

Trophic parasitism of a wasp (Hymenoptera: Ampulicidae: *Ampulex* sp.) on the ant *Ectatomma ruidum* (ROGER, 1860) (Hymenoptera: Formicidae)

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Abstract

A wasp of the genus *Ampulex* (Hymenoptera: Ampulicidae) deprived ants [Hymenoptera: Formicidae: *Ectatomma ruidum* (ROGER, 1860)] of liquid food that they had collected in a tree canopy in Costa Rica. In a first quick attack, the wasp appeared to examine whether a given ant worker was carrying a droplet between the mandibles. In a second more pronounced attack only aimed at laden workers, she took the droplet over from the ants. In this unique observation, the wasp was effective in stealing the food, as less than 10 % of workers carrying liquid food successfully reached the colony.

Key words: cleptobiosis, kleptoparasitism, food robbing, Ectatomminae

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Introduction

Cleptobiosis, the robbery of food from individuals of the same or different species, is prevalent in animals and also occurs in ants. For example, workers of the honey ant *Myrmecocystus mimicus* WHEELER, 1908 steal insect prey from harvester ants (*Pogonomyrmex* spp.) as they return to their colony (HÖLLDOBLER 1986). Another cleptobiont is the Neotropical ant *Ectatomma ruidum*, which has been reported to facultatively steal food items from both workers of the same (BREED & al. 1999 and references therein) and different ant species (PERFECTO & VANDERMEER 1993). Generally, *E. ruidum* feeds on a variety of small invertebrates including ants, as well as on carbohydrate-rich liquid food such as honeydew from hemipterans, extrafloral nectar and fruit pulp (LACHAUD 1990). Whereas ants of the subfamily Formicinae, and some other groups, transport liquids in a derived social crop and share them with nestmates after regurgitation (trophallaxis), workers of Ponerinae and Ectatomminae typically carry liquid material between their mandibles with inwardly curving setae and their extruded labium (HÖLLDOBLER & WILSON 1990). The droplet adheres due to surface tension. From this so called "social bucket" they can directly pass portions on to their nestmates (HÖLLDOBLER & WILSON 1990). Here I report a case in which *E. ruidum* is not the offender, but the victim of cleptobiosis by a parasitic wasp (*Ampulex* sp.).

Methods

Observations were carried out on 11 August 2004 at La Selva Biological Station, Heredia, Costa Rica (10°26'N, 84°01'W). A colony of the ant *Ectatomma*

ruidum (Ectatomminae) was situated in the soil at the base of a small tree (~ 5 m high) in an open, garden-like habitat, and workers were foraging solitarily on the ground in the vicinity of the colony entrance, as well as on the tree trunk and in the canopy.

Results and Discussion

Ants walking on the tree trunk on their way to the canopy were not laden, while workers returning from the foraging trip were carrying a clear food droplet between their mandibles (Fig. 1). During the whole observation (continuously between 2.30 p.m. and 4 p.m. as well as a short observation at 4.15 p.m.), a metallic green wasp of the genus *Ampulex* (Ampulicidae) was patrolling on the trunk at a height of 1 - 2 m. The wasp was stationary or walking around on the trunk, interrupted only by short flights to other parts of the trunk and sporadic grooming. She directly approached workers of *Ectatomma* as soon as they were in a range of approximately 10 cm. The ants were apparently detected visually as ants passing her on the opposite side of the trunk, which had an approximate diameter of only 3 - 4 cm, were not noticed by the wasp. When she was facing the worker at a distance of 1 - 2 cm (Fig. 1), she attacked the ant very quickly with her mandibles, so as to examine whether she was indeed carrying a droplet, and retreated immediately to a distance of again 1 - 2 cm. All encountered ants, regardless of whether they were carrying a droplet or not, were attacked in this manner. Following this first attack, after which ants that had been carrying a droplet were typically still holding it or the droplet had slipped to the tree surface, the

wasp attacked again in a similar way, but this time fighting with the ant until she had grabbed the droplet (typically not longer than two seconds). Ants with empty mandibles, however, were only attacked once and not considered further. The captured droplets were ingested immediately. During the 1.5 hours of continuous observation, approximately 30 workers returned from the canopy with liquid food, but only two of them (~ 6.7 %) reached the colony without being deprived of their load by the wasp (both were walking opposite to the wasp on the trunk when they passed her and were thus not detected). This illustrates the efficiency of the wasp's patrolling system. The wasp flew away at 4 p.m. after an attempt to catch her and was not seen for ten minutes afterwards. By 4.15 p.m., however, she had returned to the trunk, suggesting that her foraging behaviour was specifically adapted to kleptoparasitising the ants.

The first case of liquid food robbery in ants has been recently described by RICHARD & al. (2004). In their study, small myrmicine ants (*Crematogaster limata parabiatica* FOREL, 1904) intercepted 75.2 % of returning workers of *Ectatomma tuberculatum* (OLIVIER, 1792) and deprived a food droplet of 34.5 % of them. This and the present example suggest that Ectatomminae, and potentially Ponerinae, regularly face the problem of cleptobiosis of liquid food, while ants that have evolved a social crop seem better protected against cleptobiosis of liquids at least when outside their nest.

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Zusammenfassung

Eine Wespe der Gattung *Ampulex* (Hymenoptera: Ampulicidae) beraubte Ameisen [Hymenoptera: Formicidae: *Ectatomma ruidum* (ROGER, 1860)] ihrer flüssigen Nahrung, die sie in einer Baumkrone in Costa Rica gesammelt hatten. In einer ersten kurzen Attacke überprüfte die Wespe, ob die Ameise einen Nahrungstropfen zwischen ihren Mandibeln trug. War dies der Fall, folgte eine zweite, längere Attacke, in der die Wespe der Ameise den Tropfen abnahm. Während dieser einzigartigen Beobachtung war das Verhalten der Wespe effizient, da weniger als 10 % der mit Flüssignahrung beladenen Arbeiterinnen erfolgreich das Nest erreichte.

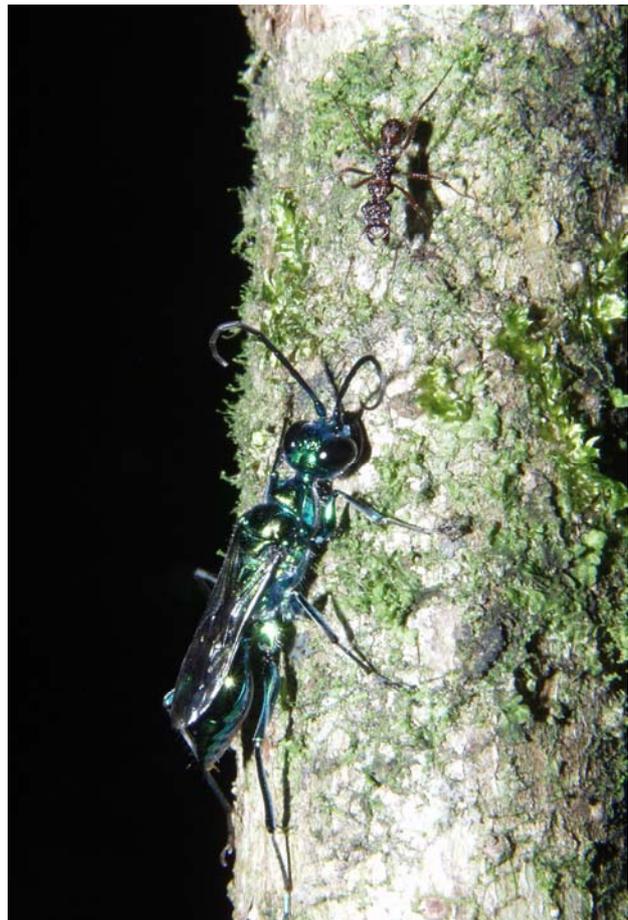


Fig. 1: A foraging worker of *Ectatomma ruidum* carrying a liquid food droplet faces the parasitic wasp *Ampulex* sp., which is stealing this liquid food from the ants.

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