

URBAN PEST ANTS OF BRAZIL (HYMENOPTERA: FORMICIDAE)

ANA EUGÊNIA DE C. CAMPOS-FARINHA

Centro de Pesquisa e Desenvolvimento de Sanidade Vegetal, Instituto Biológico, APTA, SAA, Av. Conselheiro Rodrigues Alves, 1252, São Paulo, SP, Brazil, 04014-002

Abstract Brazil shows a high diversity of urban pest ants. Among its 2,000 recorded ant species, 20 to 30 species are urban ants (tramp species). Native and introduced species are found and are not equally distributed in its 27 states. *Camponotus* species are found in the five regions that divide the country and *Tapinoma melanocephalum* and *Paratrechina longicornis* are the ones which cause more complains by Brazilian citizens. Regions are diverse in their ecosystems and cities vary greatly in size from 542 inhabitants to 8 million, reaching 95% of the population living in towns in some locations. Ant diversity in households is diverse reaching a total of 23 species in a unique hospital, fact that leads to failures in controlling the pest species.

Key Words Formicidae, distribution, control, biology

INTRODUCTION

Urban pest ants have been studied in Brazil since the 1990s. First literature recordings came from Fowler (1990) and Fowler et al. (1990). Since that time, works have been conducted on other economically-important ants, but the volume of works do not compare with those focusing leaf-cutting ants. In the 2000's researchers focused their attention on the capability of ants carrying pathogenic microorganisms in hospitals (Peçanha, 2000; Zarzuela and Campos-Farinha, 2001; Zarzuela et al., 2002b; Zarzuela et al., 2005) and once Brazil has one of the richest ant faunas (Kempf, 1972), the current pest status ants has nowadays changed considerably among physicians, pest control operators and the general community. Two recent studies made among pest control operators (Corrêa, 2000; Ramos, 2004) showed that the ants are ranked as the most difficult pests to control. A good example for ant diversity in urban environments is the collection of a minimum of 10 to 23 ant species in a hospital (Fowler et al., 1993a; Zarzuela et al., 2002a)

After reviewing the available literature, a list of the principal ant problems in Brazil has been compiled for this study. Data also include the actual research of the author of this article, but the review is not definite but, rather, representative. only non leaf-cutting ant pests have been reviewed.

Fowler et al. (1990) mentioned that at that time the evolution of control methodologies was changing slowly due to insufficient research funds. The authors also discussed that even when baits were used for ant control, as for leaf-cutting ants, little attention has been directed towards environment concerns such as bait specificity and for ants other than leaf-cutting ants, control measures seemed to be almost casual extensions of leaf-cutter control, and utilized unsuitable leaf-cutting ant toxicants. Nowadays two groups of scientists, one at Instituto Biológico, São Paulo, and other at the Paulista State University (UNESP) in Rio Claro, state of São Paulo, have been studying urban ants and their control and are forming graduate and undergraduate students on this subject. To reach this objective a specialization course on urban pests has been created and several theses have been conducted in a formal post-graduation course in zoology.

The distribution of Brazilian pest ants has been done since 1997 by this author, but myrmecofauna is still unknown in some Brazilian regions as in the North, Northeast and Central-West. A recent survey made with the help of pest control operators from all states of Brazil permitted the knowledge of the other areas (Campos-Farinha et al., 2004). The South and Southeastern States are more represented in the survey once they concentrate the major number of pest control companies (Corrêa, 2000).

Brazil is divided politically and geographically into five different regions which share common features in relation to their physical, human, economic and cultural aspects. The borders of each region - North, Northeast, Southeast, South and Central-West coincide with the borders of the states which they comprise. The complexity of ecosystems, from drylands to the tropical rain forest passing through a swamp area (the Pantanal), makes the country a suitable place to a great diversity of organisms, especially ants.

The North region covers the major part of the Brazilian territory, with an area that correspond to 45.27% of the total area 8,547,403.5 km². Comprising seven states, its area is almost completely dominated by the Amazon River basin. The Northeast region may be considered as being the most heterogeneous in the country. Divided into four vast areas - mid-north, forest area, wild lands and backlands - it occupies 18.26% of the Brazilian territory and comprises nine states.

The Southeast Brazil's most important region from an economic point of view, also contains the highest concentration of population - 42.63% of the Brazilian total population of 157,079,573 inhabitants- and industrial production. It is made up of four states and presents major differences in relation to its physical aspect, with a coastal strip, mountains and plains.

The South, Brazil's coldest region, which undergoes periods of frost and snow, is the smallest region, occupying 6.75% of the Brazilian territory and comprising just three states. The rivers flowing through this area form almost the entire Paraná Basin and are of great national importance, chiefly because of their hydroelectric potential.

The Central-West region is basically dominated by the Central Brazilian Plateau and may be divided into three portions: Goiano-Mato Grosso Massif, Paraná sedimentation basin and the depressions. Comprising four states, this region has been undergoing significant changes in relation to its vegetation with the cerrado (scrubland) being gradually replaced by plantations or cattle-rearing as a result of the process of occupation that has taken place in this part of Brazil.

Based upon available literature and personal experience, a list of Brazilian's problem ants has been drawn up, to complement the study published by Fowler et al. (1990). Also each of the ant species are discussed briefly.

Wasmannia auropunctata (native to Brazil). Besides being one of the most prevalent Neotropical ants, this small ant has not been systematically recorded in urban environments (Campos-Farinha et al., 2004). Punctual cases have been noticed and severe allergies specially in children have been recorded. Most infestations occur in and outside residences with big gardens and yards specially those with citrus plants. Workers depend upon honeydew of scales and aphids, which breed and multiply on the fruit and leaf of many tree species. When *W. auropunctata* occurs it dominates the environment and other ant species are rarely found. Polygynous nests are located under the bark of the trees and inside structures. Residents relate that workers fall from the ceiling on the beds, tables and other furnitures.

Tapinoma melanocephalum (introduced species). Prevalent in all regions except the South of Brazil, where it is rarely found, *T. melanocephalum* is the champion for human complains. Researchers at Instituto Biológico daily receive phone calls and/or specimens to be identified and information about their control (Campos-Farinha, 2001). Their polygynous nests are found inside apartment buildings, food facilities and hospitals. Their capability of carrying pathogenic and fungi is proved (Fowler et al., 1993a; Campos-Farinha et al., 2002; Zarzuela et al., 2002a; Zarzuela et al., 2002b; Zarzuela et al., 2005). Their population is favored by insecticidal control of other pests, such as cockroaches once some active ingredients, like pyrethroids promote nest fragmentation.

Camponotus spp. (native to Brazil). This is the most heterogeneous ant genera in the Neotropics (Kempf, 1972) but besides the difficulty to determine which species may be of economic importance the following species can be listed and are distributed equally in all states, mainly *C. atriceps*: *C. rufipes*, *C. crassus* and *C. sericeiventris*. Their association with urban trees is evident and in most of the times they are also located inside households, with their satellite nests. *C. atriceps* is known for its damage on apiary but also for its occurrence inside electronic appliances. This latter species shows polygyny and polydomy.

Linepithema humile (native to Brazil). In its homeland, the South of Brazil and North of Argentina, the Argentine ant has spread throughout the world, but it has been problematic in two regions of the State of São Paulo. In a public park in the city of São Paulo, polygynic nests showing aggression towards native ants such as *S. saevissima* can be observed. This latter has been displaced in the last two years by the Argentine ant (Sansone-Ferreira et al., 2002; Sansone-Ferreira et al., 2004; Ribeiro et al., 2003). A huge population of Argentine ants has also been studied in a county 160km away from the city of São Paulo. 120 households in a suburb are completely infested by this species. It is also occurring in a health care centre and inside the basic school. In the latter, children must be periodically evacuated so that their classrooms can be cleaned. The evacuation is necessary to avoid allergic reaction aggravated by the acid.

***Pheidole* spp.** (native to Brazil, except *P. megacephala*). This genus is also represented by many Brazilian species (Kempf, 1972). Some of the smaller *Pheidole* species can be of occasional importance in households as urban pests, but the introduced *P. megacephala* is undoubtedly the genus' most important representative pest, as it is in other tropical regions (Fowler, 1990; Schuller and Campos-Farinha, 2002). Huge populations of *P. megacephala* have been recorded, displacing native ants and promoting damage to electronic appliances (Campos-Farinha and Piva, 1999). *Pheidole* spp. seems to be the most important ant species in the South of Brazil (Campos-Farinha et al., 2004).

***Monomorium* spp.** (introduced species). The most common species are *M. floricola* and *M. pharonis*. Both are commonly found in hospitals, households and food facilities (Fowler, 1990; Fowler et al., 1992; Fowler et al., 1993a; Fowler et al., 1993b; Zarzuela et al., 2002a). They are only found inside structures and are distributed throughout Brazil. Their colonies are polygynous and fragment easily. Studies on their biology show great differences between both species specially on their food preference.

Paratrechina longicornis (introduced species) and ***P. fulva*** (native species). *P. longicornis* is commonly found in different structures apparently in all states of Brazil. Their polygynous colonies are dispersed inside and outside structures. Their nests can be found in the soil, in cracks of walls and sidewalks. Because of the difficulty in rearing this species in laboratory conditions, few studies have been conducted on its biology in Brazil. It is well documented in respect to its distribution. *P. fulva* is also commonly found in several states of Brazil, specially in the South and Southeast. Their nests are located mostly outside structures and it is always associated to scales and aphids in ornamental plants.

***Solenopsis* spp.** (native species). Fire ants in Brazil occasionally cause problems in their homeland. Their occurrence is punctual as in *W. auropunctata*. Sometimes it occurs in high population levels dominating a hole town, whose inhabitants suffer with their bites and nest presence. As in other parts of the world, some *Solenopsis* species can damage electrical installations. Three species are recorded promoting problems in Brazil, *S. invicta*, *S. saevissima* and *S. wasmannii* (Campos-Farinha et al., 2004).

***Brachymyrmex* spp.** (native species). Sometimes, species of this genus cause problems, especially in food facilities. Their colonies are polygynous and frequently they dominate the structure after the control of another ant species. Its association with scales and aphids is well known, but nests can be found inside structures occupying cracks in walls and other structural failures.

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