

OCORRENCE OF *MISCHOCYTTARUS ROTUNDICOLLIS* (VESPIDAE) IN MANGROVE SWAMPS ATTRACTED BY FISH IN DECOMPOSITION

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ABSTRACT

Vespidae is an important insect family that is among the largest predators of other insects in natural environments. This study in mangrove swamps was carried out in order to know if social wasp, *Mischocyttarus* (*Mischocyttarus*) *rotundicollis* could be attracted by fish (sardine) in decomposition. The insects were collected in mangrove swamps in Itaboraí, every two weeks, totaling 72 samples from August 2008 to July 2011. Over a 36 months period 69 individuals were caught. The abiotic factors (season and tidal variations) that could influence the occurrence of these wasps in mangrove swamps were recorded. The abundance of wasps was only affected by the spring season and the highest tides (spring-tides). The presence of the *M. rotundicollis*, in the mangrove swamps caught with fish in decomposition, may indicate that the studied forest area still represents a natural preserved refuge and reveals the importance of understanding of ecology these wasps and provides much information that will contribute greatly to environmental sciences.

Keywords: Abiotic Factors, APA De Guapi-Mirim, Social Wasp

1. INTRODUCTION

Among all the Brazilian ecosystems, the mangrove swamp is perhaps the most impacted, due to intense human interference. On one hand, despite the security measures, the illegal activities of hunting and fishing as well as hunting crabs with loop closures is a part of the problem and on the other hand there are large amounts of sewage, industrial and agricultural wastes being discharged into mangrove swamps (Kamaruzzaman *et al.*, 2008). These two impacts have caused physical changes to the swamp environment (Gandaseca *et al.*, 2011) and caused the death of many endemic species or changes in the structure of invertebrate colonies (Johnston and Keough, 2002).

Vespidae is an important insect family that is included in the order Hymenoptera and is among the

largest predators of other insects in natural environments. This family has approximately 4,600 species and is divided in six subfamilies: Eumeninae, Masarinae, Euparagiinae, Stenogastrinae, Vespinae and Polistinae (Carpenter, 1981). According to Carpenter (2004) twenty five genera of Polistinae are known and twenty one can be found in the Neotropics and the social wasps produce a paper-like substance by mastication of vegetation to build their nests (Gallo *et al.*, 1988).

Henrique-Simoes *et al.* (2011) reported the lack of studies of social wasps in several Brazilian ecosystems, which makes it more difficult to understand the distribution and biology of these insects.

This study of wasp *Mischocyttarus rotundicollis* in the mangrove swamps of Itaboraí (RJ) was carried out in order to know if this species could be attracted by fish (sardine) in decomposition in the Guapi-Mirim

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Environmental Protection Area (APA de Guapi-Mirim) in Itaboraí in each season and tidal variations. There are no studies showing this type of bait as attractive for this species, which increases the need for this study.

2. MATERIALS AND METHODS

The insects were collected in mangrove swamps in Itaboraí. Its geographical location is S 22° 39' 30"-22° 46' 50" latitude and W 42° 57' 00"-43° 06' 40" longitude in Rio de Janeiro state, Brazil. Collections were performed every two weeks, totaling 72 samples from August 2008 to July 2011. To collect the wasps, four 35 cm high and 15 cm diameter plastic traps placed 100m apart were used. The traps were suspended at a height of 1.20 m above the ground for a period of 48 h and the bait was sardine in decomposition (traps and methodology according to Ferreira, 1978 and modified according to Batista-da-Silva *et al.*, 2010).

All insects caught were killed by asphyxiation inside the trap, with 70% ethanol and were put into plastic pots with 70% ethanol. All wasps were identified using a stereoscopic microscope and the dichotomous keys for species according to (Carpenter, 2004; Hermes and Kohler, 2004).

The average temperatures and average humidity through satellite data (INPE, 2008) in each season and tidal variations (BN, 2011) as well as the standard deviation for the same data were recorded.

3. RESULTS

Over 36 months, 69 females of this social wasp belonging to the species *Mischocyttarus (Mischocyttarus) rotundicollis* (Cameron, 1974) were caught.

The average temperature during the period was 30.34±4.57°C and the average humidity was 65.32±10.80%.

4. DISCUSSION

Wasps can be found in several environments, among them, the Amazonian forest, Pantanal and the Atlantic Rain Forest in Brazil (Carpenter and Marques, 2001) but the social wasp distribution in other Brazilian ecosystems has not been very well documented, mainly in mangrove swamps along the Brazilian coast.

The use of sugary substance is most commonly used method to capture wasps. Noll and Gomes (2009) used

an attracting liquid, a solution of sucrose and repeated by Junior and Noll (2011) where the number of individuals of the species *M. rotundicollis* caught in a preserved area, in Matão, São Paulo, Brazil, was only 2 wasps. In this study was used as bait, sardines in decomposition because it had not been used previously, being more efficient than a solution of sucrose.

Santos *et al.* (2007) studied the diversity of social wasps in three different ecosystems: mangrove swamp, the Atlantic Rain Forest and on Itaparica Island, Bahia, Brazil; but did not catch *M. rotundicollis* in the mangrove swamp.

Abiotic factors such as tides and salinity (contains a salt concentration of approximately only 13% in mangrove swamps) are importance because they have a evident influence on the marine environment (Santos *et al.*, 2007). This may have provided the species *M. rotundicollis* a competitive advantage over other forest social wasps for food resources in relation to other species of social wasps, because no other species were caught with sardines in decomposition in mangrove swamps in Guapi-Mirim Environmental Protection Area, in Itaboraí.

According to Batista-da-Silva (2012) spring and summer has the highest tides in the mangrove swamp (1.40 m) and these abiotic factors may influence the occurrence of insects of the family Calliphoridae and Phoridae in mangrove. It is possible that these abiotic factors (tides and seasons) also influence the occurrence of *M. rotundicollis*, because the insect larvae are more abundant in mangrove swamps when the tides reached their highest levels in spring (**Table 1**). This fact may be due to the synchronism between the biological cycle of the insects, with the abiotic factors cited (tides, seasons and salinity) and a greater availability of food resources in spring, mainly insect larvae.

Table 1. Seasons of the year and tidal variations in meters in the mangrove swamp area, according to data provided by the BN (2011) and number of wasps captured from August 2008 to July 2011, Itaboraí, Rio de Janeiro, Brazil

Seasons	Low tides (m)	High tides (m)	Individuals (n)	Individuals (%)
Spring	0.0-0.40	0.90-1.30	31	44.92
Summer	0.0-0.50	0.90-1.50	11	15.94
Autumn	0.0-0.50	1.00-1.40	05	7.25
Winter	0.0-0.50	0.70-1.30	22	31.89
Total	-	-	69	100.00

5. CONCLUSION

The presence of the social wasp *M. rotundicollis*, in the mangrove swamps in this study may indicate that the studied forest area still represents a natural preserved refuge. Knowledge of the behavior of this specie (caught with fish in decomposition) related to certain abiotic factors such as tides, seasons and salinity, reveals the importance of understanding of ecology these wasps and provides much information that will contribute greatly to environmental sciences.

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