

PARASITES ASSOCIATED WITH THE PONERINE ANT  
*ECTATOMMA TUBERCULATUM* (HYMENOPTERA:  
FORMICIDAE): FIRST HOST RECORD FOR THE GENUS  
*DILOCANTHA* (HYMENOPTERA: EUCHARITIDAE)

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The ant subfamilies Ecitoninae, Myrmicinae, Formicinae and Dolichoderinae frequently harbor a variety of commensals exhibiting myrmecophilous, scavenger and/or parasitic habits (Wheeler 1910, Rettenmeyer 1963, Wilson 1971, Lachaud 1981, Hölldobler & Wilson 1990). However, among the more primitive ant subfamilies, such intruders are poorly known, and most reports deal essentially with the dipteran or hymenopteran parasites affecting the host brood. Among these, various genera of Eucharitidae (*Austeucharis*, *Chalcura*, *Neolosbanus*, *Prosilogaster*, *Schizaspidia* and *Tricoryna*) from the subfamily Eucharitinae (*sensu* Heraty 1994), are known to parasitize species of *Myrmecia* (Myrmeciinae), *Odontomachus*, *Rhytidoponera*, *Gnamptogenys*, and *Hypoponera* (Ponerinae) (Wheeler & Wheeler 1937, Bouček 1988, Heraty 1994). In the New World, only two genera of Eucharitinae have been reared from the cocoons of ponerine ants: four species of *Kapala* from *Odontomachus* and *Pachycondyla* (Wheeler 1907, Myers 1931, Wheeler & Wheeler 1937, Clausen 1941, Heraty 1994) and *Isomerala coronata* (Westwood) from *Ectatomma tuberculatum* (Cook 1905, Wheeler 1907, Wheeler & Wheeler 1937). *Kapala* and *Isomerala* belong to a distinct clade of New World Eucharitini that includes the genera *Dilocantha*, *Dicoelothorax*, *Galearia*, *Lasiokapala*, *Lirata*, *Liratella*, *Parakapala* and *Thoracantha* (J. M. H., un-

published data), all of which are probably parasitoids of large Ponerinae. Wheeler and Wheeler (1937) reported *Pogonomyrmex badius* Latr. (Myrmicinae) as the host of *Kapala floridana* (Ashmead), but this record was based only on the opinion of W. H. Ashmead and cited in Wheeler (1907). Also, a single adult female of *Galearia bruchi* (Gemignani) was found in the scrap pile of a nest of *Pogonomyrmex cunicularius* Mayr, but the association was indirect (not reared) and the condition of the adult (alive or dead) was not recorded (Gemignani 1933). *Pogonomyrmex* are not known to be host to any Eucharitidae. With accurate rearing information, *Kapala* and related genera have only been associated with large Ponerinae.

During a survey of the seasonal population variation in colonies of the neotropical ponerine ant *Ectatomma tuberculatum* (Olivier), performed between January 1995 and February 1996 (J. P. L., unpublished data), a total of 10 colonies (of which 7 were queenright) were collected in the Soconusco region of Chiapas (Mexico), in a coffee plantation (*Coffea arabica*) with open vegetation. The site was located at "Finca Santa Elena", on one side of the road to Nueva Alemania, Tapachula municipality.

On January 29, 1995, two adults (one male: 3.6 mm in length and one female: 4.4 mm in length) of *Dilocantha lachaudii* Heraty emerged from one colony collected 2 days previously in Finca Santa Elena and temporarily stored in a plastic box (30 × 20 × 8 cm). The close examination of the nest material brought back to the laboratory allowed us to separate the remains (thoraces) of four additional adults (sex undetermined). During the first hours the parasites were generally ignored, but even when persistent antennal contact occurred, aggression was never exhibited by the ant workers, apart from some openings of the mandibles. In such a situation, the wasp tended to immobilize and, on some occasions, adopted a pupal position, which triggered a typical transport behavior from workers of *E. tuberculatum*. The carried wasp was held by the thorax, with its legs and antennae folded in and its body curved over the carrier's back, and was transported within the box for a few centimeters before being released by the ant. The immobilization of the wasp after contact with an ant was in clear contrast to its numerous jumps, when moving freely (in a clear attempt to escape the box), and the buzzing displayed when experimentally held with forceps. After repeated contacts with the workers of *E. tuberculatum*, the wasps appeared to be handled more roughly by their host, and the seizure by the mandibles for transport appeared to be more vigorous. After three days, both eucharitids were found dead and dismembered, their remains abandoned on a refuse pile in a corner of the box.

Another colony of *E. tuberculatum*, collected from the same site on February 8, 1995, provided two additional adult females of *D. lachaudii* (one already dead, the other attempting to escape the nest), and two more colonies, also collected from Finca Santa Elena but on February 20, 1996, contained six females, three males and two thoraces (sex undetermined) in one colony, and two females in the other.

An additional collection was made on July 7, 1997, to examine pupae and larvae for parasitism by juvenile stages of *Dilocantha*. Of six *E. tuberculatum* colonies, three were parasitized but at a very low rate (Table 1): an unfed first-instar larva (planidium) parasitizing an ant larva in one colony, a fed first-instar larva on an ant worker prepupa within the host cocoon in the second one, and finally two unfed planidia on two ant larvae in the third colony.

The parasitism of *E. tuberculatum* by *D. lachaudii* is the first host record for this genus and adds support to the hypothesis that *Kapala* and related genera within the New World are parasitic on large Ponerinae attributed to the Ponerini, Odontomachini and Ectatommini tribes.

*Dilocantha* are unique within Eucharitidae for having a patch of specialized hook-shaped setae filling a deep depression in the scutellum at the scutoscutellar sulcus

TABLE 1. COLONIES OF *ECTATOMMA TUBERCULATUM* (ALL COLLECTED AT FINCA SANTA ELENA, TAPACHULA MUNICIPALITY, CHIAPAS, MEXICO), WITHIN WHICH WERE ENCOUNTERED ADULT OR JUVENILE STAGES OF *DILOCANTHA LACHAUDII*.

Date	Colony population <sup>3</sup>	Eucharitids <sup>4</sup>
27/01/95 <sup>1</sup>	1 Q + 0 Qa + 8 M + 491 W + 35 P + > 100 L	6 eucharitid adults (1M + 1F + 4?)
08/02/95 <sup>1</sup>	1 Q + 0 Qa + 4 M + 407 W + 3 P + > 100 L	2 eucharitid adults (2 F)
20/02/96 <sup>1</sup>	1 Q + 0 Qa + 0 M + 281 W + 46 P + ≈ 180 L	11 eucharitid adults (3 M + 6 F + 2?)
	1 Q + 0 Qa + 0 M + 428 W + 30 P + ≈ 70 L	2 eucharitid adults (2 F)
07/07/97 <sup>2</sup>	1 Q + 0 Qa + 1 M + 491 W + 17 P + ≈ 130 L	1 planidium on ant larva
	Q + 0 Qa + 0 M + 191 W + 2 P + 21 L	nothing
	0 Q + 0 Qa + 0 M + 109 W + 69 P + 55 L	nothing
	1 Q + 0 Qa + 0 M + 299 W + 123 P + ≈ 250 L	1 fed first-instar larva on worker prepupa
	4 Q + 0 Qa + 1 M + 120 W + 10 P + ≈ 65 L	nothing
	0 Q + 6 Qa + 0 M + 261 W + 37 P + 20 L	2 planidia on ant larva

<sup>1</sup>Brood not examined for parasitism. <sup>2</sup>Brood examined for parasitism. <sup>3</sup>F: female, L: larvae, M: male, P: pupae, Q: queen, Qa: alate queen, W: workers. <sup>4</sup>?: sex undetermined.

and having this associated with external secretions (Heraty 1998). The similarity of the patch and secretion to that of myrmecophilous Staphylinidae suggested that the patch could act as an ant appeasement structure (Heraty 1998). The absence of aggression from *E. tuberculatum* workers during the first hours following the emergence of eucharitid adults could, in part, support this hypothesis. However, no licking behavior by the ants was observed, and if an appeasement really occurred it was only temporary, since, in the inability to escape the artificial nest, the wasps were killed in fewer than three days. Such an observation would instead support the acquisition of a cuticular hydrocarbon profile similar to the host, as demonstrated in *Orasema xanthopus* Cameron (Oraseminae) parasitic on *Solenopsis invicta* Buren (Vander Meer et al. 1989), followed by a progressive loss of this chemical camouflage. Similar amicable treatment, followed by aggressive behavior by the ant host after several days, was observed for *Orasema viridis* parasitic on *Pheidole tepicana* Pergande (Wheeler 1907) and a species of *Orasema* parasitic on *Pheidole dentata* Mayr (J. M. H., unpublished data). Within Eucharitinae, workers of the host species of *Formica* attempted to drag freshly emerged adults of *Eucharis* back into the nest (Clausen 1941). Chemical camouflage is probably widespread, if not universal in Eucharitidae, but the specialized hair patch and associated secretion is unique to adults of *Dilocantha*. Only more detailed behavioral observations of adults recently emerged and a fine microscopic analysis of the cellular structures associated with the scutoscuteellar patch of setae would provide a confident answer of the patch's function.

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## SUMMARY

Adults of the eucharitid wasp *Dilocantha lachaudii* Heraty were reared from the ponerine ant *Ectatomma tuberculatum* (Olivier). This is the first host record for this genus, adding support to the hypothesis that all the species belonging to the distinct clade of New World Eucharitini that includes *Kapala*, *Dilocantha* and related genera, are specifically parasitic on large ponerine ants.

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