

SHORT NOTES

First predatory behavior records in *Polybia bifasciata* (Hymenoptera, Vespidae)

Primeros registros de comportamiento de depredación en *Polybia bifasciata* (Hymenoptera, Vespidae)

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ABSTRACT

Most social wasps have a generalist and opportunistic feeding habit, which is why they perform different ecosystem services. However, for some species, there is still little information on their feeding behavior. Therefore, the aim of this study was to report about the predation of Diptera and aphid larvae by the social wasp *Polybia bifasciata*, on an urban kale crop in Southeastern Brazil. Future studies may indicate the viability of using *P. bifasciata* in biological pest control.

Key words: Aphids, biological control, ethology, predation, Polistinae.

RESUMEN

La mayoría de las avispas sociales tienen un hábito alimentario generalista y oportunista, por lo que realizan diferentes servicios ecosistémicos. Sin embargo, para algunas especies, aún existe poca información sobre su comportamiento alimentario. Por lo tanto, el objetivo de este estudio fue informar sobre la depredación de larvas de dípteros y pulgones por la avispa social *Polybia bifasciata*, en un cultivo de col rizada urbana en el sureste de Brasil. Estudios futuros pueden indicar la viabilidad de utilizar *P. bifasciata* en el control biológico de plagas.

Palabras clave: Control biológico, etología, depredación, Polistinae, pulgones.

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Social wasps (Hymenoptera, Vespidae) are considered opportunistic generalist predators, as they feed on a range of prey. Due to these diverse feeding behaviors, social wasps have the potential to be used in the biological control of agricultural pests (Brock et al., 2021) and forensic science (Somavilla et al., 2019). However, for some species, such as *Polybia bifasciata* de Saussure, 1854, there is still a lack of information on diet and predatory behavior, which could be useful in potential ecosystem services. Thus, the aim of this study was to report the predation of Diptera larvae and aphid nymphs by *P. bifasciata* on an urban kale crop in the state of Minas Gerais, Southeastern Brazil.

The study was carried out from October 14 to 17, 2024, in a crop of approximately 9 m² of *Brassica oleracea* var. *acephala* (DC.) Sheldtl (Brassicaceae), in the municipality of Ritópolis (21°01'24.49" South, 44°19'12.86" West). Approximately twelve behavioral observation sessions were carried out, each lasting 15 min, using the ad libitum method (Del-Claro, 2010), totalling three hours of non-consecutive ethological recordings. Specimens of *P. bifasciata* were identified by MMS based on Richards (1978) and prey was identified using photographs taken during the observations by LCPS.

During the observation, up to three individuals of *P. bifasciata* foraged simultaneously (most commonly two) on the ground. We recorded the predation of larvae of different Diptera species, probably belonging to the genus *Musca* Linnaeus, 1758 (Muscidae) and unidentified specimens of Calliphoridae, based on the adults that visited the crop during the observation period and the predation of aphid nymphs of the genus *Brevicoryne*, possibly *Brevicoryne brassicae* (Linnaeus, 1758) (Hemiptera: Aphididae).

Individuals of *P. bifasciata* arrived on the kale substrate and, after landing on the ground, began to forage actively in search of food. At this stage, the wasps protruded into the substrate to try to reach and trap the larvae with their mandibles (Fig. 1a). When successful, the wasps pulled the larvae upwards and used their mandibles to trap them by their anterior body portion, which was then retained by the

wasp with the help of its first pair of legs (Fig. 1c). Next, the individuals flew and landed on leaves of the adjacent vegetation to reposition the larvae, aligning them with their body (Fig. 1e, f), probably to facilitate the transportation of the prey during the flight, and then the wasps flew, holding the larva with their mandibles and the first two pairs of legs (Fig. 1e), probably towards the colony. The behavior described was observed six times in the afternoon, around 2 pm. No larvae were consumed at the site throughout the observation period, which may indicate that this prey was used mainly to feed the young stages of *P. bifasciata* in its colony.

Regarding aphid predation, while foraging on Diptera larvae, *P. bifasciata* individuals occasionally found aphid nymphs on the ground and preyed on them. However, unlike the predation of Diptera larvae, the wasps consumed them completely on the spot (Fig. 1f). Three aphid predations were observed, also around 2pm. Interestingly, the kale leaves were infested by the aphid species, but the individuals of *P. bifasciata* showed no apparent interest in attacking them, preying only on the aphids on the ground.

In four years of social wasp observations in this same study area, it was the first time that *P. bifasciata* was recorded, so we can conclude that this species is not a recurring visitor to the kale crop. Apparently, the individuals were attracted by a boom of Diptera larvae that emerged after the application of a large amount of organic matter (decaying plant material and chicken and cattle manure) for organic fertilization of the crop. The large number of Diptera larvae may also have influenced the predation of aphids, because even though they were in the kale substrate, they were only predated while the wasps foraging for larvae.

The wasps are known to prey on the young stage of Diptera, as documented for some species (Prezoto et al., 2005; Somavilla et al., 2019), as well as for aphids (Renne et al., 2024). However, as there are few records, it is not yet possible to say whether these behaviors are frequent or casual, due to their availability throughout the year, as suggested by Renne et al. (2024), and the opportunistic foraging condition of social wasps (Prezoto et al., 2019).

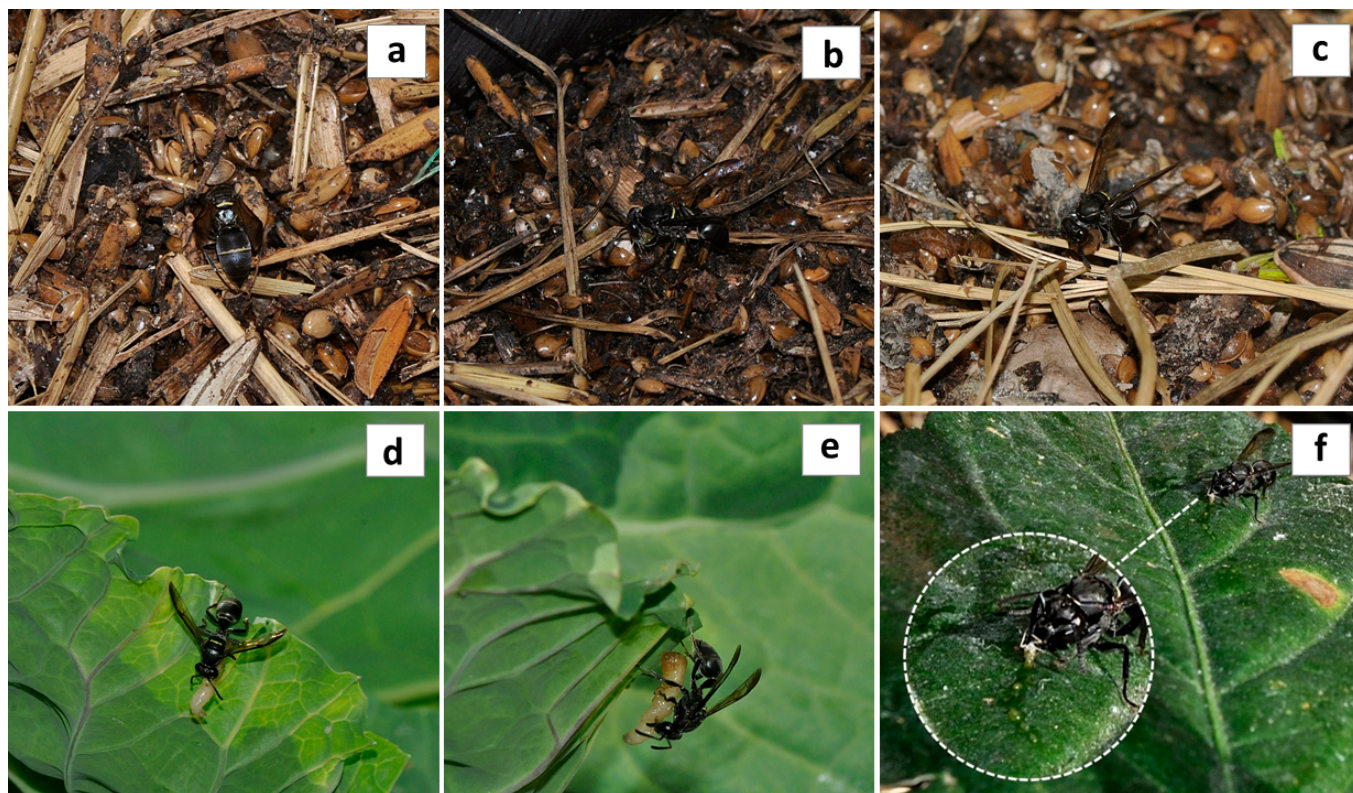


Figure 1. Predatory behavior of *Polybia bifasciata*. **a.** Individual of *P. bifasciata* foraging on the ground; **b.** Individual of *P. bifasciata* with aphid nymph stuck in its mandibles; **c.** Individual of *P. bifasciata* removing a Diptera larva from the substrate; **d-e.** Behavioral sequence of an individual of *P. bifasciata* positioning a captured Diptera larva on kale leaves; **f.** Predation of aphids.

The fact that this behavior was recorded at the height of the dry season, a period with limited food resources for social wasps (Moura *et al.*, 2022), especially in urban environments (Prezoto *et al.*, 2019), may suggest this prey must have been important for complementing the protein in their diet and thus for maintaining this species in a highly altered environment.

P. bifasciata has already been reported foraging on pitanga fruits (Souza *et al.*, 2013) mango and flowers (Barbosa *et al.*, 2014). These authors suggest that this behavior may be associated with the presence of fruit fly larvae in the fruits. Thus, our study may be an indication of a supposed preference of *P. bifasciata* for this type of prey. Therefore, another possible implication of this study would be related to the association of this species with dipterans present in animal carcasses, which may be useful in elucidating

forensic investigations, as well as other species of social wasps (Somavilla *et al.*, 2019).

This study provides preliminary information on the feeding behavior of a species with little known biology. However, we therefore suggest that further studies be carried out to assess the frequency of this behavior and the feasibility of applying this species in ecosystem services.

AUTHOR CONTRIBUTION

All authors contributed to the study conception. Data collection: GCSO. Writing initial draft: GCSO, DSV and LTIB. Writing critical review and commentary of revision: GCSO, DSV, LCPS and MMS. Supervision: MMS. All authors read and approved the final manuscript.

LITERATURE CITED

- Barbosa, B. C., Paschoalini, M. F. & Prezoto, F. (2014). Temporal activity patterns and foraging behavior by social wasps (Hymenoptera, Polistinae) on fruits of *Mangifera indica* L. (Anacardiaceae). *Sociobiology*, 61(2), 239-242. <http://dx.doi.org/10.13102/sociobiology.v61i2.239-242>
- Brock, R. E., Cini, A. & Sumner, S. (2021). Ecosystem services provided by aculeate wasps. *Biological Reviews*, 96(4), 1645-1675. <https://doi.org/10.1111/brv.12719>.
- Del-Claro, K. (2010). *Introdução à Ecologia Comportamental: Um Manual Para Estudo do Comportamento Animal* (1 ed.). Technical Books.
- Moura, P. A., Jacques, G. C., Teófilo-Guedes, G. S. & Souza, M. M. (2022). *Polistes versicolor* (Olivier, 1791) nesting in deciduous forest, Northern Minas Gerais State, Brazil (Vespidae, Polistinae). *Sociobiology*, 69(2), e7691. <https://doi.org/10.13102/sociobiology.v69i2.7691>
- Prezoto, F., Lima, M. A. P. & Machado, V. L. L. (2005). Survey of preys captured and used by *Polybia platycephala* (Richards) (Hymenoptera: Vespidae, Epiponini). *Neotropical Entomology*, 34(5), 849-851. <https://doi.org/10.1590/S1519-566X2005000500019>.
- Prezoto, F., Maciel, T. T., Detoni, M., Mayorquin, A. Z. & Barbosa, B. C. (2019). Pest control potential of social wasps in small farms and urban gardens. *Insects*, 10(7), 192. <https://doi.org/10.3390/insects10070192>.
- Renne, D., Pereira, E. C., Teófilo-Guedes, G. & Souza, M. M. (2024). Pulgões (Hemiptera, Aphididae) parasitados como recurso alimentar para vespas sociais (Hymenoptera, Vespidae). *Revista Acta Ambiental Catarinense*, 21(1), 01-06. <https://doi.org/10.24021/raac.v21i1.7860>.
- Richards, O. W. (1978). *The social wasps of the Americas excluding the Vespinae*. British Museum.
- Somavilla, A., Linard, V. & Rafael, J. A. (2019). Social wasps (Vespidae: Polistinae) on carcasses of *Rattus norvegicus* (Mammalia: Muridae) in Central Amazonia, Brazil: Possible forensic implications. *Revista Brasileira de Entomologia*, 63(1), 18-21. <https://doi.org/10.1016/j.rbe.2018.12.001>.
- Souza, G. K., Pikart, T. G., Jacques, G. C., Castro, A. A., Souza, M. M., Serrão, J. E. & Zanuncio, J. C. (2013). Social wasps on *Eugenia uniflora* Linnaeus (Myrtaceae) plants in the urban area of Viçosa, Minas Gerais State, Brazil. *Sociobiology*, 60(2), 204-209. <https://doi.org/10.13102/sociobiology.v60i2.204-209>.