

## DESCRIPTION OF THE PREPUPA OF *CHALYBION FEMORATUM* (HYMENOPTERA: SPHECIDAE), WITH COMMENTS ON LARVAL CHARACTERS IN THE GENUS

JOSÈ TORMOS<sup>1</sup>, CARLO POLIDORI<sup>2</sup> AND JOSEP DANIEL ASÍS<sup>1</sup>

<sup>1</sup>Unidad de Zoología, Facultad de Biología, Universidad de Salamanca. 37071- Salamanca, Spain, e-mail: tormos@usal.es

<sup>2</sup>Dipartimento di Biologia, Sezione di Zoologia e Citologia, Università degli Studi di Milano—Via Celoria, 26, 20133, Milan, Italy

### ABSTRACT

The prepupa of *Chalybion femoratum* (Fabricius) is described and illustrated. The most salient character state shown by the mature larva of this species lies in the presence of scattered setae on the integument. Morphological characters with diagnostic value for the final instar of the tribe Sceliphirini are discussed.

Key Words: Hymenoptera, Sphecidae, *Chalybion femoratum*, larval morphology

### RESUMEN

Se describe, y compara con la previamente descrita del género, la prepupa de *Chalybion femoratum* (Fabricius). El estado de carácter que permite distinguir la larva madura de esta especie radica en la presencia de setas esparcidas en el tegumento. Adicionalmente, se discuten caracteres morfológicos con valor diagnóstico de las larvas maduras de la tribu Sceliphirini.

Translation by the authors.

Sphecid wasps of the genus *Chalybion* Dahlbom normally nest in preexisting cavities and provision their nests with spiders (Bohart & Menke 1976). Of the 45 species of the genus (Pulawski 2005), only the mature larva of *Ch. californicum* (de Saussure, 1867) is known (Evans and Lin 1956; Evans 1959). The aim of this paper is to describe the prepupa of *Ch. femoratum* (Fabricius, 1781).

### MATERIALS AND METHODS

The description is based on 1 postdefecated mature larva (prepupa) obtained by Carlo Polidori in Castelleone (Cremona Province, Italy) in July 2004, from a nest of *Sceliphron caementarium* (Drury 1770). Following the method used to conserve and prepare larval specimens (Asís, unpublished), the specimen was fixed in alcohol (70%) for later treatment with KOH (10%, 70 °C) for study under the microscope. The following abbreviations are used: d = diameter, h = height, l = length, w = width. The voucher specimen is deposited at the "Torres-Sala" Entomological Foundation (Valencia, Spain).

#### Description of the Mature Larva

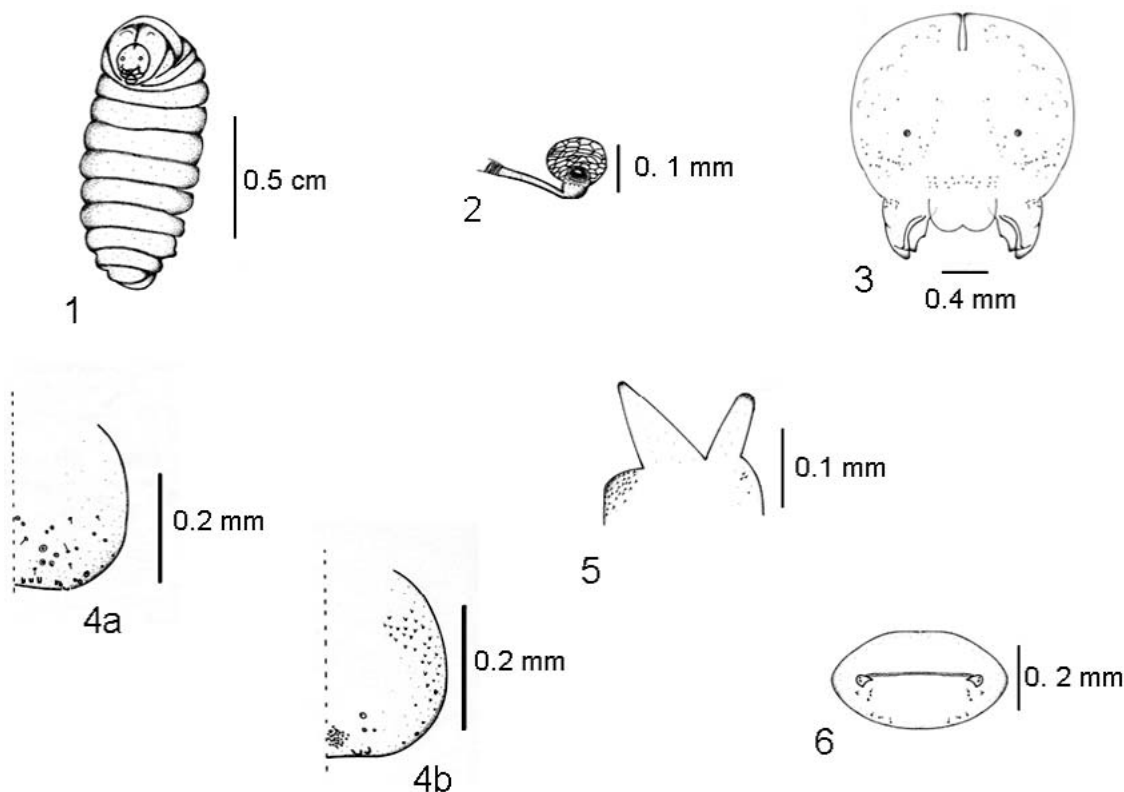
*Chalybion femoratum* (Fabricius) (Figs. 1-6)

Body (Fig. 1) (l = 11 mm, maximum w = 5 mm) yellow, fusiform, strongly curved at level of third

thoracic segment. Anus transverse, in terminal position; supra- and infra-anal lobes very similar in size. Pleural lobes well developed. Integument with tiny spinules (l = 5 µm) and few dispersed setae (l = 10 µm). Thoracic and abdominal spiracles (Fig. 2) of the same size, all in a single line; atria (d = 120 µm) with walls lined with ridges forming irregular hexagons, subatria short and subglobose, opening into subatria armed with spines. Thorax with a pair of oval callosities, one on each side of the mid-dorsal line, just anterior to the first pair of spiracles.

Cranium (Fig. 3) [w = 0.7 mm, h (measured to apex of clypeus) = 1.1 mm] higher than wide, with sparse setae (l = 20 µm), more abundant on the lower sides of the cephalic capsule, and punctations (5-7 µm). Coronal suture present, parietal bands absent; antennal orbits (d = 48 µm) subcircular, with a small circular central area with three sensilla. Clypeus with scattered setae (10 µm) and punctations. Labrum (Fig. 4a) (maximum w = 420 µm; maximum h = 300 µm) bilobate; anterior margin with six barrel-shaped sensilla on each side of the median line; each lobe surface with several setae (l = 10 µm) and sensory pores (d = 8-10 µm); epipharynx (Fig. 4b) spinulose centrally and laterally, with several sensory pores (d = 8-10 µm).

Mouthparts. Mandible (l = 435 µm, maximum w = 335 µm) robust, sclerotized, brown, with four api-



Figs. 1-6. Mature larva of *Chalybion femoratum*: (1) Body, ventro-lateral view; (2) Anterior thoracic spiracle (atrium (a), subatrium (b), tracheal trunk (c)); (3) Cranium (frontal view); (4) Labrum; (5) Epipharynx; (6) Maxilla; (7) Labium.

cal teeth, with several setae close to the basal external margin. Maxilla (Fig. 5) with the lacinial area spinulose and external margin with setae ( $l = 5 \mu\text{m}$ ) and punctations; maxillary palpus ( $l = 82 \mu\text{m}$ ) with 3 apical sensilla; galea ( $l = 120 \mu\text{m}$ ) similarly with 2 apical sensilla. Labium (Fig. 6) setose ( $l$  of the setae =  $12 \mu\text{m}$ ); labial palpus longer than wide ( $46 \times 36$ ), with two pointed sensilla; salivary orifice ( $l = 328 \mu\text{m}$ ) transverse with lips raised.

#### DISCUSSION

The mature larva of *Ch. femoratum* is similar to that of *Ch. californicum*, the only other of this genus described to date. It differs from the latter in having scattered setae on the integument.

Although in both mature larvae it is possible to consider that the epipharyngeal sensory pores are well removed from the anterior margin, this character state is not very differentiated in *Ch. femoratum*. Additionally, in the latter larva the convexities on the top and sides of the cephalic capsule are almost indiscernible. These two character states should not be used in classification keys until more mature larvae of this genus become known.

The variability observed in these two character states means that currently there is no clear autapomorphy that allows the differentiation of the last larval stage of the two genera encompassed within the subtribe Sceliphrina: *Chalybion* and *Sceliphron*. To date, these two genera, respectively, are defined by exhibiting (Evans & Lin 1956; Evans 1959), the following: (a) vertex and sides of head capsule strongly roughened by small convexities/vertex and sides of head capsule weakly roughened, and (b) epipharyngeal sensory pores removed from the anterior margin of the labrum /epipharyngeal sensory pores scattered, some being close to the anterior margin of labrum.

The last larval stage of Sceliphrina can be differentiated from that of Podiina, the other subtribe that with Sceliphrina forms the tribe Sceliphtrini, by the presence, in the former, of abundant setae on the head capsule (Evans 1959). In the subtribe Podiina, only the mature larvae of species of *Penopodium* and *Podium* are known (Evans & Lin 1956; Evans 1964; Buys 2001; Buys et al. 2004).

Currently, the last larval stage of Sceliphtrini can be defined by the combination of the following

character states: (a) Thoracic and abdominal spiracles of the same size, all in a single line, (b) labrum with large setae and prominent sensory cones, and (c) thorax with two or three pairs of prominent subdorsal callosities.

#### ACKNOWLEDGMENTS

The laboratories of the *Fundación Entomológica "Torres-Sala"* were used to carry out this study. Financial support for this research was provided by the Junta de Castilla y León, project SA012A05.

#### REFERENCES CITED

- BOHART, R. M., AND A. S. MENKE. 1976. Sphecid Wasps of the World. A Generic Revision. University of California Press, Berkeley, Los Angeles, London. 1 color plate, IX + 695 pp.
- BUYYS, S. C. 2001. Last instar larva of *Penepodium dubium* (Hymenoptera: Sphecidae). *Rev. Biol. Trop.* 49 (1): 327-330.
- BUYYS, S. C., E. F. MORATO, AND C. A. GARÓFALO. 2004. Description of the immature instars of three species of *Podium* Fabricius (Hymenoptera, Sphecidae) from Brazil. *Rev. Brasil Biol.* 21(1): 73-77.
- EVANS, H. E. 1959. Studies on the larvae of digger wasps. Part V: Conclusion. *Trans. American Entomol. Soc.* 85: 137-191.
- EVANS, H. E. 1964. Further studies on the larvae of digger wasps. *Trans. American Entomol. Soc.* 90: 235-299.
- EVANS, H. E., AND C. S. LIN. 1956. Studies on the larvae of digger wasps (Hymenoptera, Sphecidae). Part I: Sphecinae. *Trans. American Entomol. Soc.* 81: 131-153.
- PULAWSKI, W. J. 2005. Catalog of Sphecidae. [http://www.calacademy.org/research/entomology/Entomology\\_Resources/Hymenoptera/sphecidae/Genera\\_and\\_species\\_PDF/introduction.htm](http://www.calacademy.org/research/entomology/Entomology_Resources/Hymenoptera/sphecidae/Genera_and_species_PDF/introduction.htm).