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 Dolichoderinace 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 Eucharitidiae (Austeucharis, Chalcara, Neolobanus, Propillogaster, Schizaspida 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, Dicoelotheta, 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.
|| Date | Colony population | Eucharitids$^{1}$ |
|----|------------------|------------------|
| 27/01/95$^1$ | 1 Q + 0 Qa + 8 M + 491 W + 35 P + > 100 L | 6 eucharitid adults (1M + 1F + 4?) |
| 08/02/95$^1$ | 1 Q + 0 Qa + 4 M + 407 W + 3 P + > 100 L | 2 eucharitid adults (2 F) |
| 20/02/96$^2$ | 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$^2$ | 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 |

$^1$Brood not examined for parasitism. $^2$Brood examined for parasitism. $^3$F: female, L: larvae, M: male, P: pupae, Q: queen, Qa: alate queen, W: workers. $^4$: 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 scutoscutellar 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.

REFERENCES CITED

FIRST REPORT OF CERATITIS CAPITATA (DIPTERA: TEPHRITIDAE) IN THE EASTERN AMAZON, PARÁ, BRAZIL

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The Brazilian Amazon, which comprises about 45% of the Brazilian territory, contains approximately 180 known native and exotic fruit species (Zucchi et al. 1996). The available data on fruit flies and their hosts are scarce when compared to the high diversity of the available host species that occur in the region (Silva et al. 1996).

Earlier surveys of fruit flies in the Brazilian Amazon reported several Anastrepha species reared from collected fruit or captured in traps, but no specimens of Mediterranean fruit fly, Ceratitis capitata (Wiedemann), were found (Malavasi et al. 1980, Silva 1993, Silva et al. 1996, Zucchi et al. 1996).

C. capitata is native to sub-Saharan Africa (White & Elson-Harris 1992) but a global process of colonization has been taking place throughout the last century. In Brazil, where its presence has been reported since the early 1900's (Ihering 1901), C. capitata is considered one of the major quarantine pests, preferentially infesting...