DESCRIPTION OF THE FINAL INSTAR LARVA OF *PERITHOUS SCURRA* WITH COMMENTS ON ITS MORPHOLOGICAL CHARACTERS (HYMENOPTERA: ICHNEUMONIDAE, PIMPLINAE, DELOMERISTINI)

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ABSTRACT

A description is given of the final instar-larva of *Perithous scurra* (Panzer, 1804), which is compared with the previously described species of the genus, *P. divinator* (Rossius, 1790). The greater or lesser development of the epistoma, and the number of sensilla of the maxillary and labial palpi are the best characters for distinguishing between both species. Additionally, the larva of *P. scurra* presents spinules on the tegument and sensilla on the antennal orbits, but none of those structures has been described in *P. divinator*.

Key Words: Ectoparasitoid, final-instar larva, Ichneumonidae

RESUMEN

Se describe la larva madura de *Perithous scurra* (Panzer, 1804), y se compara con la especie previamente descrita del género, *P. divinator* (Rossius, 1790). El mayor o menor desarrollo del epistoma, y el número de sensilas de los palpos maxilares y labiales, son los caracteres que mejor permiten distinguir ambas especies. Adicionalmente, la larva de *P. scurra* presenta espínulas en el tegumento y sensilas en las órbitas antenales, aunque ninguna de estas estructuras ha sido citada en *P. divinator*.

The immature instars of parasitic Hymenoptera have been studied by several authors, the classic works of Clausen (1940) and Hagen (1964) being outstanding, as are the keys for the taxonomic differentiation of mature larvae compiled by Beirne (1941), Short (1952, 1959, 1970, 1976), Finlayson (1967, 1975) and Capek (1970). Within this broad group, the Ichneumonidae have been particularly studied by Short (1978), Finlayson & Hagen (1979), Finlayson (1967, 1987), Wahl (1986), and Brooks & Wahl (1987).

Here we describe the mature larva of a species of Pimplinae (= Ephialtinae, sensu Townes, 1969) [Delomeristini (sensu Fitton et al., 1988)] [= Theronini auct.]: *Perithous scurra* (Panzer, 1804) (= *mediator* Fabricius). This species is a larval ectoparasitoid of Hymenoptera Aculeata that nest in hollow stems (Aubert, 1969), and its biology has been studied by Verhoeff (1891), Bouché (1847), Brocher (1926), and Fitton et al. (1988). Although a detailed description of the internal anatomy of the mature larva was provided by Brocher (1926), he failed to describe the morphological characters present on the cephalic structures (sclerotized areas of the external cephalic skele-

ton), spiracles (usually prothoracic), and tegument, that would permit a characterization of the preimaginal stages of Hymenoptera Parasitica (Short 1978; Finlayson & Hagen 1979).

MATERIALS AND METHODS

Three mature larvae and six imagos of *P. scurra* were obtained from two trap nests of *Ailanthus altissima* Swingle (Simaroubaceae), in which *Pemphredon lethifer* (Shuckard, 1837) (Hymenoptera, Sphecidae) had nested. The trap nests were placed in the field in April 1993 at Casas Valle Carmona (Cuenca, Spain) and were collected in September. The methodology of Asís (1990) was employed to open the nests, and for data collection, preservation, and preparation; the terminology of Finlayson (1987) was used for the description of the mature larva.

Voucher specimens are deposited in the Departamento de Zoología, Facultad de Biología, Universidad de Salamanca, Salamanca (Spain).

RESULTS

Perithous scurra (Panzer)

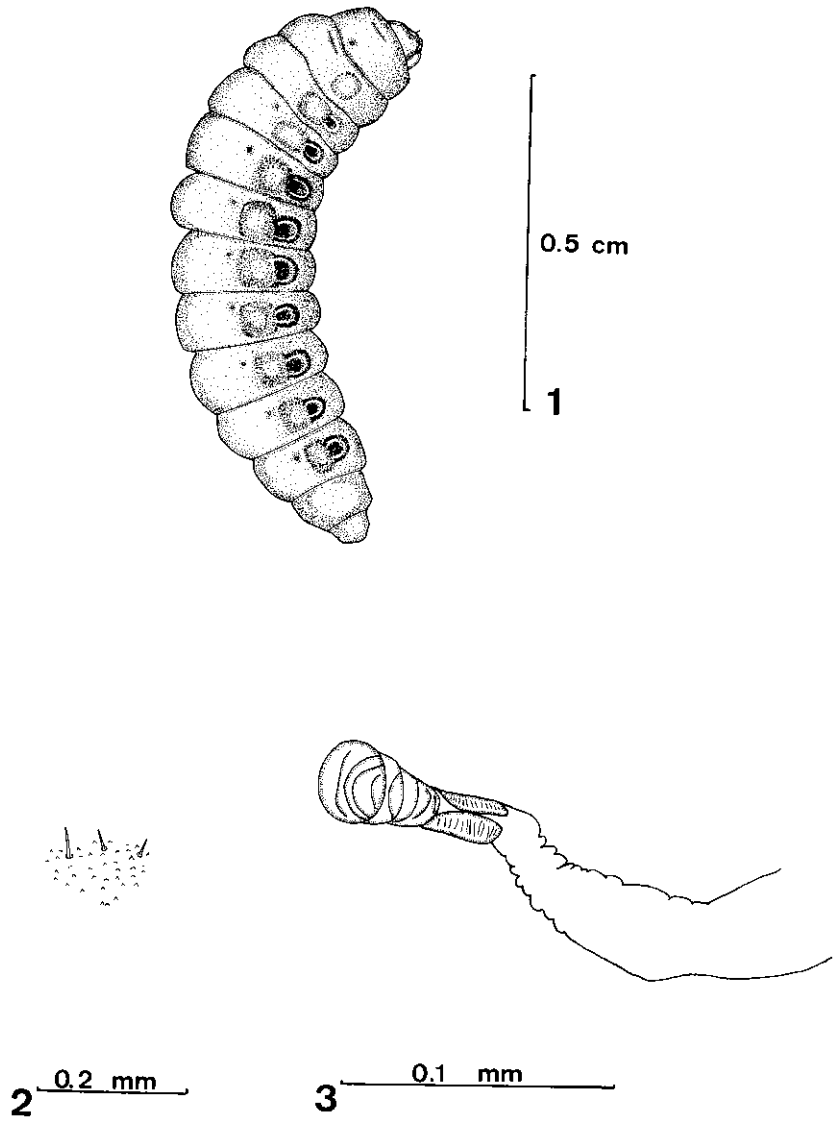
Of the eight cells contained in one of the nests of *P. lethifer*, the externalmost five were parasitized; in the other nest with nine cells the externalmost three and the sixth were parasitized. The mature larva had not constructed a cocoon in any case. One male and two females of the parasitoid emerged from the first of the nests (two mature larvae were stored in vials with 70% ethanol for later study), while three females emerged from the second one (one larva was preserved for later study). Two of the larvae (ref.: 93070401) were prepared for microscopic examination while the other one (ref.: 93070402 A) was used for whole-body drawings.

Mature larva. *General aspect* (Fig. 1). Elongate (length = 1.25 cm, maximum width = 22 mm), more or less fusiform, slightly curved body, with three thoracic and ten abdominal segments; whitish, weakly sclerotized, except spiracles and setae. Anus small, almost terminal. Pleural lobes well developed. Tegument papillose, with spinules (l = 3 μm) and setae (l = 25-40 μm) (Fig. 2); the latter in a transverse line around each of the body segments.

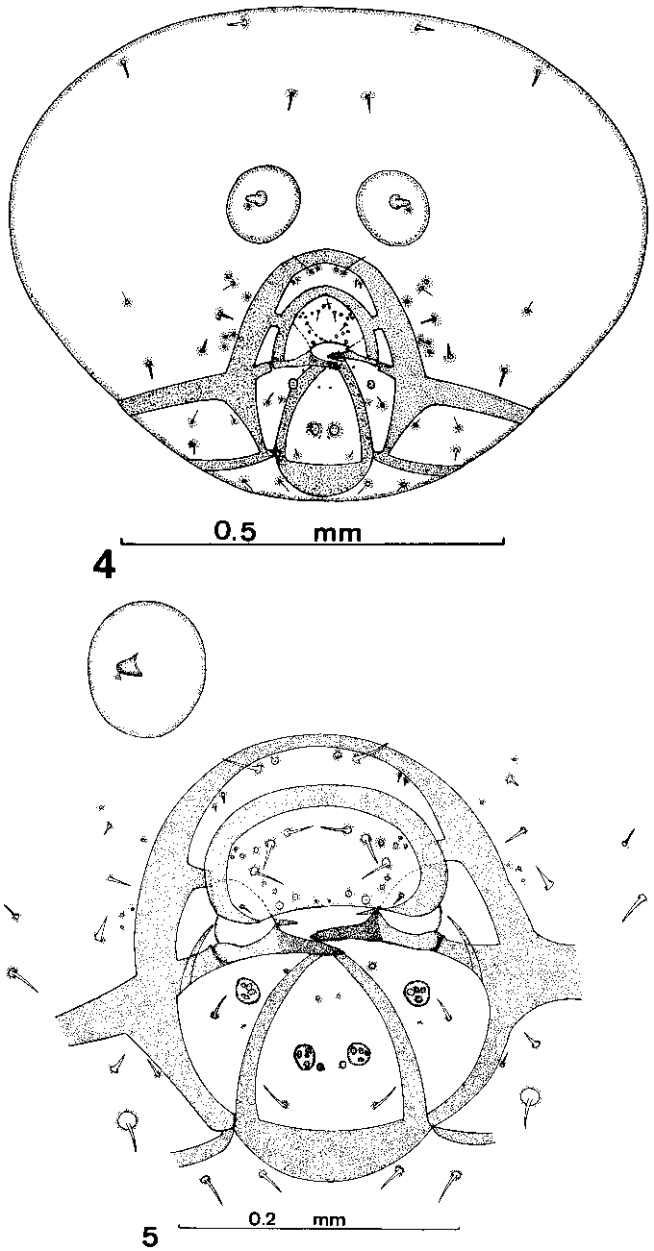
Spiracles (Fig. 3) located on prothorax and first eight abdominal segments; atrium (diameter = 30 μm) round, unarmed, separated from closing apparatus (l = 22 μm, w = 15 μm) by a short section of trachea (l = 19 μm, w = 18 μm).

Cranium (Fig. 4) (w = 825 μm, h = 630 μm) small, weakly sclerotized, slightly retracted within prothorax; with sensilla (d = 6 μm) and sparse setae (l = 13-50 μm), more numerous on lateral side of sclerotized areas of external cephalic skeleton; ecdysial suture line and ocular lines undifferentiated (they are slightly apparent on larva not treated for microscopy); antennae papilliform (l = 32 μm; w =25 μm), with a sensillum (d = 5 μm) on antennal orbit; epistoma completely developed; pleurostoma, hypostoma, lacinial sclerite, hypostomal spur and stipital sclerite well sclerotized; superior and inferior pleurostomal processes present; cardo absent; ventral zone of labial sclerite twice or three times width of lateral zones; labral sclerite complete, well sclerotized; clypeus with six setae (l = 5-23 μm) and two sensilla (d = 4 μm); labrum with eight setae (l = 18-20 μm) and eighteen sensilla (l = 1-5 μm).

Mouthparts (Fig. 5). Mandibles with wide base and blade bifurcate; in this bifurcated blade, the larger part has teeth on both dorsal and ventral surfaces, the smaller one being unarmed, and with a large posteromedial tooth; maxillae with five setae (l



Figs. 1-3. Mature larva of *P. scurra* (Panzer). 1. Lateral view of body; 2. Detail of tegument with papilla, spinules and setae; 3. Spiracle (atrium, trachea, spiracular closure).



Figs. 4 & 5. Mature larva of *P. scurra* (Panzer). 4. Cranium (frontal view); 5. Detail of antenna, sclerotized areas of cranium (the hypostoma has been cut off), clypeus, labrum and mouthparts.

= 3-20 μm); labium with four setae (l = 3-20 μm); maxillary (w = 15 μm) and labial (w = 16 μm) palpi not protruding, disc shaped with four sensilla on each; salivary orifice transverse ovoid; spinneret undifferentiated; postlabium with four setae (l = 20 μm).

Discussion

The results obtained in the present work confirm the data reported by Wolf (1953) and Fitton et al. (1988) concerning the hosts and the parasitic behaviour of *P. scurra.* According to Fitton et al. (1988), at least the British species of the genus *Perithous* Holmgren, 1859 would have become specialist idiobiont ectoparasitoids of sphecids, parasitizing their prepupal stage. In Great Britain, *P. scurra* parasitizes *Pemphredon lugubris* (Fabricius, 1793), pupating inside the cell of its host without constructing a cocoon. Although these authors consider *P. lugubris* as a usual host of *P. scurra*, Wolf (1953) obtained this pimpline from *P. lethifer.*

As in the case of the larvae of the Pimplinae (Short 1978; Finlayson 1967, 1975, 1987), the mature larva of *P. scurra* has the hypostomal spur joining the stipital sclerite very close to where the latter joins the labial sclerite. As in the other Delomeristini, the characters described by Short (1978) are well defined; and as an ectoparasitoid species the mandible blades have teeth and a broad unarmed projection in the form of a tooth on the base and blade of the mandibles, nine pairs of functional spiracles (one prothoracic and eight abdominal), and an undifferentiated spinneret.

Unlike the previously described species of the genus, *P. divinator* (Danks 1970; Short 1978), *P. scurra* displays the following traits (Table 1): a) more setae on clypeus, maxilla, and postlabium; and more sensilla on clypeus and labrum; b) completely developed epistoma [a character only present, among the Delomeristini, in *Pseudorhyssa* Merrill, 1915 (Short 1978)]; c) maxillary and labial palpi with four sensilla (character present in only this species among Delomeristini); d) undifferentiated spinneret [in *P. divinator*, although not very differentiated, the spinneret is perceptible]; e) tegument with spinules [this character was not reported either by Danks (1970) or Short (1978) for *P. divinator*]; and f) antennal orbit with a single, well differentiated sensillum.

Furthermore, in the species studied the pleurostoma is well sclerotized, as in *P. divinator* and *Pseudorhyssa*, and there is no seta on the posterior part of the stipital sclerite, the cardo being absent. These latter two characters were reported by Short (1978) for *P. divinator*, although Danks (1970) did not include them in his description.

In any case, it should be noted that the comparison has been made with Short's (1970) and Dank's (1978) descriptions of *P. divinator*; according to Brooks & Wahl (1987), those descriptions could be inadequate in several aspects.

Table 1. Morphological differences between the mature larvae of *P. Scurra* (Panzer) and *P. Divinator* (Rossi). Characters [Presence (*); Absence (-)]: Number of Setae On: 1) Clypeus; 2) Maxillae; 3) Postlabium; Number of Sensilla On: 4) Clypeus; 5) Labrum; 6) Maxillary and Labial Palpi; 7) Epistoma Completely Developed; 8) Spinneret; 9) Spinules On Tegument; 10) Sensillum Of Antennal Orbit.

Species	1	2	3	4	5	6	7	8	9	10
P. scurra	6	6	4	6	18	4	*	—	*	*
P. divinator	4	3/4	2	4	2	3	—	*	?	?

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