

Last instar larva of *Penepodium dubium* (Hymenoptera: Sphecidae)

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Abstract: The last instar larva of *Penepodium dubium* is described from southeastern Brazil. This is the first description of an immature stage of the genus *Penepodium*. The larva of *P. dubium* is similar to those of *Podium*, but it can be distinguished from the species of this genus by the presence of depressions on the front and clypeus, and lack of brownish blotched areas on the head. The cocoon of *Penepodium* seems to be unique among those of Sceliphriini in bearing a nipple-like projection at one end.

Key words: *Penepodium dubium*, Sphecidae, Hymenoptera, digger wasp, larva, taxonomy, Brazil.

The knowledge on digger wasp larval morphology has greatly increased since the comprehensive papers of Evans (references in Evans 1964). Even so, the larvae of a great number of genera are still unknown. The tribe Sceliphriini is composed by eight genera. The larvae of only four of these genera have been described, namely *Chlorion* (Evans 1964), *Sceliphron* (Evans and Lin 1956, Asís *et al.* 1989), *Chalybion* (Evans 1959), and *Podium* (Evans and Lin 1956, Evans 1964). In this paper the last instar larva of *Penepodium dubium* (Taschenberg) is described.

plastic pots lined inside with absorbent paper until the larvae reached maturity. The description below is based on three last instar larvae preserved in alcohol (80%), but the morphometric features of the head was measured in only one specimen. The head and some parts of the integument have been dissected and heated in KOH (10%) for about 10 min. to eliminate soft tissues. Voucher specimens have been deposited in the entomological collection of the Departamento de Zoologia da Universidade Federal do Rio de Janeiro.

MATERIALS AND METHODS

Females of *P. dubium* dig unicellular nests in the soil, and store them with epilamprine cockroaches. Several preys bearing wasp eggs were collected in the Biological Reserve of Poço das Antas (Rio de Janeiro State, southeastern Brazil) and conserved in

DESCRIPTION

Larva (Figs 1 - 4)

Body: Cylindrical (l = 12 – 18 mm, maximum w = 4.5 – 6 mm, about fifth abdominal segment), pale yellowish. Pleural lobes indistinct on thorax and prominent on abdomen.

Prothorax with three pairs of lightly pigmented callosities, the most prominent one on dorsum, the other two on lateral and dorso-lateral position. Integument covered with minute spines ($l = 5-7 \mu\text{m}$); callosities bare, except for some few scattered setae. Anal segment rounded, protuberant. Anus a sub-apical slit. Spiracles pale brown; atrium circular, all the same size ($d = 110 \mu\text{m}$); opening into subatrium armed with a circlet of spines.

Head: Pale yellowish, slightly darker than body ($h = 1.20 \text{ mm}$ - exclusive of the labrum, $w = 1.25 \text{ mm}$). Peristoma, hipostoma, posterior tentorial arms, and labrum, brown; mandibles dark-brown. Front roughened on top and sides, with four depressions, two near middle line and two on lateral portions above antennal orbits; parietal bands unpigmented; antennal orbits subcircular ($d = 55.0 \mu\text{m}$), with three small sensillae; front with scattered setae ($l = 5.0 - 15.0 \mu\text{m}$), more concentrated near base of mandibles. Epistomal suture indistinct. Clypeus with punctures, some of them with minute setae; a pair of shallow circular depressions on middle portion of clypeus. Coronal suture distinct.

Mouthparts: Labrum strongly bilobed ($w = 0.58 \text{ mm}$), with marginal barrel shaped sensillae ($w = 5 - 7.5 \mu\text{m}$); scattered punctures, some of them with minute setae ($l = 7.5 - 10.0 \mu\text{m}$). Epipharynx strongly spinulose. Mandibles ($l = 0.57 \text{ mm}$, $w = 0.25 \text{ mm}$) with four teeth. Maxillae with setae laterally ($l = 12.5 - 17.5 \mu\text{m}$); galeae brownish ($l = 62.5 \mu\text{m}$, $40.0 \mu\text{m}$), longer than the maxillary palpi ($l = 52.5 \mu\text{m}$, $w = 35.0 \mu\text{m}$); lacinial area densely spinulose. Labium very papillose; labial palpi brownish, ($l = 50.0 \mu\text{m}$, $w = 47.5 \mu\text{m}$) spinneret a transverse slit with large lips ($w = 127.5 \mu\text{m}$).

Cocoon (Fig. 5)

Fusiform, dark-brown, external surface somewhat opaque, internal one brilliant. A nipple-like projection in one extremity with an orifice through which the meconium is eliminated. Wall a one-layer of silky material, internally

coated with substance expelled by larva; texture as a brittle, but resistant, paper.

DISCUSSION

The larva of *P. dubium* is quite similar to those of *Podium luctuosum* Smith and *Podium rufipes* Fabricius (Evans and Lin 1956, Evans 1964). It can be distinguished from those species by the presence of depressions on the front and clypeus and the lack of brownish blotched areas on the head. The larvae of *Penepodium* and *Podium* resemble those of *Sceliphron* and *Chalybion*. However, the latter two genera have larger and more abundant setae in the head and unpigmented dorsal callosities (Evans and Lin 1956, Evans 1959, Asís *et al* 1989). *Chlorion* differs from the aforementioned genera by its smaller thoracic spiracles in relation to those of the abdomen, weakly pigmented anterior prothoracic annulet, and the head with both blotched areas and depressions in the front and clypeus (Evans 1964).

The cocoon morphology of *P. dubium* is very similar to those of *Penepodium luteipenne* (Fabricius) (Williams 1928) and *Penepodium goryanum* (Lepeletier) (Garcia and Adis 1993). The cocoon of the cockroach-hunting genera in the tribe Sceliphtrini are generally similar, sharing features as follows: one-layered wall, internal coating with a substance expelled by the larva, texture like a brittle paper, and brown colour (Rau 1915, Williams 1928, Arlé 1933, Evans 1964, Krombein 1967, 1970, Eberhard 1974, Vardy 1978, Garcia and Adis 1993). However, the cocoon of *Penepodium* seems to be unique in bearing a nipple-like projection.

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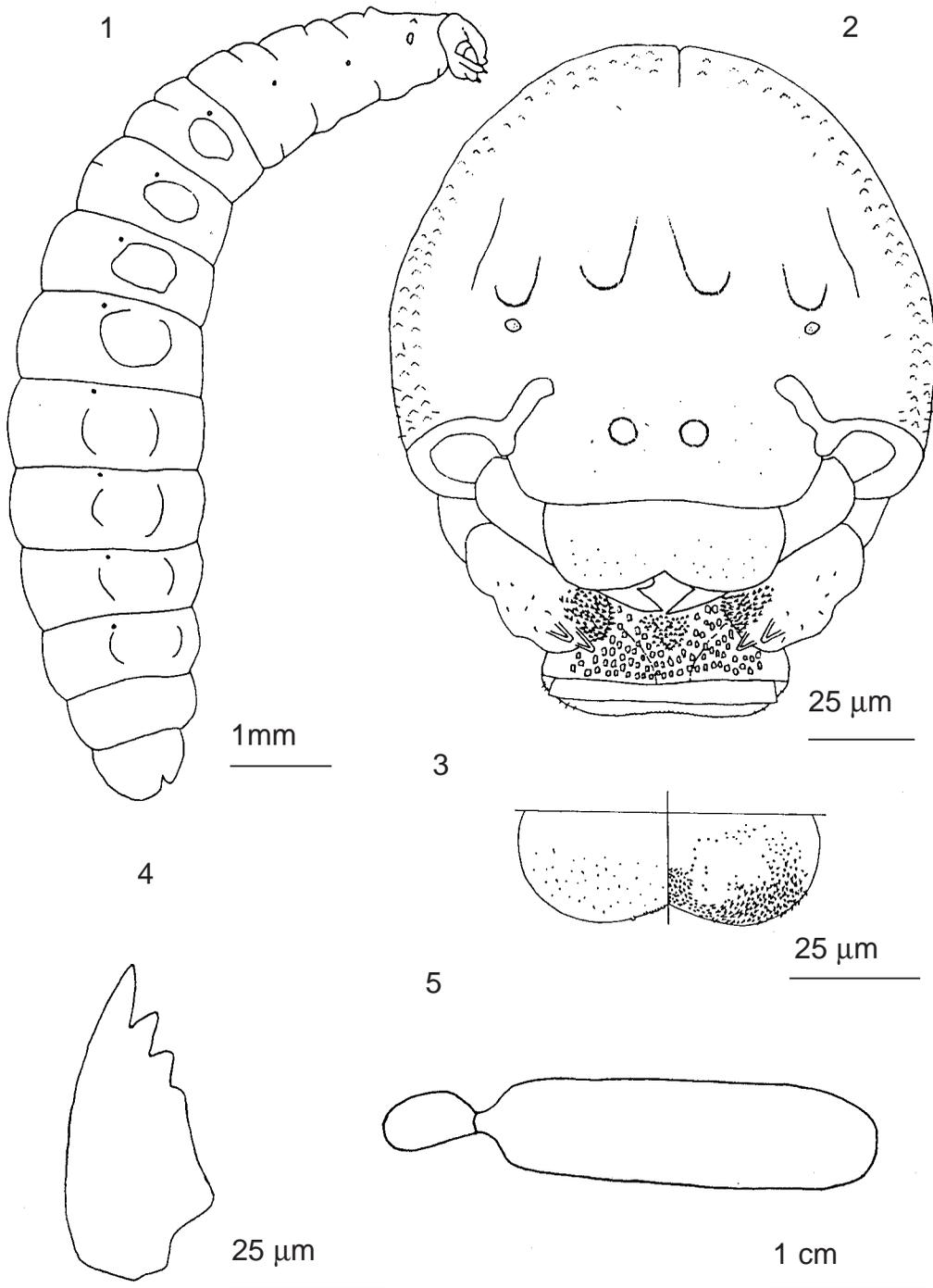


Fig. 1-5. *Penepodium dubium*, last instar larva. 1) Body, lateral view. 2) Head, frontal view. 3) Labrum and epipharynx, frontal view. 4) Mandible, frontal view. Fig. 5) Cocoon.

REFERENCES

- Arlé, R. 1933. Sobre a nidificação, a biologia e os parasitos de *Sceliphron (Trigonopsis) abdominalis*, Perty. Ann. Acad. Brasil. Ciên. 5: 205-211 + pls IV.
- Asís, J.D., S.F. Gayubo & J. Tormos. 1989. Descripción de la larva madura de *Sceliphron destillatorium* (Illiger) (Hymenoptera, Sphecidae). Misc. Zool. 13: 105-108.
- Eberhard, W.G. 1974. The natural history and behaviour of the wasp *Trygonopsis cameronii* Kohl (Sphecidae). Trans. R. Ent. Soc. Lond. 125: 295-328.
- Evans, H.E. 1959. Studies on the larvae of digger wasps (Hymenoptera, Sphecidae) Part V: Conclusion. Trans. Amer. Ent. Soc. 85: 137-191 + pls XVIII - XXIV.
- Evans, H.E. 1964. Further studies on the larvae of digger wasps (Hymenoptera: Sphecidae). Trans. Amer. Ent. Soc. 90: 235-299 + pls VIII - XIX.
- Evans, H.E. & C.S. Lin. 1956. Studies on the larvae of digger wasps (Hymenoptera, Sphecidae) Part I: Sphecinae. Trans. Amer. Ent. Soc. 81: 131-153 + pls. I - VIII.
- García, V.B. & J. Adis. 1993. On the biology of *Penepodium goryanum* (Lepeletier) in wooden trap-nests (Hymenoptera, Sphecidae). Proc. Entomol. Soc. Wash. 95: 547-553.
- Krombein, K.V. 1967. Trap-nesting wasps and bees: life histories, nests, and associates. Smithsonian. Washington, D.C. 570 p.
- Krombein, K.V. 1970. Behavioral and life-history notes on three Floridian solitary wasps (Hymenoptera: Sphecidae). Smith. Contrib. Zool. 46: 1-26.
- Rau, P. 1915. The differentiation of the cocoons of *Pelopoëus caementarius* and *Chalybion caeruleum* (Hymen.). Psyche 22: 62-63.
- Vardy, C.R. 1978. A revision of the Neotropical genus *Trigonopsis* Perty (Hymenoptera: Sphecidae). Bull. Br. Mus. Nat. Hist. (Ent.) 37: 117-152.
- Williams, F.X. 1928. Studies in the tropical wasp – their host and associates. Bull. Haw. Sug. Planters' Assoc. 19: 1-179.