

## SCIENTIFIC NOTE

Survey of Preys Captured and Used by *Polybia platycephala* (Richards) (Hymenoptera: Vespidae, Epiponini)FÁBIO PREZOTO<sup>1</sup>, MARIA A.P. LIMA<sup>2</sup> AND VERA L.L. MACHADO<sup>3</sup><sup>1</sup>Depto. Zoologia – ICB, Univ. Federal de Juiz de Fora, Campus Universitário-Martelos, 36.036-900, Juiz de Fora, MG, fprezoto@icb.iff.br<sup>2</sup>Pós-Graduação em Entomologia, Univ. Federal de Viçosa, MG, guta@insecta.ufv.br<sup>3</sup>Centro de Estudos de Insetos Sociais, UNESP, Rio Claro, SP

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Neotropical Entomology 34(5):849-851 (2005)Avaliação das Presas Capturadas e Utilizadas na Alimentação por *Polybia platycephala* (Richards) (Hymenoptera: Vespidae, Epiponini)

RESUMO - As vespas sociais são predadoras de várias espécies de insetos e, portanto, o estudo de suas presas pode revelar seu potencial para programas de controle biológico de pragas. Durante o período de setembro de 2000 a janeiro de 2002, foram realizadas 70h de coleta de presas capturadas em doze ninhos de *Polybia platycephala* Richards, localizados em áreas urbanas do município de Juiz de Fora, MG. As presas capturadas por *P. platycephala* compreenderam cinco ordens de insetos: Diptera (33,4%), Lepidoptera (28,6%), Hemiptera (12,0%), Hymenoptera (9,4%) e Coleoptera (7,2%). O peso médio da carga protéica transportada pelas vespas foi  $1,9 \pm 1,6$  mg ( $n = 34$ , 0,3 - 6,2 mg), e a taxa média de proteína transportada por dia foi 22,8 mg. De acordo com os resultados, pode-se estimar a captura de 4.380 presas por ano por uma única colônia de *P. platycephala*. Desta forma, a espécie pode ser utilizada em programas de manejo em ambientes urbanos contribuindo para o controle de insetos pragas como larvas de pernilongos, lagartas desfolhadoras de plantas de jardins, pulgões e formas aladas de formigas.

PALAVRAS-CHAVE: Vespa social, atividade forrageadora, presa, controle biológico

ABSTRACT - The social wasps are predators of several species of insects and the study of their preys can reveal their potential for programs of biological pest control. During the period of September 2000 to January 2002, were accomplished 70h of collections of the preys captured in twelve nests of *Polybia platycephala* Richards, placed in urban areas of Juiz de Fora municipality, Minas Gerais State, Brazil. The preys captured by *P. platycephala* include five orders of insects: Diptera (33.4%), Lepidoptera (28.6%), Hemiptera (12.0%), Hymenoptera (9.4%) e Coleoptera (7.2%). The mean weight of protein charge carried by the wasps was  $1.9 \pm 1.6$ mg ( $n = 34$ , 0.3 - 6.2 mg), and the mean of protein transported per day was 22.8 mg. According to the results, we could estimate that 4,380 preys are captured by a single colony of *P. platycephala* during one year. Thus, this species could be used in management programs of urban pests, helping the equilibrium of this environment.

KEY WORDS: Social wasp, foraging activity, prey, biological control

Foraging activity in social insects is considered one of the most important behaviours to keep these animals alive (Lima & Prezoto 2003). This activity involves the capacity of workers in interacting with the environment and collecting the resources necessary to the complete development of the colony (Wilson 1971). Usually, the materials collected by social wasps are water, carbohydrates, construction material to the nest and animal protein (Wilson 1971, Hunt *et al.* 1987). Among the materials collected,

the most complex behaviour activity is the capturing of preys. It involves preys recognition, predation ability, and the capacity to return to the nest (Wilson 1971, Ugolini & Cannicci 1998).

Studies on *Polybia occidentalis* (Olivier) (Gobbi *et al.* 1984), *Polybia paulista* Ihering (Gobbi & Machado 1985) and *Polybia ignobilis* (Haliday) (Gobbi & Machado 1986) showed that from 90% to 95% of preys captured by *Polybia* are Lepidoptera larvae.

*Polybia platycephala* Richards is a swarm-founding wasp occurring in the states of Mato Grosso, Goiás, Amazonas, Minas Gerais, São Paulo, Rio de Janeiro, in Brazil. It was also found in Surinam and Peru. The nests have many rows of horizontal combs that are usually constructed under perennial leaves (Richards 1978) and covered, comb-by-comb, by an envelope. These features provide difficulties concerning the study of its biology, ecology and behaviour. Because of that, there are few studies about this species in literature.

The aim of this study was to survey the material captured by the foragers of *P. platycephala* for the nourishment of the wasps during the colonies' cycles, contributing to the knowledge of its importance within the Neotropical ecosystems.

Materials captured by foraging wasps were collected in twelve nests of *P. platycephala*, found in urban areas of Juiz de Fora municipality (21°46'S 43°21'W, altitude 800m), Minas Gerais State, Brazil.

Biweekly, during the period of September 2000 to January 2002, in the warmer period of the day (10:30 a.m. to 2:30 p.m.), wasps returning from foraging activity were collected, amounting 70 hours of recordings, in ten different colonies, all in post-mergence stage. The wasps returning with prey were identified by their slowly flight and were captured using entomological nets, where they easily discharged the material carried. This material was fixed in alcohol 70% for further identification in stereomicroscopy.

Usually, the wasps collected were released after they have discharged their preys, but ten individuals were used to determine the weight mean of their body. It was also determined the preys' weight mean and the mean of wasps which returned with prey per hour for the estimative of protein charge transported.

From the 84 preys collected it was possible to identify five orders of insects: Diptera (33.4%); Lepidoptera (28.6%); Hemiptera (12.0%); Hymenoptera (9.4%) and Coleoptera (7.2%) (Table 1). This diversity of preys captured is associated with pests of urban environment, like larvae of mosquito, herbivorous caterpillars, aphids and winged reproductives ants. Surprisingly, the most collected preys were Diptera larvae of the family Culicidae (26.2%).

Studies about preys captured by *Polybia dimidiata* (Olivier) (Campos-Farinha & Pinto 1996), *P. ignobilis* (Silva et al. 1968; Gobbi & Machado 1986; Picanço et al. 1988; Marques 1996), *P. occidentalis* (Gravena 1983; Gobbi et al. 1984), *P. paulista* (Gobbi & Machado 1985; Marques 1996; Campos-Farinha & Pinto 1996), and *Polybia sericea* (Olivier) (Silva et al. 1968; Marques 1996) showed a preference by wasps in collecting Lepidoptera larvae. Prezoto et al. (1994) and Giannotti et al. (1995) reported a detailed survey about preys captured by *Polistes simillimus* Zikán e *Polistes lanio* (Fabricius) respectively. Both species collected most larvae of Lepidoptera, which were in cultivated areas near the studied nests.

Although the present study has not contemplated the seasonality of the capture of preys, *P. platycephala* didn't present specificity related to the preys, although was observed a larger Diptera collection (33.4%). A similar behavior was

Table 1. Preys captured by active colonies of *P. platycephala* (n = 70h), from September 2000 to January 2002.

List of preys	N	%
<b>Lepidoptera</b>		
Noctuidae		
<i>Spodoptera frugiperda</i> (J.E. Smith)	3	3,6
<i>Mocis latipes</i> (Guenée)	2	2,4
<i>Alabama argillacea</i> (Hübner)	1	1,2
Unidentified	8	9,4
Hesperiidae		
Unidentified	1	1,2
Pieridae		
Unidentified	3	3,6
Pyrilidae		
Unidentified	2	2,4
Limacodidae		
Unidentified	1	1,2
Unidentified	3	3,6
<b>Diptera</b>		
Culicidae		
Sciariidae	22	26,2
<i>Sciara</i> sp.		
Syrphidae	1	1,2
Drosophilidae	1	1,2
Unidentified	2	2,4
	2	2,4
<b>Hymenoptera</b>		
Formicidae – Formicinae	6	7,0
Vespidae	1	1,2
Dipriomidae	1	1,2
<b>Coleoptera</b>		
Ptilidae	1	1,2
Dytiscidae	1	1,2
Chrysomalidae	3	3,6
Unidentified	1	1,2
<b>Hemiptera</b>		
<b>Homoptera</b>		
Psyllidae		
<i>Psilla</i> sp.	3	3,6
Cercopidae	1	1,2
<b>Heteroptera</b>		
Ligaeidae	2	2,4
Unidentified	1	1,2
Unidentified material	8	9,4

described for *P. paulista* by Gobbi & Machado (1985). This fact also shows the plasticity of this species in the environment studied, where colonies can survive from one to two years.

The mean weight of protein charge carried by *P. platycephala* was  $1.9 \pm 1.6$  mg ( $n = 34$ , 0.3 - 6.2 mg), and the mean of protein transported per day was 22.8 mg. The mean weight of wasps' body was  $14.2 \pm 1.5$  mg ( $n = 10$ , 12.5 - 17.5 mg). These results suggest that *P. platycephala* can transport charges with 13.4% of its body weight. Similar estimations for *P. paulista* (Gobbi & Machado 1985) and *P. ignobilis* (Gobbi & Machado 1986) demonstrated index of 25.3% and 11.3%, respectively. Differences among these values are due to morphology of each species and to the size of each proteic charge carried.

During the study period, an average of 1.2 returns of wasps per hour was registered, that is equal to 22.8 mg of protein captured along a day of activity. In this way, it is possible that during one year, a colony of *P. platycephala* can collect about 4,380 preys.

In two collected colonies we verified the storage of corporal parts of reproductive forms of ants and termites inside the cells, what demonstrates that the prey capturing by *P. platycephala* workers goes further than the offer. This behavior is similar to the described by Gobbi & Machado (1985) for *P. paulista*.

Thus, an adequate management of colonies of this species in urban areas could contribute for an efficient strategy to control urban pests infesting these places, reducing costs of treatments used, with equilibrium among these species and the habitat.

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