

**Observations on the *Acanthostichus quadratus* (Hymenoptera: Formicidae: Cerapachyinae) Visiting Underground Bait and Fruits of the *Syagrus romanzoffiana*, in an Area of the Atlantic Forest, Brazil**

by

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ABSTRACT

The occurrence of the *Acanthostichus quadratus* Emery in Mogi das Cruzes, state of São Paulo, Brazil is reported and a new method is described for collecting ants that do not live in the understorey or the superficial soil layer. Using an underground trap, it was possible to collect a total of 433 worker ants and approximately 200 larvae of a species characterized by cryptic habits which, as a consequence, are rarely collected using the techniques commonly employed in surveys of ant fauna.

INTRODUCTION

The species of the ant subfamily Cerapachyinae are widely distributed throughout the tropical and subtropical regions of the world. They are characterized by cryptic habits and feeding habits that are probably specialized, and as a consequence, they are rarely collected (Wilson 1958).

The genus *Acanthostichus* presently contains twenty-two known species, all distributed in the New World, from the U.S.A. to northern Argentina (MacKay 1996). It consists of predominantly subterranean ants. They are probably common, but due to their below-ground activity and cryptic habitats, they are seldom seen (MacKay 1996). The species of *Acanthostichus* are known to be termite predators (Brown 1975, Andrade 1998), and some species show behavior and raiding organization that is similar to army ants (Brown 1975).

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The biology of most species of *Acanthostichus* is as yet unknown. Information available in the literature is mostly the result of occasional observations. Workers have been collected associated with termite and ant nests. Inferences regarding the flights of the sexual forms have been made based on ants captured in light traps or malaise traps (see MacKay 1996). *Acanthostichus quadratus* Emery is a species that is widely distributed and has been collected in Ecuador, Peru, Brazil, Bolivia and Argentina, however its biology is unknown (MacKay 1996).

This study brings together biological information about the foraging activity of workers of *A. quadratus*, obtained during a quantitative study of ant fauna that visit underground traps and fruits of *Syagrus romazzoffiana* (Arecaceae) in an area of the Atlantic Forest in Brazil.

## MATERIALS AND METHODS

### Study site

The study was carried out in an area of secondary Atlantic Forest at an altitude of 800 meters (23° 29' 22" S and 46° 11' 55" W). The area is in the initial stages of recuperation. The soil contains from 31 to 35 percent clay, and the layer of understorey is not very developed. The vegetation is characterized by the presence of various individuals of *S. romanzoffiana* (Cham.) Glassman (Arecaceae) of differing ages. The fallen fruits serve as a locale for the development of *Revena rubiginosa* (Coleoptera: Curculionidae) larvae and as a food resource for *Sciurus ingrami* (Mammalia: Rodentia).

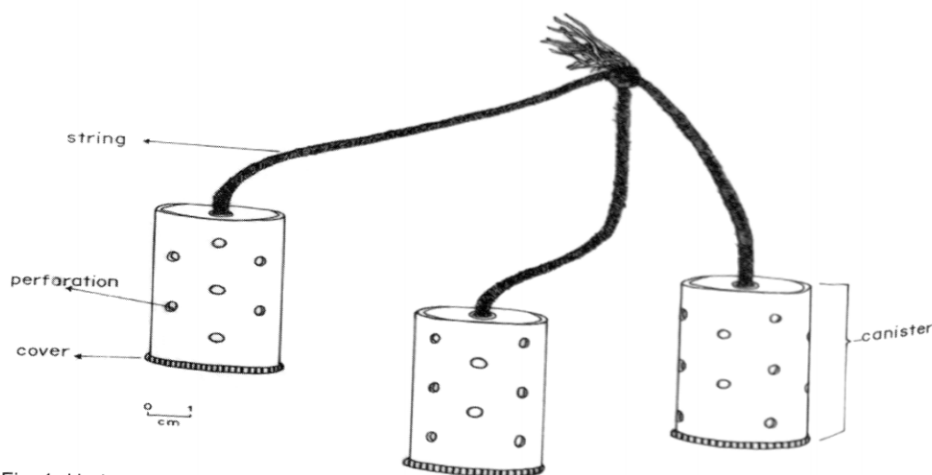


Fig. 1. Underground traps

### Ant collection

Initial recordings of *A. quadratus* were obtained during a study of the ant fauna visiting the fruits of *S. romanzoffiana* (Arecaceae) in the understorey. During this study, the fruits visited were classified into two classes: 1) fruits that were preyed upon by the squirrel *S. ingrami* (Mammalia: Rodentia), characterized by an exposed endocarp, and 2) fruits that had not been preyed upon, characterized by an orifice made by the larva of a Coleoptera (*R. rubiginosa*), leaking an exudate. The results of this study are reported in Morini et al. (2003).

Collection of the *A. quadratus* was carried out using underground traps containing attractive bait. Subterranean ants were baited using empty, white film canisters buried in the ground. Each canister was perforated with a drill bit (n. 1; 3mm), and a 45 centimeter-long string was connected to the bottom of the canister to be able to locate the traps (Fig. 1). Twenty collection points were marked along a 400 meter transection. Each point received a set of three underground traps, spaced at a distance of 10 cm from each other, each containing a different attractive bait: sardines preserved in vegetable oil; honey; or beef frankfurters (Viennese sausage). The traps were placed in 30-centimeter-deep holes that were dug using a hand shovel. They were then covered with soil and left for a period of 24 hours. Collections were carried out monthly for a period of ten months (from February to November, 2003).

## RESULTS AND DISCUSSION

Six workers of *A. quadratus* were observed in October, 2000, foraging on the fruits of *S. romanzoffiana*. The fruits visited by *A. quadratus* presented an orifice made by larvae of *R. rubiginosa*, from which a sugary exudate oozed which is often exploited by *Solenopsis (Diploproctum)* sp. 1 (Morini et al. 2003) and, possibly by *A. quadratus*. In the underground traps containing honey, 25 workers of *A. quadratus*

Table 1. Total number of workers of *Acanthostichus quadratus* collected according to the collection point and type of bait, in an area of regeneration in the Municipal Nature Park of Serra do Itapety, São Paulo, Brazil.

Date	Collection Point	Bait	Total Number
26/09/03	2	Frankfurter	113
		Honey	16
		Frankfurter	81
30/10/03	8	Sardines	± 100 individuals and 200 larvae)
		Frankfurter	139 + 1 larva
		Honey	9

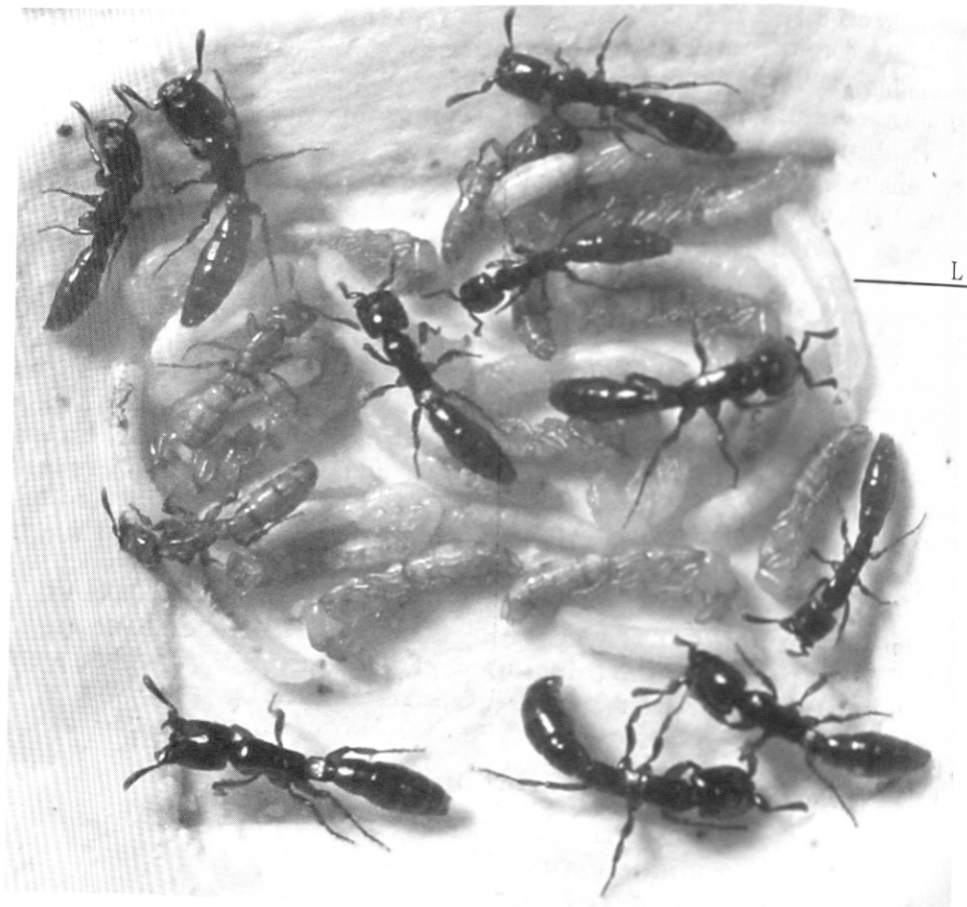


Fig. 2. A fraction of colony of *Acanthostichus quadratus*, with workers (W) and larvae (L)

were also recorded (Table 1). On the fruits with endocarps exposed due to manipulation by *S. ingrami*, this species of Cerapachyinae was not observed.

*A. quadratus* was recorded visiting underground traps on September 26 and October 30, 2003 at three collection points, especially traps containing sardines and frankfurters, where up to 139 individuals were collected in a single trap (433 workers total) as well as a large number of immature ants, approximately 200 larvae (Table 1; Fig. 2). The species *Acanthostichus* appears to prey, at least to some extent, on termites, and has the ability to conduct mass raids which take the form of a column, or swarm (Brown 1975, MacKay 1996). Our observations indicate that *A. quadratus* were able to access the fruits of *S.*

*romanzoffiana* from the soil surface and traps through the surrounding soil.

Workers of *Acanthostichus* are rarely collected using the techniques commonly employed in research on ant fauna, although males can be relatively common in light traps. Information about occasional reports of these ants can be found in studies conducted by Quiroz-Robledo & Valenzuela-González (1995) in pasture areas in Los Tuxtlas, Vera Cruz, Mexico and by Delabie et al. (1996), in a region of cocoa production near Ilhéus (Bahia, Brazil).

The foraging of the *Acanthostichus* colony may be largely underground, and therefore other methods of accessing these subterranean ants are necessary. It is known that certain ant genera considered to be rare are in fact seldom found due to the use of inappropriate techniques generally used in inventories (Espadaler & Lopes-Soria 1991, Delabie et al. 2000). Some of these techniques, which may even result in the capture of a small quantity of ant specimens, may provide records of interesting and otherwise uncollected species (Delabie & Reis 2000). Thus, the methodology used in this study can contribute to the collection of ant species that do not inhabit the understory or the superficial soil layer.

#### ACKNOWLEDGMENTS

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