antennal insertion with 2 stemmata closely associated and dorsal to antennal base, 1 stemma posterodorsal, 1 stemma posteroventral (Fig. 10). Occipital foramen large, suboval directed ventrally. Ventral surface of epicranial halves almost smooth, faintly rugosus, glabrous. Hypostomal rods long and weakly diverging apically.

Antenna short, slender, fairly prominent, $0.13 \times$ head width, antennomere ratio: AI:II:III=1.0:4.0:0.7; antennal base large, membranous, retractile (Fig. 10). AI transverse with single pore; AII about $3 \times$ as long as wide, with 3 long subterminal setae and one campaniform sensillum; AIII about as long as wide, with 3 long setae arising near apex, 1 setiferous sensillum and pointed process apically; sensorium arising slightly distally to base of AIII, swollen at base and distinctly narrowed apically. Antennal fossa externally closed by head capsule, insertion very distant from mandibular articulation point. Frontoclypeal suture present. Clypeus transverse, about as long and broad as labrum, bearing 3 pairs of setae. Labrum (Fig. 8) $0.5 \times$ as long as wide, free with pair of setae, a transverse row of pores near middle, and 2 pointed setae on each side; anterior margin bearing 12–14 obtuse denticles. Epipharynx



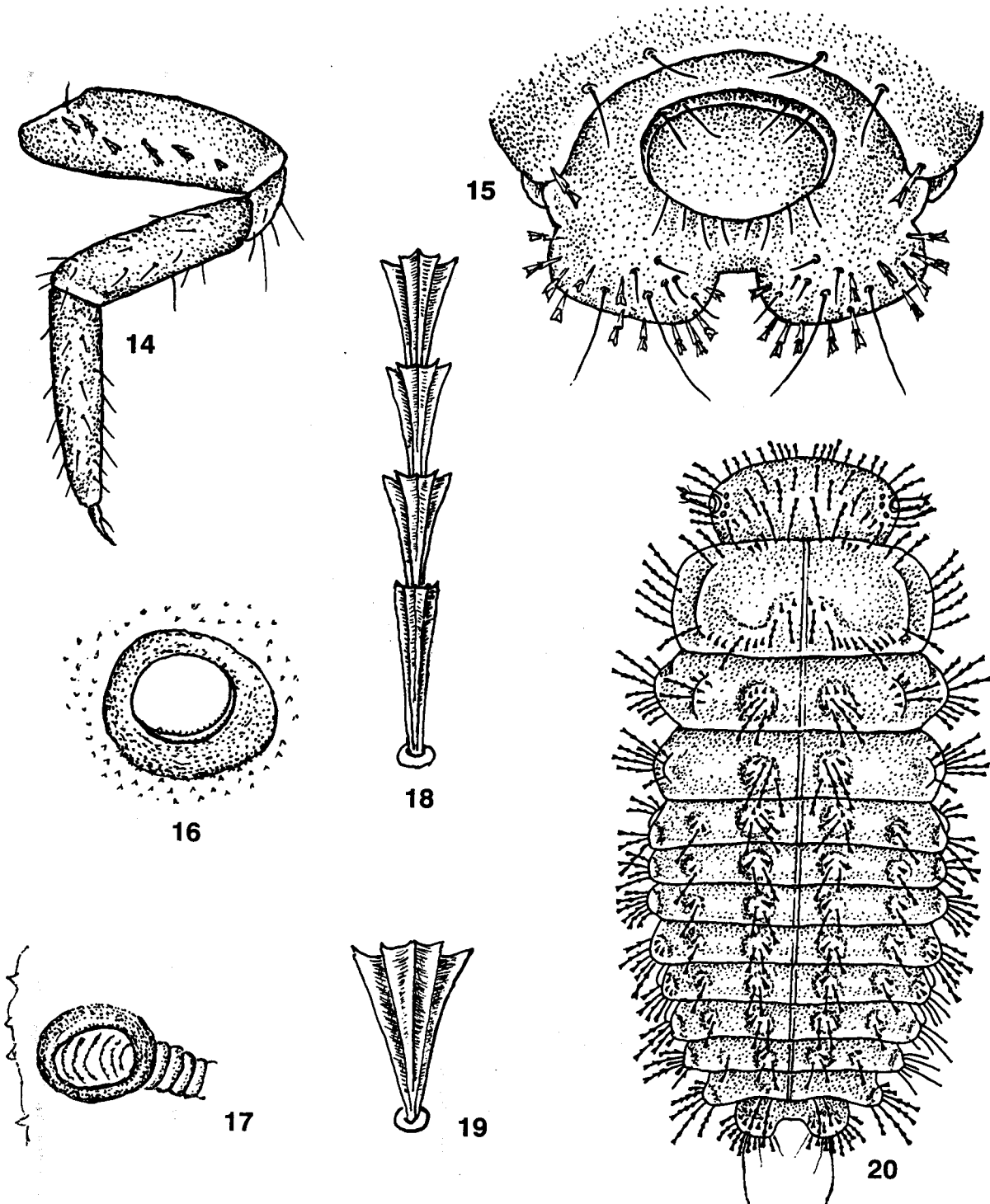
Figures 3, 4. *Mycetina cruciata*, larval head: (3) dorsal view; (4) ventral view.



5-13. *Mycetina cruciata*, larva. 5-7 Left mandible: (5) dorsal; (6) mesal; (7) ventral. 8-9. Labrum-epipharynx: (8) dorsal; (9) ventral. 10. Antenna and arrangement of stemmata. 11. Hypopharynx, dorsal. 12-13. Maxilla: (12) ventral; (13) tip of maxilla, ventral.

9) membranous; anterior margin bearing 3 pairs of curved and 3 pairs of short setae; median area with 6 id sensilla; lateral areas with minute, obliquely directed spinules; posterior part with 2 pores and numerous fine filaments. Mandibles (Figs 5-7) symmetrical broad gular, with single pointed apical tooth and smooth

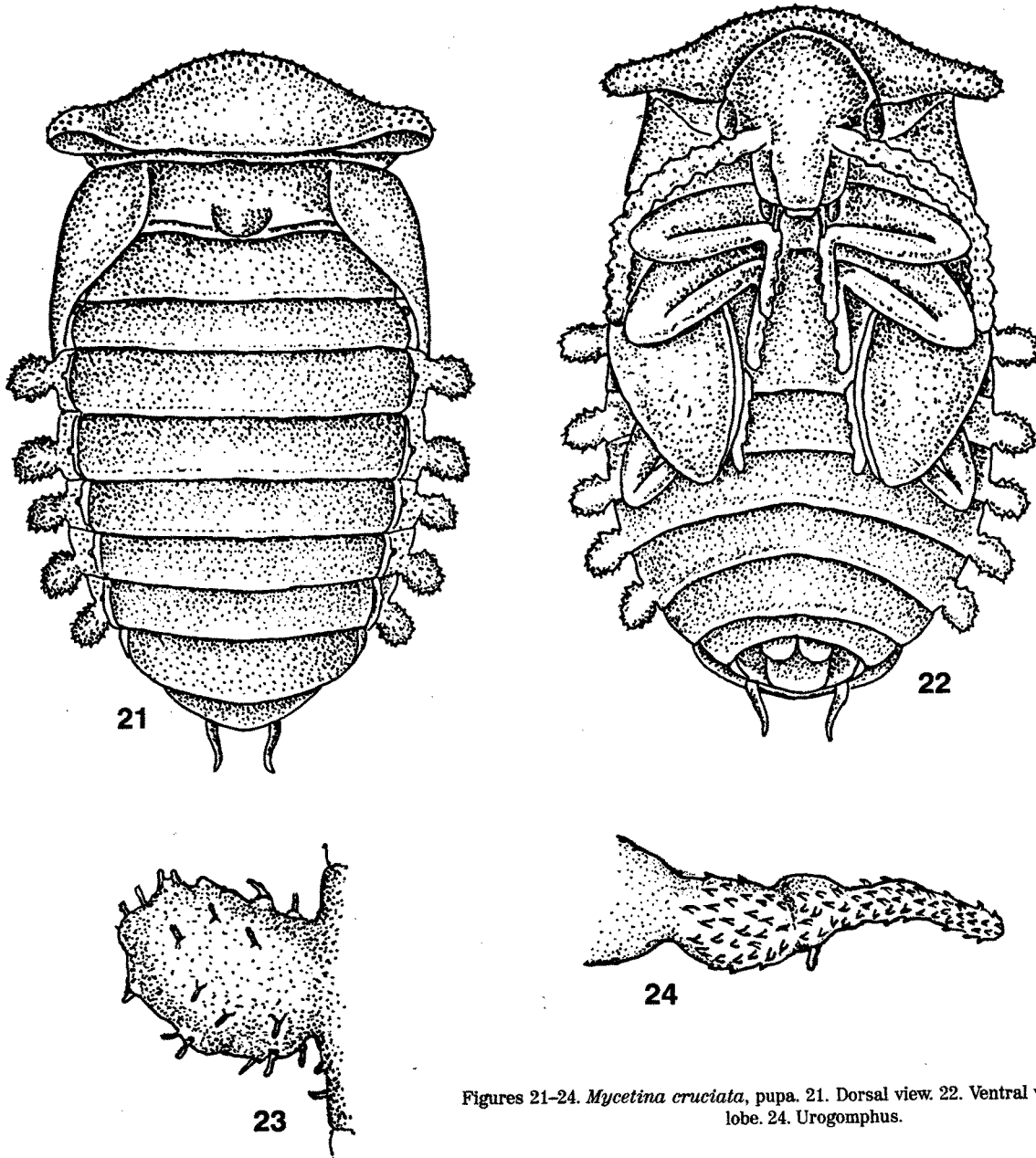
sharp incisor edge; ventral accessory process absent; mola prominent, mesal surface arcuate, with asperities forming discrete transverse rows (Fig. 6); protheca flat, hyaline, without setae; outer surface with 2 setae; dorsal side with single campaniform sensillum. Maxillolabial complex (Fig. 4) retracted. Maxilla with narrow well-developed articulat-



Figures 14-20. *Mycetina cruciata*, larva. 14. Leg. 15. Abdominal segments 8-10, ventral; 16. Mesothoracic spiracle. 17. Abdominal spiracle. 18. Long fan-shaped seta (head). 19. Short frayed seta (abdominal tergum). 20. First instar larva, dorsal view.

ing area; cardo triangular with single seta; stipes elongate with mesal margin heavily sclerotized; mala demarcated from stipes by internal sclerotization with broad rounded apex (Fig. 12) bearing stout spines, dense fringe of hairs and short spines on ventral surface (Fig. 13); maxillary palpomere 3-segmented, palpomere length ratio:

PI:PII:PIII=1.0:1.5:2.0, PI ringlike with single pore, PII with long seta and 2 pores, PIII with single digitiform peg at base, 1 seta and a pore medially and a group of sensilla at apex. Labium (Fig. 4) with mentum and submentum fused, submentum narrowing posteriad; prementum broader than long with 2 setae and 2 pores; ligula membranous, rounded



Figures 21-24. *Mycetina cruciata*, pupa. 21. Dorsal view. 22. Ventral view. 23. Pleural lobe. 24. Urogomphus.

ically, with pair of apical setae broadly separated; labial palp 2-segmented, arising from a distinct palpifer; bases of palps widely separated; PI with single seta, PII with 2 pores and minute papillae apically. Hypopharynx (Fig. 11) with sclerotized parts well-developed consisting of large hypopharyngeal sclerome, bracon and subparallel hypopharyngeal rods; membranous part with numerous filaments and projecting forwardly maxillulae.

Thoracic terga about 0.4 times as long as total body (Fig. 1); dorsal verrucae, covered with dark, fan-like, multiply-barbed setae. Protergum 0.5 × as long as wide, bearing dorsal protuberances and lateral projections. Mesotergum and metatergum much shorter than protergum, each with four rounded verrucae. Each thoracic pleural region with a larger lateral lobe covered on apical half with dark, fan-shaped

setae (Fig. 19). Abdomen (Figs 1, 2) with segments 1-8 similar in shape; terga with similar verrucae as those on thorax and with lateral lobe projecting dorsolaterally on each side. Abdominal pleural regions each with projection clothed with dense, dark, modified setae. Thoracic and abdominal terga divided by narrow pale ecdysial line. Tergite IX (Fig. 15) small, deeply emarginate posteriorly covered with fan-shaped setae; venter with 8 short and 4 long pointed setae. Sterna 1-8 with many minute setae and 2 pairs of long pointed setae. Anal segment circular, surrounded by sternum VIII, bearing a whorl of 6 pairs of minute setae.

Legs (Fig. 14) relatively short, moderately widely separated, with short and pointed setae, only coxa with sparse fan-shaped modified setae; tarsungulus slender with single seta.

Spiracles (Figs 16, 17) very small, annular, surrounded with sclerotized ring, not raised on tubes, hidden in folds beneath tergal lobes; mesothoracic spiracle larger than abdominal ones and located at anterior end of mesosternal laterotergite.

FIRST INSTAR LARVA

(Fig. 20)

This stage is very similar to the mature larva described above, but body is paler and in relation to the body size the body is slender, the fan-shaped setae sparser and longer and the caudal notch larger.

Length of freshly emerged larva about 2.5 mm, width across pronotum 0.9 mm, head width 0.7 mm, width of 9th abdominal tergite 0.4 mm.

PUPA

(Figs 21–24)

Length 3.7 mm; width across wing-cases 2 mm. Body oval (Figs 21, 22), dorsoventrally compressed. Last three segments of abdomen positioned in the skin cast of the last larval instar. Color creamy-white; weakly sclerotized; surfaces microspinulose and setose, without long hairs or setae.

Head subglobular, glabrous, completely concealed from above under pronotum, eyes dark brown. Antenna moniliform, extending caudally and slightly outward and nearly reaching knee of midfemur; antennal surface with short acute tubercles forming transverse rows.

Mandibles stout, arcuate, unidentate apically; clypeus trapezoidal; labrum small, liguliform; apices of mouthparts reaching femora of midlegs.

Pronotum tile-shaped when viewed from dorsal side, with lateral angles obtuse; surface covered with dense minute spicules anteriorly and laterally. Mesonotum rectangular, scutellum subovate. Metanotum 2 × as wide as mesonotum. Elytra and wings fitting obliquely at both sides of body and passing to the under side below hind legs, and reaching fourth abdominal sternite; each elytron with a few minute setae. Legs long, clinging to the underside of body; tibiae directed perpendicularly while tarsi along the body axis; tarsi broadly separated; distal part of protarsi and midtarsi reaching level of first and second ventrite respectively, these of hind legs reaching beyond posterior margin of third abdominal ventrite. Front and mid legs with few short setae on apices of femora. Spiracle extremely small, elliptical, open on small tubercles located in pleural membranes near lateral part of abdominal tergites I–VII.

Abdomen 9 segmented, equalling about 0.6 of total body length. Terga I–V similar in shape, almost subequal in width; subsequent terga gradually tapering apically. Tergum IX small, semicircular, concealed below tergum VIII

(which is the longest of all abdominal terga) and provided with a pair of slender urogomphi (Fig. 24). Pleura II–VI with pleural lobes covered with minute peg like setae placed on small tubercles (Fig. 23). Only eight abdominal sterna visible; VIII short with posterior margin deeply incised. Female gonotheca paired, posterior to VIII sternum. Anal cone between gonotheca and posterior part of tergum IX.

Note. Pupa of *M. cruciata* is similar to that of *Eumorphus* (Bugnion 1909) and *Amphix* (Costa et al. 1988) in having pleural abdominal lobes on segments 2–6, and apical urogomphi fixing the pupa within the last cast skin to a substrate.

COLLECTING AND REARING DATA

Locality data. Poland, Białowieża National Park: section 378, 20.IX.1975, in shady and moist site (2, adults and several mature larvae; 11 larvae taken for lab culture); 10.X.1975, first pupa observed; 17.X.1975, first teneral adult. Teneral adults continued to appear until 30.X.1975. Same locality: 20.IX.1975 (2, adults, taken for lab culture); 30.X.1975 (2, first-instar larvae, preserved); 15.XI.1975 (adults died).

Material used for study. 2 first instar larvae; 4 mature larvae, 2 pupae (in alcohol, and on slides); 5 reared adults. All in the collection of Museum and Institute of Zoology, Warsaw.

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