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DESCRIPTION OF THE LARVA
OF *LEPTOMASTAX HYPOGAEUS* PIRAZZOLI
(COLEOPTERA SCYDMAENIDAE)

BY

Stanislav VIT¹ et Luigi De MARZO²

With 14 figures

ABSTRACT

Description of the larva of *Leptomastax hypogaeus* Pirazzoli (Coleoptera Scydmaenidae). — The larva of *Leptomastax* is described and illustrated. It is compared to other scydmaenid larvae and included into the tentative key to genera of Scydmaenidae given previously by Brown & Crowson.

INTRODUCTION

Larvae of Scydmaenidae are only poorly known. The most complete account of European forms is that by Brown & Crowson (1980). Previously, the larvae of only three European Scydmaenids have been described: *Scydmaenus tarsatus* Müll. & Kunze (Meinert 1887), *Cephennium thoracicum* Müll. & Kunze (Paulian 1941) and *Stenichnus collaris* Müll. & Kunze (Paulian 1941).

Brown & Crowson (1980) confirmed the identity of previously described larvae and added descriptions and further data for the larvae of *Eutheia schaumii* Kiesenw., *Eutheia linearis* Muls., *Cephennium gallicum* Ganglb., *Neuraphes elongatus* Müll. & Kunze, *Stenichnus bicolor* Deny and *pusillus* Müll. & Kunze, *Scydmoraphes sparshalli* Denny, *Euconnus (Tetramelus) eppelsheimi* (?) Croissandeau and *Neuraphes angularis* Müll. & Kunze; the three latter being attributed only by combination of systematic characters, elimination and association with adults. They provided a key to genera which includes *Eutheia*, *Cephennium*, *Neuraphes*, *Scydmoraphes*, *Euconnus*, *Stenichnus* and *Scydmaenus*. Nevertheless the larvae of other genera occurring in

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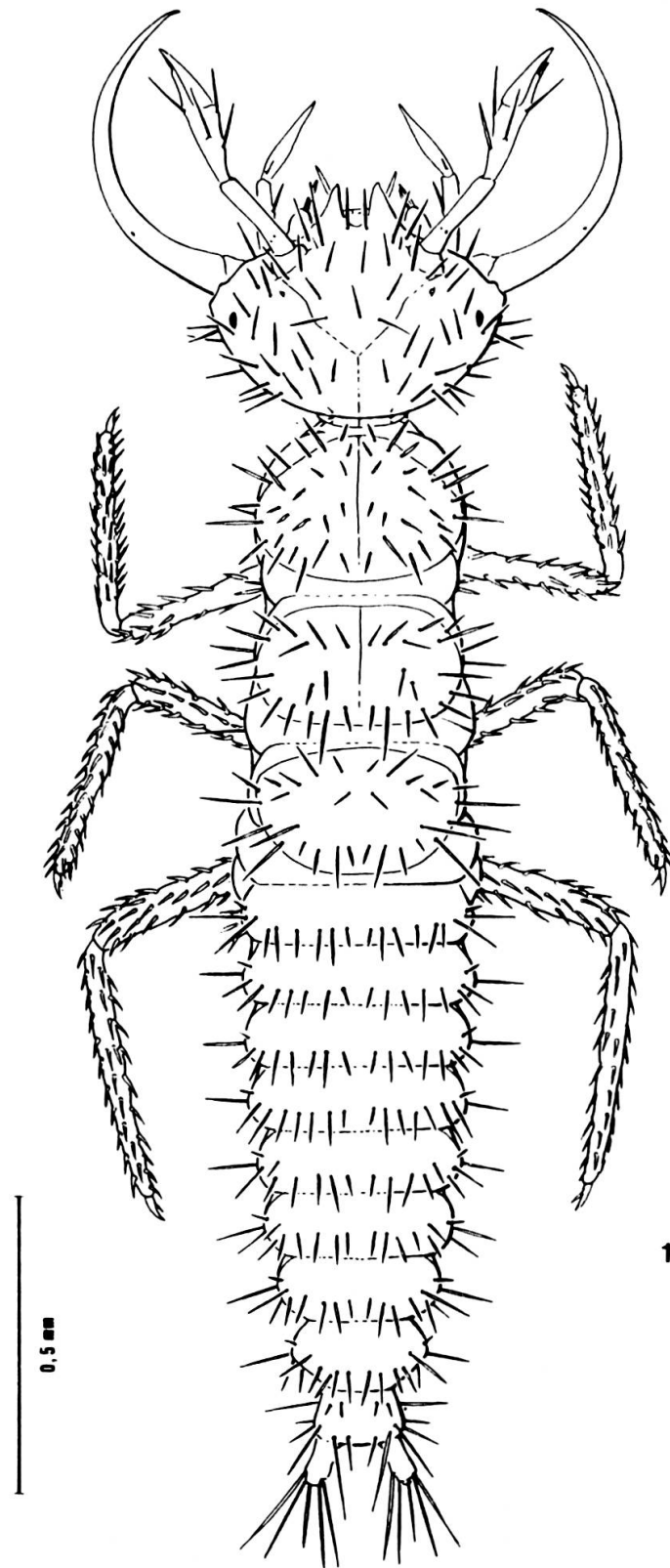


FIG. 1.

Leptomastax hypogaeus, larval habitus (dorsal) (by L. De Marzo).

European fauna remain unknown and nothing is known about the larva of its sub-genera.

De Marzo (1983, 1984) described the three larval instars of *Mastigus pilifer* Kraatz and integrated it into the generic key. Among the forms peculiar to Mediterranean scydmaenid fauna *Mastigus* represents the only Mediterranean genus whose larva is known.

GENERALITIES

The genus *Leptomastax* Pirazzoli is peculiar to the Mediterranean fauna. It is distributed from France, Italy and Northern Africa over the Balcans to the Caucasus. Adult *Leptomastax*, together with *Mastigus* are markedly the most aberrant scydmaenid types of Mediterranean fauna but there is some evidence of a closer relation of *Leptomastax* and *Ablepton* Friv.

The below described larva is attributed to *Leptomastax* Pirazzoli owing to the following reasons:

- a) despite its unusual features it shares the defining characters of scydmaenid larvae;
- b) its head and mandibles closely resemble those of adults;
- c) it was collected in association with *Leptomastax hypogaeus* Pirazz. which were the only adult Scydmaenids present in the sample.

Both, larval characteristics and similarities with adult makes the attribution of the larva to *Leptomastax* highly probable.

Material: 1 larva/7 adults, Italy, Toscana, Monte Argentario, 9.IV.1985, in dry oak leaf-litter (S. Vit.).

DESCRIPTION

Larva (fig. 1) campodeiform, subparallel, entirely whitish except for head; thorax flattened dorsally, abdomen gently narrowing, with only nine abdominal segments visible in dorsal view, urogomphi present, legs long, mandibles conspicuous. Length (midline) 2.15 mm.

Integument shining and smooth, unpigmented. Setation erect and scarce; the setae rigid, spine-shaped.

Head (fig. 2, 3) prognathous and protracted, strongly depressed, with differentiated neck; moderately sclerotised, testaceous, subrhomboidal, unusually shaped to receive the mandibles so that the insertion of the latter is the most external point of the

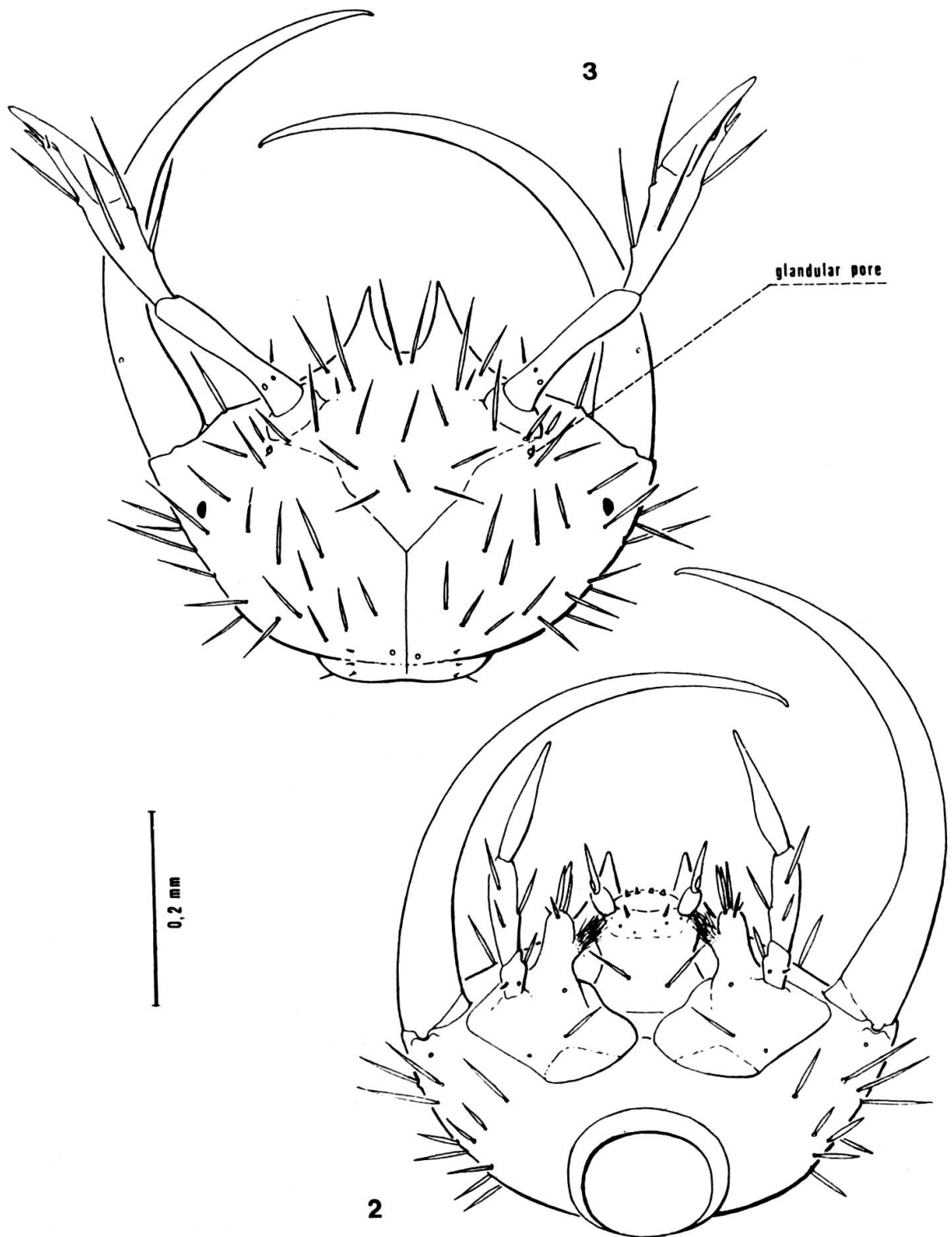


FIG. 2, 3.

Leptomastax hypogaeus, larval head (by L. De Marzo).
2: Ventral view. 3: Dorsal view.

head, semicircular behind, prominent anteriorly between the mandibles, distinctly larger than long including the nasale. Occipital foramen comparatively small, with raised margin forming the neck. Antennal insertion dorsomedian, frontoclypeal suture absent. Labrum fused, nasal projected in two acute lobes separated by a deep median incision (fig. 3). Gula and gular suture absent.

Coronal suture distinct, long; frontal sutures V-shaped, sinuate, well-defined and complete, reaching the antennal insertions. One small glandular pore is present above the base of each antenna (fig. 3).

Ocelli present, well-defined; one single large, low dome-shaped ocellus on each side lying dorsolaterally behind the mandibular insertion.

Antennae (fig. 9, 10) 3-segmented, club-shaped; basal segment unusually elongate and slender for a Scydmaenid, with two placoid sensilla in the basal part; segment 2 elongate, spindelform, pointed apically, sensory appendage lying anterodorsally, strongly elongate, longly subconical, segment 3 poorly defined, possibly represented by the minute, digitiform appendage lying laterally at the antennal apex. Chaetotaxy as in fig. 9, 10.

Mandibles (fig. 11, 12) very slender, falciform, not clearly divided into a pale basal and a strongly sclerotised apical part, without retinaculum and without serration, bearing one dorsal and one lateral placoid sensillum in their basal part. This conspicuous shape of mandibles is found also in adult *Leptomastax*.

Maxillae (fig. 14) without visible articulating area. Cardo subtriangular; stipes with well-separated mala, the latter obtuse, split apically, clearly divided into two unarticulated lobes, the outer bearing a group of apical spine-shaped setae, the inner densely hairy. Maxillary palpi 3-segmented; basal segment short, distinctly articulated with stipes, segment 2 elongate, subcylindric, apical segment elongate, pointed. Chaetotaxy as in fig. 14.

Labium (fig. 13) without ligula, weakly concave apically but bearing distally a row of papilliforme sensilla, not distinctly subdivided into prementum, mentum and submentum ventrally with two pairs of long setae and three pairs of placoid sensilla. Labial palpi two-segmented, largely separated, articulated; segment 2 subulate, with one placoid sensillum in its basal part.

Dorsal head setation (fig. 3) regular, moderately dense.

Thorax depressed, median suture distinct, terga weakly sclerotised, not expanded laterally but oval-shaped and of relatively small size for scydmaenid larvae (fig. 1). Sterna membranous. Mesothoracic spiracles situated anterolaterally.

Abdominal segments transverse (fig. 1, 4, 5, 6), of even width, slightly larger than the thoracic ones, terga weakly sclerotised. Setation relatively scarce and stout, lateral setae longer. Abdominal spiracles lateral, present in segment 1-8. Segment 9 slightly transverse, trapezoidal, with a pair of pale, unsclerotised, mostly staphylinoid-like but unarticulated urogomphi, the latter rounded apically and bearing each five long apical setae. Segment 10 cylindric not visible from above

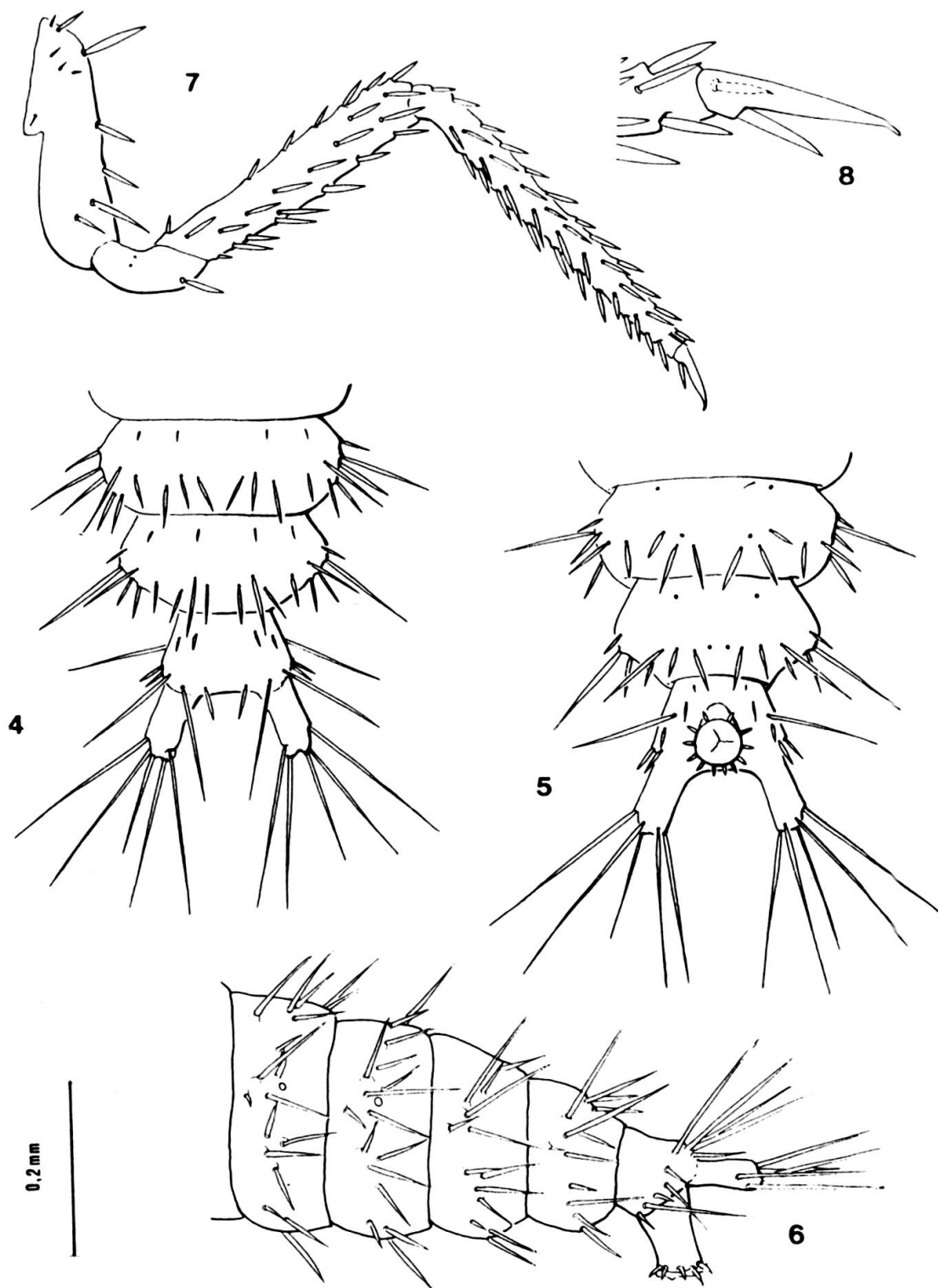


FIG. 4-8.

Leptomastax hypogaeus, larval abdomen (by L. De Marzo).
 4: Abdomen apex, dorsal. 5: Id., ventral. 6: Segments A5-A10, lateral view.
 7: Anterior leg. 8: Tarsungulus.

because of its position on the ventral side of segment 9, the apex with a corona of short setae (fig. 5, 6).

Legs (fig. 7) with rows of spine-shaped setae, tibiae tapered apically, longer than femora, tarsungulus with two basal setae, but lacking the pre-apical barbs (fig. 8).

COMMENTS

Even though the larva of *Leptomastax* concords with the definition of *Scydmaenidae* including *Eutheia* given by Brown & Crowson (1980), it differs clearly from most other scydmaenid larvae in the following features: elongate subparallel body; scarce, rigid setation; terga nonexpanded laterally; differentiated neck; particular shape of head and mandibles; nasal projections; dorso-median position of antennal insertion; presence of glandular pores on the base of the antennae; clearly divided mala; strongly elongate basal segment of antennae; weakly sclerotised unarticulate urogomphi and abdominal segment 10 directed ventrally. Several of these characters are present in *Eutheia* and were tentatively assumed to be primitive in *Scydmaenidae* others are unique within the known scydmaenid larvae.

According to Brown & Crowson, these primitive features (slender, elongate, weakly sclerotised body, horny urogomphy, and partly split mala found in *Eutheia*) suggest affinities to different families of Staphylinoidea. Slender body and horny urogomphi are encountered in the primitive larvae of *Pselaphidae*, the divided maxillary lobe is shared with *Leiodidae* or *Silphidae*.

The differentiated neck, the nasal projections, the cephalic glandular pores, the elongate basal antennal segment of club-shaped antennae, the clearly divided mala, the stout unarticulated urogomphi, and the ventrally situated abdominal segment 10, are known only in *Leptomastax*. Its weakly sclerotised urogomphi, bearing a tuft of long apical setae, are radically different from those of *Eutheia*. The lobes of the divided mala in *Leptomastax* differ from those of *Mastigus* in their highly specialised vestiture. The maxillary palpus of *Leptomastax* is 3-segmented, the one of *Eutheia* is 2-segmented*. A large single ocellus is present in three unrelated larvae (*Leptomastax*, *Mastigus* and *Stenichnus*). Antennae of *Mastigus*, bearing also the elongate basal segment, are not of club-shaped type. The cephalic glandular structures of *Mastigus* is of different type. The vestigial segment 3 of antennae is found in *Eutheia*, *Euconnus (Tetramelus)* and *Leptomastax*.

Another striking feature is the convergence of adult and larval structures of the mouth-parts and head organisation of *Leptomastax*. This is found in a number of groups of Coleoptera (Crowson 1981) but is reported for the first time in *Scydmaenidae*. This convergence indicates the highly similar, specialized

* *Veraphis* 3-segmented (Newton in press; personal communication).

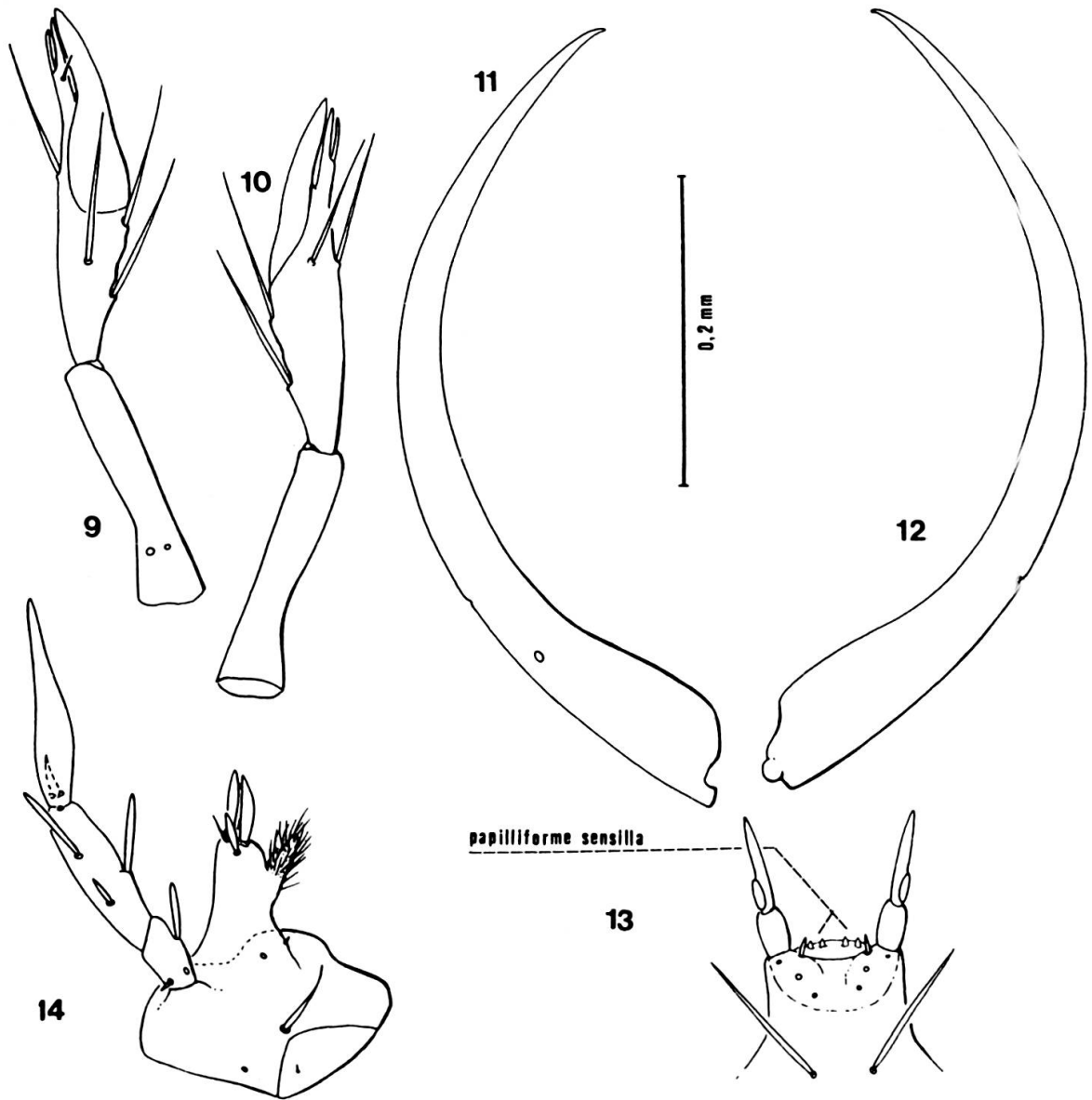


FIG. 9-14.

Leptomastax hypogaeus, larval mouthparts and antennae (by L. De Marzo).

9, 10: Antenna, left dorsal and ventral. 11, 12: Mandible, left dorsal and ventral. 13: Labium, ventral.
14: Maxilla, right ventral.

feeding habits of larvae and adults. The feeding habits of *Leptomastax* remain unknown in detail but are undoubtedly predatory. Generally, characteristics related with feeding habits are considered as adaptive.

Leptomastax can be included into the existing key to genera of Scydmaenidae, which is not based on evolutionary relationship, near *Eutheia*:

1. — Abdominal segment 9 with a pair of thick urogomphi, body slender, elongate, integument pale 2
 - Abdominal segment 9 without urogomphi, body moderately elongate to ovate, integument more or less pigmented *remaining genera*
2. — Urogomphi unsclerotised, staphylinoid-like, only nine abdominal segments visible in dorsal view, segment 10 situated in the ventral side of the nine. Head with distinct frontal sutures and large single ocellus, antennal insertion dorsomedian, nasale projected in two acute lobes *Leptomastax*
 - Urogomphi horny, cucujoid-like, abdominal segments 10 exposed in dorsal view. Head with or without distinct frontal sutures and without ocelli, antennal insertion lateral, nasale without projections *Veraphis, Eutheia*

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