

Foraging activity in colonies of the neotropical paper wasp *Polistes simillimus* Zikán, 1951 (Hymenoptera, Vespidae)

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Introduction

The social wasp *Polistes simillimus* Zikán, 1951 possessed the largest colony among the species of the genus in the neotropical area (Richards, 1978), could reach a population with more than 500 individuals in a nest with more than 1.500 cells Prezoto (2001). Information of the behavioural ecology and of interactions, as well as the dynamics of the forage and its captures of preys is scarce for this genus. In the Brazil, several authors have been suggesting the importance of the wasps of the genus *Polistes* as agents of control of pests in agrossystem (Butignol, 1992; Prezoto *et al.*, 1994, Giannotti *et al.*, 1995; Prezoto & Machado, 1999; Andrade & Prezoto, 2001). Between 90 and 95% of the prey captured by *Polybia occidentalis* (Gobbi *et al.* 1984), *Polybia paulista* (Gobbi & Machado 1985), *Polybia ignobilis* (Gobbi & Machado 1986), *Agelaiia pallipes* (Machado *et al.* 1987), *Polistes simillimus* (Prezoto *et al.* 1994) and *Polistes lanio* (Giannotti *et al.* 1995) are Lepidoptera larvae.

Objective

The objective of this study was evaluated to dynamics of the activity foraging in colonies of *P. simillimus*, correlating that activity with climatic variables.

Methods

On the period of March to April of 2005 three observations of the activity foraging were accomplished in one colony of *P. simillimus*, in Juiz de Fora, MG, (21°46'S; 43°21'W, altitude 678m). The wasps were observed from 7:00 a.m. to 5:00 p.m., resulting in 10 hours of daily observations in each nest as proposed by Prezoto *et al.* (1994). Temperature (°C) and humidity (%) were taken near the nests using a digital thermo-hygrometer (Templec™) at intervals of 30 minutes. The speed of wind and the intensity of light were registered in the observations. In the returns of wasp was identified the materials collected using the methodologies descriptive by Prezoto *et al.* (1994). The solid materials (preys or wood pulp) were identified through fly slow, by presence of the visible material in the apparel buccal and by the behaviour of partaking of the material between individuals. The liquid collections were identified when happened trophallaxis among the individual that came back of the forage and another present in the nest or with the offspring (= nectar), and when was deposited directly in the wall of the nest (= water).

Results

The activity foraging began about 7 a.m. and finished around 5 p.m., between 10 a.m. and 2 p.m. the forager was more intense. The mean of the number of exits and returns of wasps for the activity foraging/hour was of 40 ±23,97 (2-88) and 42,3 ±21,76 (2-84), respectively. Spearman's test of correlation showed the positive correlation between the number of exits to forage and the temperature ($r=0,3260$, $p < 0,0091$), however there wasn't correlation between the numbers of exits and the relative humidity of the air ($r = -0,1791$, $p=0,1601$); intensity of lights ($r=0,1273$, $p=0,3202$) and with the speed of wind ($r = 0,27232$, $p=0,0302$). This results revealed that there wasn't a significant correlation among the climatic factors in relation to activity foraging of the wasps, but so it was observed that in the hottest hours of the day (between 10 a.m. and 2 p.m.), there was a tendency to the increase of the number of exits and workers' returns, probably because in this period the climatic variables were more favourable. Those results agree with the observations accomplished by Prezoto *et al.* (1994), Giannotti *et al.* (1995) and Prezoto & Andrade (2001), both studying the foraging activity of wasps of the gender *Polistes*. The identification of the returns of the wasps that returned of the foraging revealed the following proportion: 64,3% (n=818) of the returns was fruitless; 21,8% (n=277) was nectar; 13,7% (n=174) was solid load (preys and/or materials of construction) and 0,2 (n=2) were water. The results revealed that *P. simillimus* collects an average of 5,8 ±5,41 (0-22) loads solids/hour (preys and/or materials of construction). Gobbi (1977) studying the foraging activity of *Polistes versicolor* (Olivier, 1791) verified that the beginning of this activity depends on the temperature. The influence of the weather on the foraging activity of social wasps was also found by Prezoto

et al. (1994) in *Polistes similimus* (Zikán, 1951), Giannotti *et al.* (1995) in *Polistes lanio lanio* (Fabricius, 1775), Silva & Noda (2000) in *Mischocyttarus cerberus styx* (Richards, 1940) and Andrade & Prezoto (2001) in *Polistes ferreri* (Saussure, 1853). Paula *et al.* (2003) demonstrated the influence of the stage of development of the colony on the rhythm of the foraging activity for the swarm-founding wasp *Parachartergus fraternus* (Gribodo, 1892) that possibly can also happen in *P. simillimus*.

Conclusion

The results of this work can be inferred that for a day of activity (= 10 hours), a great colony of *P. simillimus* can collect the mean of $58 \pm 15,9$ (40-70) solid loads the day (= preys and/or materials of construction), what reflects an important ecological interaction with the great number of potential pests of the atmosphere. Among the climatic variables, the temperature demonstrated to be the most important factor for the foraging activity.

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