

TRAMP ANT SPECIES CONTROL WITH METHOPRENE BAITS IN BRAZIL

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Abstract Several ant species have association to human structures in Brazil and their presence promotes problems such as contamination of food, damage to electronic appliances, and allergies due to the their venom. The objective of this work was to evaluate the effects of a methoprene-based bait against different ant species. The study site was the Instituto Biológico, a research institute in Brazil with severe ant infestation in critical areas. Prior to control trials a survey revealed four ant species distributed on the six floors of the main building. Evaluations of baits efficacy was performed on the right side of the building and after 18 wks all ant species showed lower infestations compared to the initial ones.

Key Words *Tapinoma melanocephalum*, *Monomorium floricola*, *Brachymyrmex* sp., *Paratrechina fulva*

INTRODUCTION

In Brazil about 2,000 ant species are known and many are considered pests in the agriculture and urban environments (Campos-Farinha et al., 1997). The pest status of ants in Brazilian cities has been reported by Campos-Farinha (2005), and in industrial and scientific environments by Zarzuela et al. (2005, 2007) and Bueno and Campos-Farinha, (1999a). The problems related to ants transporting microorganisms in hospitals has been reported by several authors (Fowler and Bueno, 1999; Bueno and Campos-Farinha, 1998; Zarzuela et al., 2002; Moreira et al., 2005).

Ant control in Brazil is primarily with the use of liquid or aerosol insecticides (Bueno and Campos-Farinha, 1999b), which often promote colony budding and subsequent spread of infestations. Bueno and Campos-Farinha (1999a) reported that the most effective control of pest ant species is with bait formulations. Among active ingredients used in baits methoprene has been used in several countries but in Brazil there is no commercial products registered until now. Methoprene is an insect growth regulator which inhibits larvae development and consequently adult emergence (Jacob, 2002). The mode of action of this insecticide is to interfere with ant development and colony elimination (Rupes et al., 1983).

Reported here are the results of field trials conducted in the building of Instituto Biológico, a research institution in Brazil, of the efficacy of an ant bait containing methoprene, the Biopren BM bait, against four ant species.

MATERIALS AND METHODS

Ant Survey

In October 2006 it was conducted a survey in the main building of Instituto Biológico, a scientific institute from the Ministry of Agriculture, in São Paulo, Brazil. The building has 6 floors and an area of 9,617 m². Its construction has bilateral sides which are almost identical according to the room divisions. On each floor two types of non-toxic baits were used: one with honey solution (1:1), and the other with ground dog food. Baits were placed in 4 cm diameter plastic lids which were disposed in pairs next to each other in each 10 m². Totals were 618 places and 1,236 baits. Baits were dispersed around 10 a.m. and after 2 and 4 hrs they were investigated. If ants were present they were collected in vials with 70% ethanol for identification.

The number of infested baits was calculated for the whole building in order to evaluate the percentage of infestation.

Trials With Methopren Baits

The right side of the building was chosen for the field trials and methoprene bait stations (Biopren BM) were placed on each floor except on the third one that did not show ant infestation during the survey. The number of bait stations per room was calculated according to the infestation rate: 0 = free of infestation, no ants observed; 1 = some foragers are observed, trails are not seen; 2 = a few foragers observed along one trail; 3 = dozens of foragers are observed in one or two trails; 4 = hundreds of foragers are observed along two or more trails. Two to four stations were placed next to ant trails for each 80 m² when infestation rates were low (1-2) and 4 to 8 stations when infestation rates were high (3-4). Bait stations were monitored weekly during the first 6 weeks and at each fifteen days from the 7th to the 18th week. In each monitoring infestation rates were calculated using the degrees explained above. Empty or damaged bait stations were changed during monitoring. In the 19th week all bait stations were removed and a new survey was done following the same methodology explained before in the whole building in order to compare ant infestations.

RESULTS AND DISCUSSION

Ant Survey

Four ant species were collected in the building of Instituto Biológico and they occupied 17.48% of the 618 places with the pair of baits (Figure 1). They were *Tapinoma melanocephalum* (Fabricius), *Monomorium floricola* Jerd, *Paratrechina fulva* Mayr and *Brachymyrmex* sp. They were collected in administrative rooms and research laboratories but the higher infestations were in kitchens where employees usually have their coffee breaks. *T. melanocephalum* was distributed in all floors, except on the third one, and its frequency was higher than the other ant species (Figure 2).

Trials With Methoprene Baits

Along the 18 week trial it was clearly observed a reduction on the number of ant foragers. Bait consumption was high along the trial and neither ant species showed aversion to the baits, even though consumption was higher in the beginning of the treatment. *T. melanocephalum*, the most common ant species, showed an infestation rate from 1.7 to 3 before treatment, and 0 to 1 after baiting (Figure 3). *M. floricola* was observed on the 4th, 5th and 6th floors and its infestation rate dropped from 2 to 2.5 down to 0 to 0.2 after baiting (Figure 4). *P. fulva* infested 1st, 2nd and 6th floors with an initial infestation rate of 1.7 to 3 decreasing from 0 to 1.2 after treatment (Figure 5). *Brachymyrmex* sp. was observed after the 8th week of monitoring on first and second floors and workers were completely controlled (Figure 6).

The survey after baiting showed 7.76% of baits infested with ants in the whole building of Instituto Biológico. Even one side was not tested with the methoprene baits, the results showed efficacy of the baits against other ant species than *M. pharaonis* (Rupes et al., 1983; Bajomi et al., 2005; Lee et al., 2003). Bait consumption was lower in rooms where normal food was present, which contributed to ant infestation in the side of the building treated with bait stations. Along this study the 5S program was established at Instituto Biológico that is a methodology for organizing, cleaning, developing, and sustaining a productive work environment.

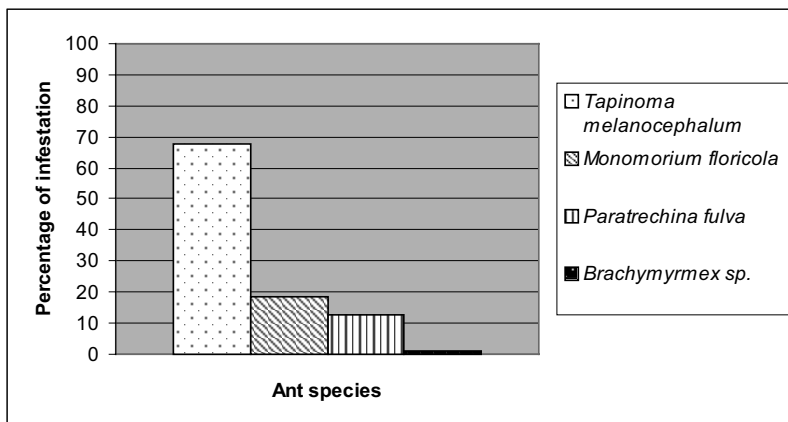


Figure 1. Percentage of infestation of the ant species in the whole building of Instituto Biológico before trials with methoprene baits. (N = 618).

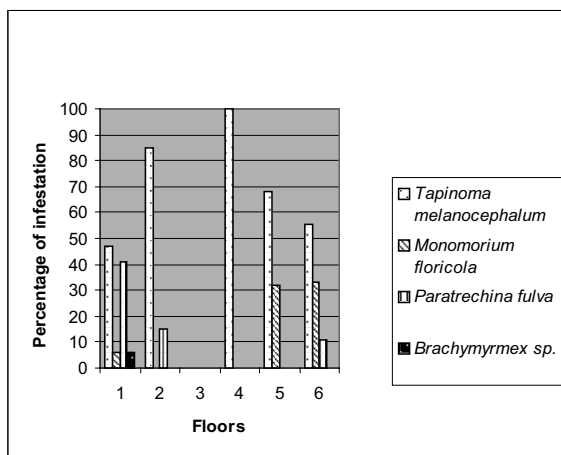


Figure 2. Percentage of ant infestation per floor in the main building of Instituto Biológico.

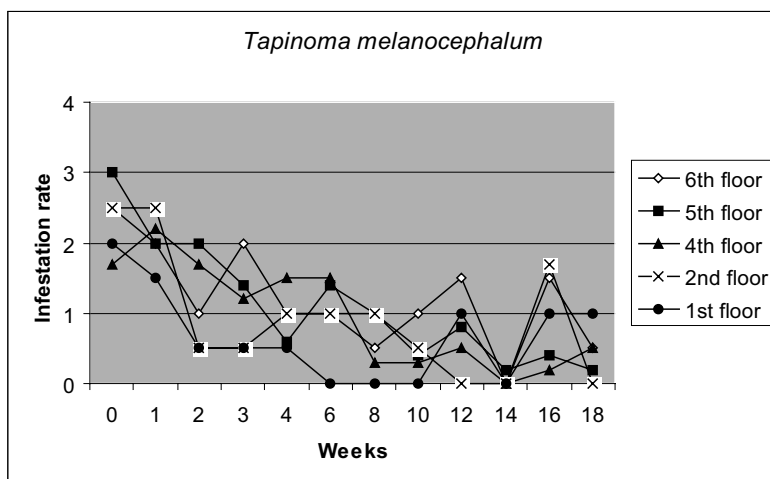


Figure 3. Effects of methoprene baits on *Tapinoma melanocephalum* in the main building of Instituto Biológico.

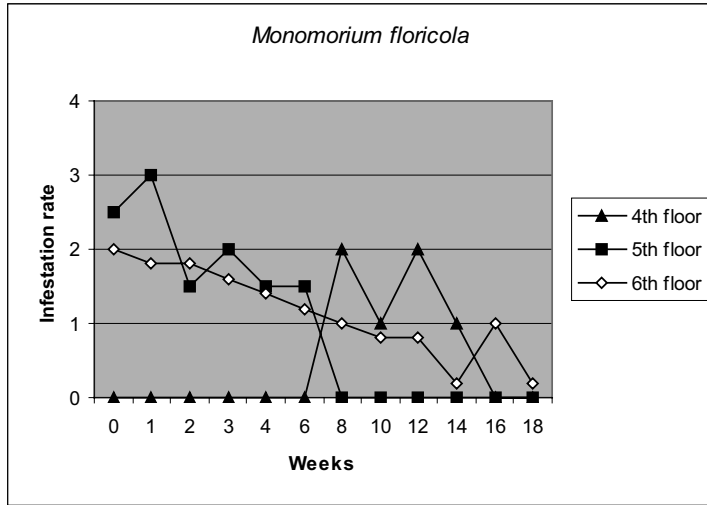


Figure 4. Effects of methoprene baits on *Monomorium floricola* in the main building of Instituto Biológico.

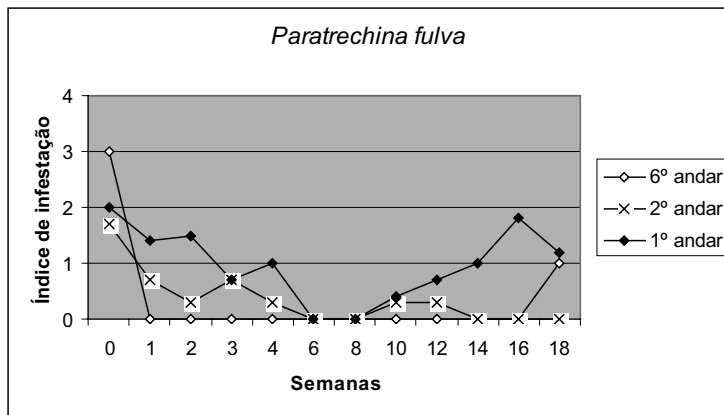


Figure 5. Effects of methoprene baits on *Paratrechina fulva* in the main building of Instituto Biológico.

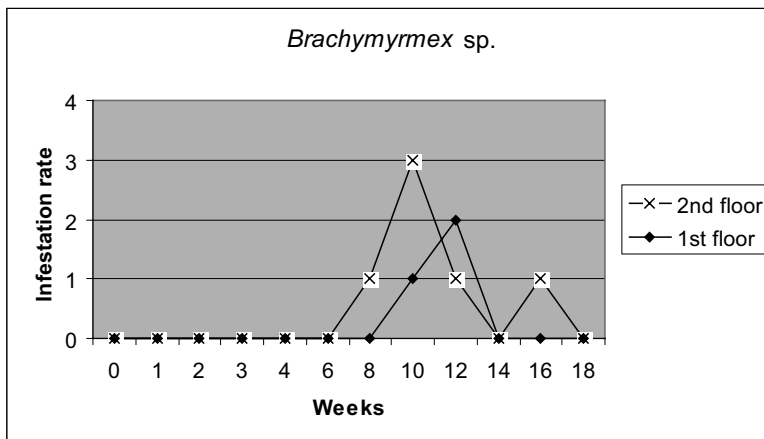


Figure 6. Effects of methoprene baits on *Brachymyrmex* in the main building of Instituto Biológico.

CONCLUSION

Tapinoma melanocephalum, *M. floricola*, *P. fulva* and *Brachymyrmex* sp. foragers decreased when controlled with granular methoprene baits. Pre-treatment monitoring like the survey conducted in this studied is necessary in order to determine infestation level and locate possible nesting sites. Post-treatment monitoring will detect new infestations before new colonies are established. Monitoring the bait stations help detect failures like bait avoidance or new infestations. Educating employees on the needs of rooms free of food residues or access of ants to food helps control success.

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