

Genus	Vol. 15(2): 163-171	Wrocław, 30 VI 2004
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Larvae of *Xenomycetes* with description of mature larva of  
*X. morrisoni* HORN, 1880  
(Coleoptera: Endomychidae)

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ABSTRACT. The mature larva of *Xenomycetes morrisoni* HORN is described and illustrated for the first time. Its characters are compared with *X. lawersi* HATCH and a diagnosis for the genus is provided. Some adult and larval characters in particular, concerning similarities to other Endomychidae are discussed.

Key words: entomology, taxonomy, larval description, Coleoptera, Cucujoidea, Endomychidae, Xenomycetinae.

INTRODUCTION

HORN (1880) established the genus *Xenomycetes* for a single species, *X. morrisoni*, from Nevada (USA) indicating that it “must be referred to the Lycoperdinites of Chapuis or the more comprehensive tribe Dapsini of Gerstaecker”, but he also added that “the general appearance of this insect is that of a large *Phymaphora*”. HATCH (1961) described *X. lawersi* from Washington and placed *Xenomycetes* near *Endomychus*. STROHECKER (1953) in his world generic review and catalogue, placed *Xenomycetes* in a large and very diverse subfamily Mycetacinae, which included also *Phymaphora*, and subsequently he (STROHECKER in ARNETT 1962) used the name Xenomycetinae – to accommodate the single genus *Xenomycetes* (which contains two species). This was followed by LAWRENCE and NEWTON (1995). According to the recent classification of the Endomychidae based on a phylogenetic analysis of adult characters (TOMASZEWSKA

2000), *Xenomycetes* is placed in a basal polytomy of the more derived members of the family, suggesting that the genus may have a rather isolated position in the group. There are no unique adult characters supporting the relationships of *Xenomycetes* to other groups, though there are several characters linking it to taxa such as Leiestinae and its possible relatives (e.g. BOUSQUET and LESCHEN 2002).

In an effort to provide a new character system that can be used to address the phylogeny of Endomychidae, I describe in this paper, for the first time, in detail the larva of *Xenomycetes morrisoni* HORN, found recently among the larval material borrowed from the Australian National Insect Collection, Canberra, Australia (ANIC). I also compare its morphology to the larva of *Xenomycetes laversi* HATCH, described by JOHNSON (1986), giving the diagnosis for the genus and discussing the possible relations of *Xenomycetes* to the larvae of other subfamilies of Endomychidae.

### *XENOMYCETES* HORN

#### DIAGNOSIS

Body long-oval, somewhat fusiform, turgid, onisciform, at least weakly convex dorsally, without urogomphi. Notae and abdominal terga with paired plates, slightly darker than the rest of body. Surface texture in form of dense, truncate microscoli; glands absent. Vestiture consisting of frayed setae. Head prognathous; epicranial stem absent; frontal arms V-shaped; median endocarina absent; hypostomal rods present. Stemmata hemisphaerical, 3 per side. Frontoclypeal suture absent. Antenna short, 3-segmented, inserted rather close to mandibular articulations with antennomere 2 at most 2 x longer than antennomere 1; sensory appendage slightly longer than antennomere 3. Mandible slightly longer than broad; ventral accessory process absent; protheca membranous; mola with fine transverse ridges; dorsal surface with two long, stout, pointed setae; ventral surface with transverse ridge near base. Maxillolabial complex retracted. Maxilla with rather well-developed articulating area. Maxillary palp 3-segmented, with palpomeres 1 and 2 transverse, and palpomere 2 shortest. Labial palpi 2-segmented, inserted in large, bulbous palpigers, fused medially. Legs short and moderately stout, covered with long and very long, pointed setae; claw with single seta. A9 with posterior margin evenly rounded. Segment 10 ventral.

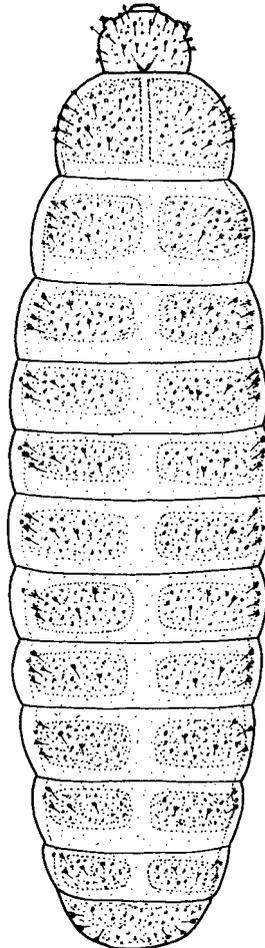
### *Xenomycetes morrisoni* HORN

#### DESCRIPTION OF MATURE LARVA

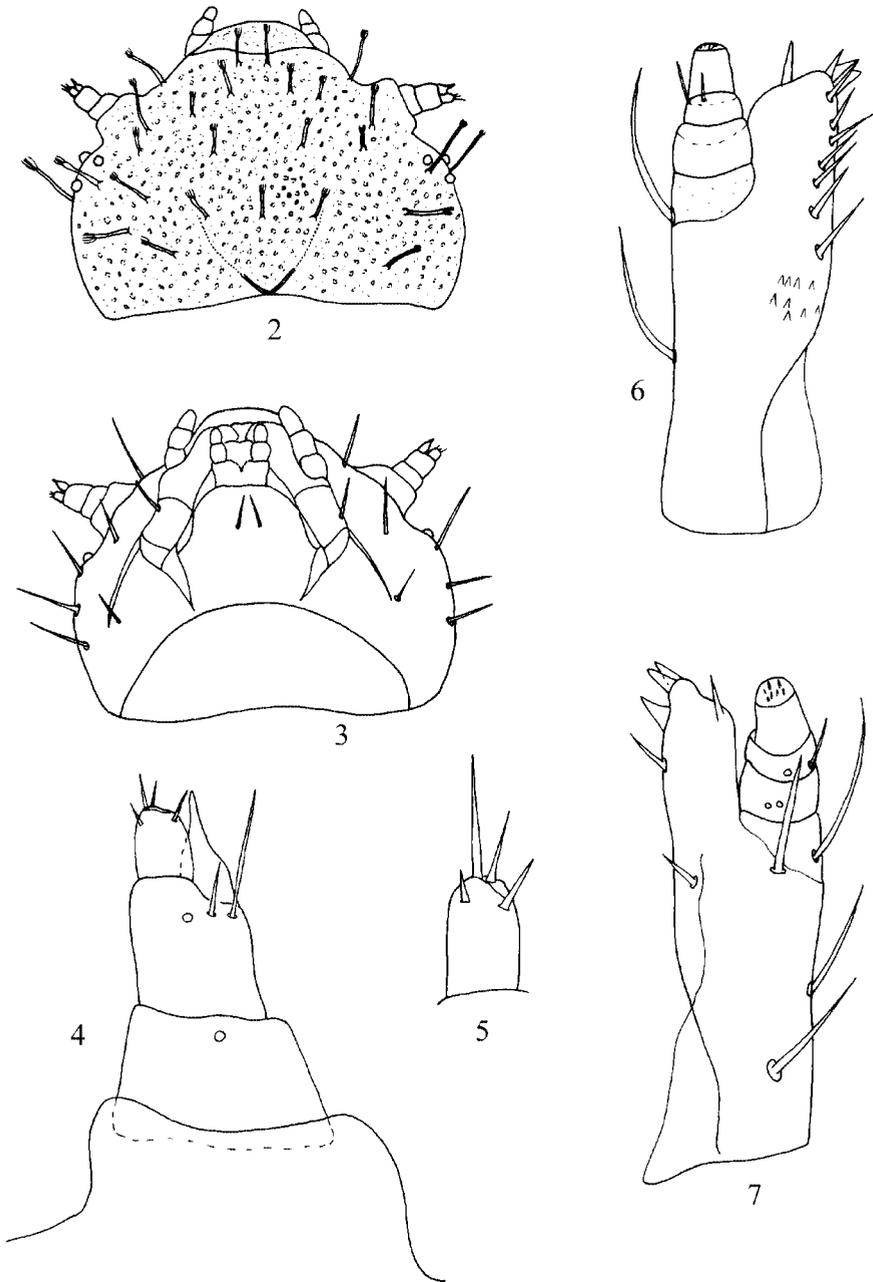
Length 8.15 mm; head width 0.80 mm; maximum width of thorax 2.05 mm; maximum width of abdomen 2.30 mm. Body (fig. 1) convex dorsally; widest at middle (across abdominal segments 2 and 3), gradually, very weakly tapering anteriorly and posteriorly; without urogomphi. Dorsum cream-coloured with notae and abdominal terga 1-9 slightly darker; mouth frame, mandible and claw dark

brown. Vestiture consisting of frayed setae (fig. 15) – short and dense, covering dorsal surface of head and dorsal plates, and very long and sparsely distributed on head and lateral parts of dorsal plates; ventral surfaces provided with sparse, simple setae; legs covered with moderately long, pointed setae.

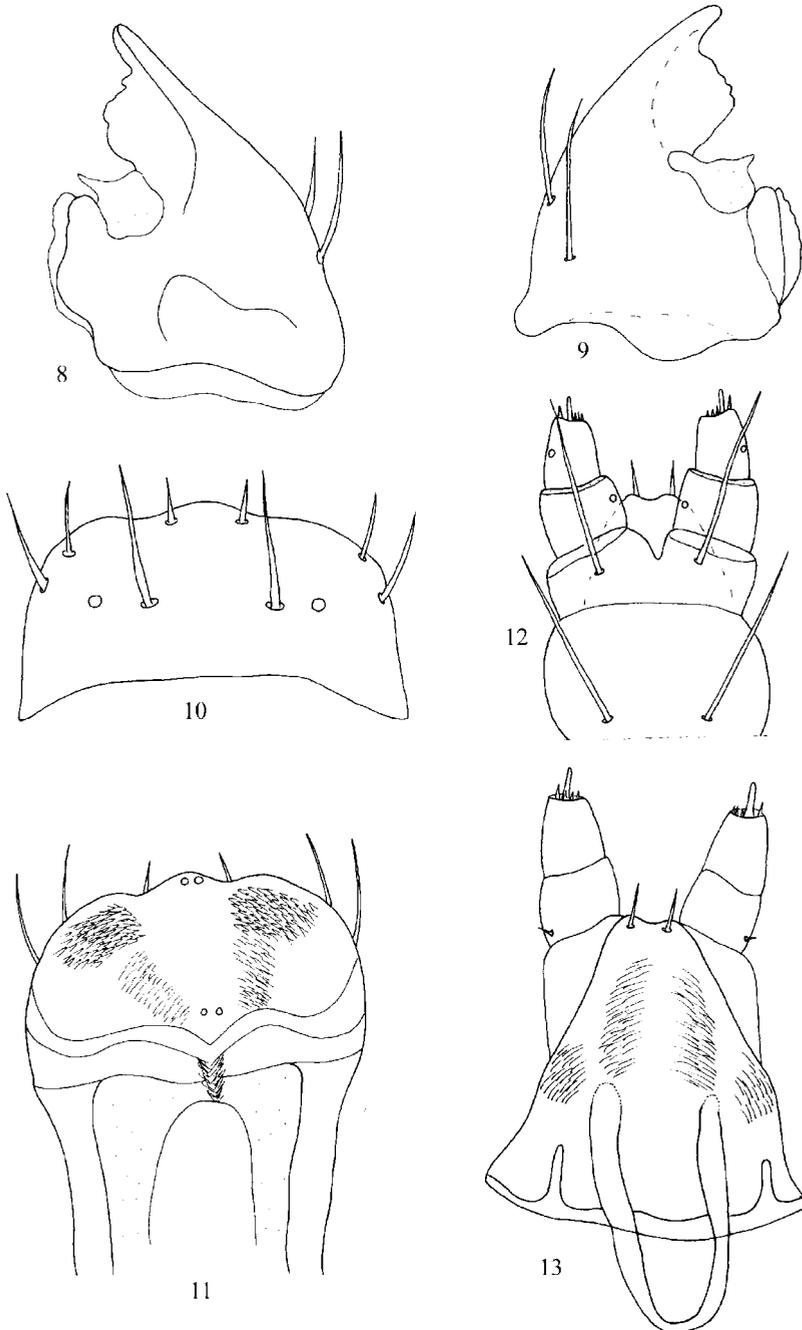
Head (figs 2, 3) protracted, visible from above, prognathous, somewhat triangular, moderately flattened dorsoventrally; 0.81 x as long as wide and 0.52 x as wide as prothorax. Frontal arms short, widely V-shaped. Hypostomal rods moderately long and divergent posteriorly. Stemmata forming equilateral triangle posteriorly to antennal insertions. Clypeus weakly emarginate at apex, bearing two long frayed setae. Labrum (fig. 10) sclerotized, free, 2.20 x as wide as long, with anterior margin weakly sinuate, bearing a pair of short setae medially and



1. *Xenomyces morrisoni*, mature larva, dorsal

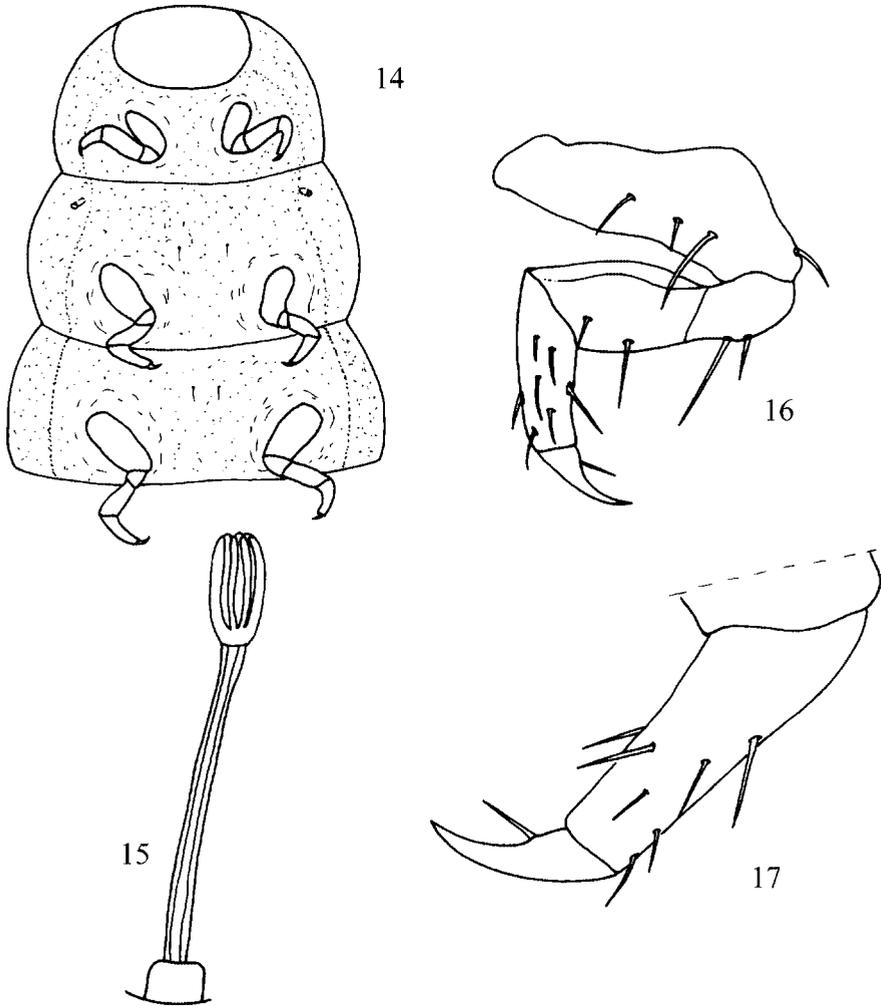


2–7. *X. morrisoni*, larval structures: 2 – head, dorsal, 3 – head, ventral, 4 – antenna, right, ventral, 5 – antennomere 3, 6 – maxilla, dorsal, 7 – maxilla, ventral



8- 13. *X. morrisoni*, larval structures: 8 - mandible, ventral, 9 - mandible, dorsal, 10 - labrum, dorsal, 11 - labrum-epipharynx, 12 - labium, 13 - hypopharynx

two pairs of moderately long setae laterally; middle part with a pair of very long setae and two pores transversely. Epipharynx (fig. 11) membranous; sides near anterior margin provided with patches of inwardly directed spinulae; median area with two patches of obliquely directed, fine setae; two pairs of pores situated medially – one pair near anterior, and one pair near basal margin. Antenna (fig. 4) short and comparatively stout, inserted in large convexities of head, rather close to mandibular articulation. Antennomere 1 widest, bearing 1 ventral pore, subequal in length with antennomere 2 and about 1.9 x as long as antennomere 3; antennomere 2 with 1 ventral pore and 2 setae; antennomere 3 (fig. 5) almost 0.64 x as long as



14-17. *X. morrisoni*, larval structures: 14 – thorax, ventral, 15 – frayed seta, 16 – fore leg, right, ventral, 17 – tibiotarsus and claw

sensory appendage, cylindrical with a few long, apical setae; sensory appendage swollen at base and weakly narrowing towards middle length, thence produced into long apical process. Mandible (figs 8, 9) somewhat triangular with blunt, shallowly excised apex; incisor edge bluntly denticulate; prostheca moderately large, membranous; mola well developed, large, covered with fine transverse ridges, prominent with mesal surface longitudinally, weakly incised. Maxilla (figs 6, 7) with cardo somewhat triangular; stipes elongate with 1 seta on outer edge, 1 ventral seta proximad and 1 ventral seta near base of palp. Mala almost twice as long as wide, submembranous, with 3 stout, triangular meso-apical processes, 3 widely separated setae on ventral surface and a row of stout spines on inner-dorsal edge. Maxillary palp 3-segmented, based on large membranous palpifer, provided with a very long seta situated on outer edge (somewhat ventrally); palpomere 1 with 2 ventral pores; palpomere 2 with 1 ventral pore, 1 dorsal seta and long seta on outer edge; terminal palpomere weakly tapering, blunt at apex, bearing a group of short, apical sensory processes. Labium (fig. 12) with prementum short, ligula submembranous, narrowing towards apex and weakly emarginate; mentum transverse, bearing 2 very long setae posteriorly; labial palpigers large, bulbous, fused medially, each bearing 1 very long, pointed seta; palpomere 1 about 0.75 x shorter than terminal palpomere, provided with one pore near mesal edge; terminal palpomere subcylindrical, blunt at apex with 1 ventral pore and a group of apical sensillae; hypopharynx (fig. 13) with moderately sclerotized parts consisting of hypopharyngeal sclerome, bracon and subparallel hypopharyngeal rods; submembranous anterior part provided with 2 pointed apical setae and covered with 2 pairs of patches, of dense setae, directed inwardly.

Thorax about 0.31 x as long as body length, widest across metathorax; prothorax almost 1.65 x wider than long, widest near middle length, 1.11 x longer than mesothorax and 1.40 x longer than methathorax; ecdysial suture and two large notal plates distinct on each tergum.

Legs (figs 14, 16, 17) with coxae widely separated at their bases, longer than trochanter and femur combined, provided with a few pointed setae; trochanter elongate with 2 mesal setae; femur weakly flattened on outer edge, about 2.0 x as long as wide, with 2 long mesal setae; tibiotarsus about as long as femur, narrowing towards apex, bearing numerous, pointed setae; claw rather long and sharp, with a single seta (fig. 17).

Abdomen widest across segments 2 and 3. Segments A1-8 similar in shape with terga bearing similar notal plates as those on thorax. A8 slightly shorter and narrower than preceding segments. A9 slightly shorter than A8, visible from above. Segment 10 ventral.

Spiracles small, annular, located in pleural membrane on segments A1-8 (pleural regions with spiracles, not very well visible from above).

#### COMMENTS

The Nearctic *Xenomycetes* HORN is a somewhat unusual member of the family Endomychidae. Adult *Xenomycetes* is most similar to Epipocinae and

Lycoperdininae by the overall body appearance, the abdominal ventrites bearing sexually dimorphic characters (as in both subfamilies) or having the mesoventrite strongly carinate (as in Lycoperdininae). Larvae of *Xenomycetes* however, are similar to those of Leiestinae (see descriptions in BURAKOWSKI and ŚLIPIŃSKI 2000), in having the similar shape of body, prognathous head with antennae inserted closely to the mandibular articulations, the antennomere 2 at most 2 x longer than the basal one, 3 pairs of stemmata and modified spiracles (not simple annular - in some members of both subfamilies, like *Leiestes seminiger* GYLLENHAL and *Xenomycetes lawersi* HATCH). The larvae of *Xenomycetes* can be distinguished from the described Leiestinae larvae by the combination of characters, and in particular, the presence of the mandibular protheca, short and broadly V-shaped frontal arms, the antennal sensory appendage slightly longer than antennomere 3 and in having frayed setae. Among Endomychidae, similar setae are also present in *Aphorista* (Lycoperdininae), *Endomychus* (Endomychinae) and *Mycetaea* (Mycetaeinae) (see BÖVING and CRAIGHEAD 1931), but many other characters, including the presence of 3 pairs of stemmata, will distinguish *Xenomycetes* from these genera. The unique character which can distinguish *Xenomycetes* from all remaining Endomychidae larvae, seems to be the large, fused medially labial palpigers.

To date, no larval synapomorphies have been proposed for most of Endomychidae subfamilies, and some of them, in particular Epipocinae, Stenotarsinae, and Lycoperdininae, share many larval similarities (BURAKOWSKI and ŚLIPIŃSKI 2000). There are, however, many larval features that vary considerably and could be very informative for determining phylogenetic relationships. A cladistic study is currently in progress for the subfamily Lycoperdininae (TOMASZEWSKA, in prep.) and exemplar taxa of other subfamilies (including Xenomycetinae) will be included as terminal taxa. The cladistic analysis, using the combination of adult and larval characters will be an interesting test of the relationships within the family as proposed previously (TOMASZEWSKA 2000).

The larva of *X. morrisoni* is very similar to that of *X. lawersi* (JOHNSON 1986), but differs in having the body larger, cream-coloured and less flattened, the spiracles annular, the frontal sutures V-shaped (JOHNSON reported U-shaped frontal arms for *X. lawersi* – error ?), the antennomeres 1 and 2 almost equal in length, and the labrum strongly transverse with anterior margin somewhat sinuate.

*Xenomycetes lawersi* seems to have the sole fungal host – *Paxillus atrotomentosus* (Basidiomycetina: Agaricales: Paxillaceae) (JOHNSON 1986). JOHNSON (1986) reported spores inside the frayed setae, and these may function as mycangia. The biology of *X. morrisoni* is poorly known, the label information however that the larva was collected “under conifer bark” and its gut containing undetermined material, hyphae, and a few fungal spores, confirmed at least the mycophagy of *X. morrisoni*.

## MATERIAL EXAMINED

California: Amador Co., Cal. 88 at Kirkwood Lk. Turnoff 7900', VI.28.1975.  
Under conifer bark; A. NEWTON, M. THAYER (1: ANIC) – det. J.F. LAWRENCE:  
*Xenomycetes morrisoni* HORN.

## ACKNOWLEDGMENTS

Adam ŚLIPIŃSKI (ANIC) is very sincerely acknowledged for the loan of the Endomychidae larvae including the material used in this study. I thank very much Rich LESCHEN and Adam ŚLIPIŃSKI for reading, commenting and correcting an earlier version of this paper.

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