

DEFENSIVE CHEMICAL WEAPONRY IN THE ANT *PACHYCONDYLA HARPAX* (FORMICIDAE: PONERINAE)

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(Accepted for publication April 19, 1987)

ABSTRACT

When pursued with forceps, workers of the ant *Pachycondyla harpax* release a stream of clear viscous secretion from the top of the abdomen. It is suggested that these are defensive secretions employed in tunnels where room is lacking in which to wield the sting.

Key Words: Ant, Formicidae, Ponerinae, defensive behavior.

J. Entomol. Sci. 22(3): 268-269 (July 1987)

INTRODUCTION

The ponerine ant *Pachycondyla harpax* (Fabr.) is widely distributed in the Americas, from Texas to Paraguay and southern Brazil (Kempf 1972). Wheeler (1900) studied this species in southern Texas, and aside from an investigation of nest founding (Haskins and Enzmann 1938) no other general study of its habits seems to have been made. Nests are found in the soil or under logs. Prey include soft-bodied insects and myriapods. Scattered biological notes indicate that *P. harpax* is found in the Amazon Basin on the forest floor (Wheeler 1915) or in the soil (Wheeler 1925). Nests of up to 40 individuals are common in the soil from nonflooding forest near Belém, Brazil, and a colony fragment of 25 ants collected from the botanical park of the Museu Goeldi in Belém was maintained in the laboratory for three weeks in 1982. Termite workers (*Nasutitermes* sp.) were stung and eaten by these ants.

METHODS AND MATERIALS

Two colonies exhibited the behavior to which I would like to call attention. Both were found on 13 April 1984 in the crowns of two "inajá" palm trees (*Maximiliana regia*) at 8 and 12 m above the ground, in flood forest on the western bank of the Tocantins River, near the mouth of the Arapari River, in Pará State, northern Brazil. This area was flooded in late 1984 by the reservoir of the Tucuruí hydroelectric dam, and the collection was part of a general inventory of the forest canopy insect fauna. The palms were felled, and their fronds cut with axes and chain-saws. Ants were caught with jewelers forceps and placed in 70% ethanol. Vials were labeled in the field. The nests of both colonies of *P. harpax* consisted of irregular tunnels in the soil supported by the bases of palm leaves, and both were associated with nests of *Nasutitermes* sp.

RESULTS

When pursued with forceps, workers of *P. harpax*, running on soil or on palm fronds, released a stream of clear, viscous secretion from the tip of the abdomen.

This resembled the dragline of a jumping spider, but was much more gross, about the thickness of a fine pencil lead (0.5 mm) and extending for 2 to 8 cm. When secured by the thorax or by a leg, ants produced foam from the anus with a pumping movement of the abdomen, the froth rapidly surpassing the ant in total volume. Foam was produced by 18 workers as they were held.

The appearance of viscous strands and froth during attempts to catch ants suggested that these were defensive secretions. Workers of *Nasutitermes* placed on the strands became trapped and took several seconds to free themselves. All fifteen termite workers treated with froth died within one minute. Both sticky strands and foam elicited grooming in the termites. Careful opening of the nests of *P. harpax* revealed foam in the tunnels.

DISCUSSION

Dr. James Trager of the University of Florida (in litt.) observed foam production in *P. harpax* on January 1985, on the grounds of the Hotel Tropical in Manaus, Brazil. The ant in question was fighting with an unidentified *Camponotus* ant. No toxic after-effects were noted.

Toxic frothy secretions are known from myrmicine (Blum 1981) and dolichoderine ants (Wheeler 1910), but these are groups in which the sting is modified and does not inject venom. *Pachycondyla harpax*, in contrast, has a functional and well-used sting. On the other hand, species in the genus *Bothroponera*, the only other ponerine taxa whose workers are reported to produce a froth at the tip of the abdomen, will not sting readily (Wheeler 1922).

The presumptive value of the defensive secretion is in protecting the ant in tunnels where room is lacking in which to wield the sting. Foam might possibly block a tunnel behind a fleeing ant. More attention should be paid to small ponerines, which surely have other novel defensive secretions.

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