

# Description of the Larva of *Sphaerophthalma pensylvanica* (Lepeletier) (Hymenoptera: Mutillidae: Sphaerophthalminae)<sup>1</sup>

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**Abstract** The larval stage of *Sphaerophthalma pensylvanica* (Lepeletier) is described and differentiated from other known larval Mutillidae. The larva of *S. pensylvanica* differs from the other described larvae of Mutillidae by the following combination of characters: the tenth abdominal segment rounded and not produced over the anus, a basal mandibular tooth half the size of the third mandibular tooth, large, densely clustered sensilla on the labrum, and prominent pleural lobes.

**Key Words** Sphaerophthalmina, immature stage, Vespoidea, velvet ant

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*Sphaerophthalma pensylvanica* (Lepeletier) ranges throughout the southeastern United States, extending west to Texas and north to Missouri (Krombein 1979). It is the only species of this genus found in the East. Comparatively more is known of its biology than that of other mutillids. *Sphaerophthalma pensylvanica* is reported to be a parasite of several sphecids, *Isodontia mexicana* (Saussure) (Manley and Carithers 1998) and the mud daubers, *Sceliphron caementarium* Drury (Rau and Rau 1916), and *Trypoxylon politum* Say (Rau 1928). It also has been reared from mud nests of a pompilid wasp, *Auplopus architectus*? (Say) (Rau and Rau 1918).

Krombein (1967) provided most of the details for the biology of *S. pensylvanica*, including photographs of a larva and host cocoon. He found that *S. pensylvanica* is also parasitic upon three twig-nesting species of *Trypoxylon* (*Trypargilum*), from which emerged both males and females. He concluded that this mutillid species parasitizes a wide range of mud dauber hosts but confines its attacks to those that store paralyzed spiders. Recently, Matthews (1997) has shown that *S. pensylvanica* exhibits an unusual sex allocation in that only males are reared from *T. politum*.

Of the approximately 9,000 mutillid species, larvae of only five have been described. These are: *Smicromyrme rufipes* (Fabricius) (Grandi 1954), *Pseudomethoca frigida* (Smith) (Brothers 1972), *Myrmosula parvula* (Fox) (Brothers 1978), *Dasymutilla ursula* (Cresson) (Evans 1987), and *Dasymutilla scaevola* (Blake) (Hook and Evans 1991). *Dasymutilla* and *Pseudomethoca* are in the subfamily Sphaerophthalminae, *Myrmosula* in Myrmosinae, and *Smicromutilla* in Mutillinae. These descriptions represent only three of the seven subfamilies of Mutillidae according to Brothers (1975).

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The mature larval stage described here is the sixth known for the family and the first for this genus.

### Materials and Methods

Eight postdefecating larvae were collected in Georgia, U.S.A. (Clarke Co., Athens, 3 ♂ larvae, 27.II.1997, ex. *Trypoxylon politum* nest, coll. J. P. Pitts and Oglethorpe Co., Lake Oglethorpe, 5 ♂ larvae, IV.1989, ex. *Trypoxylon politum* nest, coll. R. & J. Matthews). The larvae were preserved in Kahle's solution.

Techniques employed for specimen treatment were those described by Michener (1953). The intact specimen was drawn with the aid of a camera lucida. The head capsule and integument were then cleared with a solution of hot potassium hydroxide. The head was neutralized in water and placed in a deep-well slide filled with hot glycerine jelly. Descriptive terminology follows Evans (1987).

Voucher specimens are deposited in the University of Georgia, Collection of Arthropods.

### *Sphaerophthalma pensylvanica* (Lepeletier)

Body (Fig. 1C) length 10-13 mm; maximum width 6 mm. Pleural lobes prominent, blunt on abdominal segments 1-8, weakly developed and rounded on thorax. Mid-dorsal line with small humps on metathorax and abdominal segments 1-8; humps more defined on abdominal segments. Body compactly fusiform, tapered posteriorly. Anal segment rounded, not produced above the anus. Ten pairs of spiracles; spiracles small, second thoracic pair minute; spiracular atria unarmed, subatria elongate. Integument smooth, glistening, lacking setae; but under high magnification seems to be covered with minute spinules which are separated by about their own lengths.

Head (Fig. 1A) 1.30 times as wide as high (height measured to apex of clypeus),

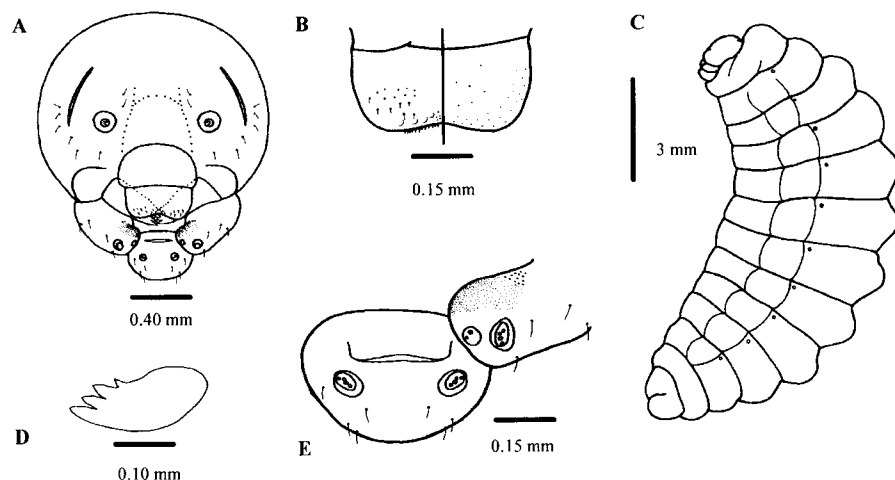


Fig. 1. Mature larva of *Sphaerophthalma pensylvanica* (Lepeletier). A. Head, anterior view. B. Labrum (left) and epipharynx (right). C. Body, lateral view. D. Mandible. E. Labium and maxilla.

unpigmented except for the apical halves of mandibles; sides of head more convex than vertex; vertex not depressed medially. Parietal bands present as long, faint streaks. Antennal orbits slightly below middle of head capsule, located on a large, circular elevated area; each with three sensilla. Head with few scattered setae (Fig. 1A).

Mandible (Fig. 1D) 2.0 times as long as wide at base, without setae, terminating in four teeth in nearly the same plane, basal tooth much smaller, three apical teeth subequal in size. Labrum (Fig. 1B) bilobed, each lobe with 16 sensilla, some bearing minute setae; apical median margin spinulose. Epipharynx minutely spinulose, median area with sensilla. Maxilla with several lateral setae, mesally minutely spinulose; maxillary palpus much wider than high, with four apical sensilla; galea smaller than palpus but similarly formed, each with two sensilla. Labium (Fig. 1E) broad, with a few small apical setae, smooth oral surface without spinules or papillae; labial palpi much broader than high, each with 4 sensilla; spinneret a transverse slit, somewhat widened medially.

## Discussion

The description of *S. pensylvanica* generally agrees with the description given by Evans (1987) of the larval stage for the Mutillidae. Differences between *S. pensylvanica* and the other described species are probably important characters at the subfamilial and generic level.

*Dasymutilla scaevola* and *M. parvula* are similar to each other in that both have a conical tenth abdominal segment produced over the anus. *Sphaerophthalma pensylvanica* differs by having the tenth abdominal segment rounded and not produced over the anus. *Sphaerophthalma pensylvanica* differs from the larva of *D. scaevola* (Hook and Evans 1991) as follows: second mandibular tooth  $\frac{3}{4}$  length of apical mandibular tooth; body without prominent dorsal protuberances; tenth abdominal segment rounded and not produced above the anus. Differences between the larvae of *S. pensylvanica* and *M. parvula* (Brothers 1978) are as follows: basal mandibular tooth much smaller than third mandibular tooth and tenth abdominal segment rounded and not produced above the anus.

The larva of *S. pensylvanica* is similar to the larval stage of *D. ursula* and *P. frigida*. All have the tenth abdominal segment rounded and not produced over the anus. *Sphaerophthalma pensylvanica*, however, differs from *D. ursula* (Evans 1987) by having a basal mandibular tooth half the size of the third mandibular tooth and larger, more densely clustered sensilla on the labrum. It differs from the larva of *P. frigida* (Brothers 1972) by having a basal mandibular tooth that is not serrate and pleural lobes that are much more prominent.

The overall body shape of *S. pensylvanica* resembles that of *Dasymutilla ursula*, *Pseudomethoca frigida*, *Smicromyrme rufipes*, and *Myrmosula parvula*. The larvae of all of the described species of Mutillidae are similar in details of the antennae, spiracles and integument.

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