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Scientific Note

Polistes satan (Vespidae: Polistinae) feeding on exudates from fallen *Phoenix roebelenii* (Arecaceae) fruits

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Abstract: We report for the first time the consumption of exudate from *Phoenix roebelenii* O'Brien (Arecaceae) fruits by the social wasp *Polistes satan* Bequaert, 1940 (Vespidae: Polistinae) in Brazil. The observation took place on 13 August 2025 at the Federal Institute of Minas Gerais, Bambuí Campus, in an anthropised environment. Six individuals were observed feeding on exudate from the pulp (mesocarp) remaining in the calyx of the clusters after the fruits had fallen. The wasps did not directly access the interior of the intact fruits. This record highlights the opportunistic use of an exotic plant as a food resource by a native social wasp and expands our knowledge of trophic interactions between insects and exotic plants.

Keywords: Social wasps; food resource; exotic plant; foraging; trophic interaction.

Resumo: (*Polistes satan* (Vespidae: Polistinae) forrageando em exsudato de frutos caídos de *Phoenix roebelenii* (Arecaceae)). Registramos pela primeira vez o consumo de exsudato dos frutos de *Phoenix roebelenii* O'Brien (Arecaceae) pela vespa social *Polistes satan* Bequaert, 1940 (Vespidae: Polistinae) no Brasil. A observação ocorreu em 13 de agosto de 2025, no Instituto Federal de Minas Gerais, Campus Bambuí, em ambiente antropizado. Seis indivíduos foram observados alimentando-se de exsudato da polpa (mesocarpo) remanescentes no cálice dos cachos após a queda dos frutos. As vespas não acessaram diretamente o interior dos frutos íntegros. Esse registro evidencia o uso oportunista de uma planta exótica como recurso alimentar por uma vespa social nativa e amplia o conhecimento sobre as interações tróficas entre insetos e plantas exóticas.

Keywords: Vespas sociais; recurso alimentar; planta exótica; forrageamento; interação trófica.

Social wasps of the subfamily Polistinae perform important ecological functions as insect predators (Jacques et al., 2018), utilising protein resources primarily to feed the colony's larvae (Prezoto et al., 2005). Adults, on the other hand, require energy sources rich in carbohydrates to sustain activities such as flight, thermoregulation and brood care (Hunt et al., 1987). For this reason, they frequently consume nectar (Pereira, 2014), honeydew (Araújo et al., 2014) and ripe fruit (Renne et al., 2024). Although fruit consumption has been documented for some wasp species (Cranshaw et al., 2011; Brügger et al., 2017), there are no records of social wasps using the fruit of the *Phoenix roebelenii* O'Brien palm (Arecaceae) as a food source.

This palm tree is an exotic species, native to South-Central China, widely cultivated in Brazil for ornamental purposes (Carvalho et al., 2025). Its small, dark, sugar-rich fruits are highly sought after by birds as a food source (Omote et al., 2014) and may also represent new food source for native insects, particularly in anthropogenic environments, where the availability of natural resources is often reduced (New, 2015). However, such interactions are still poorly acknowledged, and records of them may contribute to our understanding of the ecological effects of introducing non-native plant species.

Accordingly, the aim of this study is to report, for the first time, the foraging of *Polistes satan* Bequaert, 1940 (Vespidae: Polistinae) on ripe fruits of *P. roebelenii* in an anthropised environment in Brazil. The record was made by chance on 13 August 2025 at the Federal Institute of Education, Science and Technology of Minas Gerais – Bambuí Campus (IFMG – Bambuí) (20° 02' 22.6'S 46° 00' 38.9'W), Minas Gerais, Brazil. The campus covers an area of 328.76 hectares, comprising agricultural crops, fragments of Cerrado and various exotic ornamen-

tal plants near the buildings, including *P. roebelenii*.

The foraging behaviour of the wasps on the palm tree was photographed, filmed and monitored for approximately 10 minutes using the *ad libitum* (at will) observation method (Del-Claro, 2010). Two wasps were collected, preserved in 70% alcohol, deposited at the IFMG Biodiversity Research Laboratory in Bambuí, and identified using taxonomic keys (Somavilla & Carpenter, 2020). The identification was confirmed by PhD. Marcos Magalhães de Souza of the Federal Institute of Education, Science and Technology of Southern Minas – Inconfidentes Campus. The plant, meanwhile, was identified using the Flora & Funga website (2025) compared with the specimen deposited in the herbarium and the fruit from the carpoteca of the Federal Institute of Education, Science and Technology of Minas Gerais – Bambuí Campus (IFMG – Bambuí) Herbarium and confirmed by Prof. Maria Carolina Gaspar Botrel of the same IFMG.

The observation was conducted on two *P. roebelenii* palm trees (Fig. 1A) near a campus building. On each palm tree, three individuals of *P. satan* were foraging on the fruit clusters (Fig. 1B), feeding on remnants of the exudate from the pulp (mesocarp) that persisted in the calyx of the fruit clusters after the ripe fruits had fallen due to exposure to the environment (Fig. 1C-D). The wasps remained on each fruit for varying periods of time, probably depending on the amount of food available, with a maximum length of approximately 20 seconds.

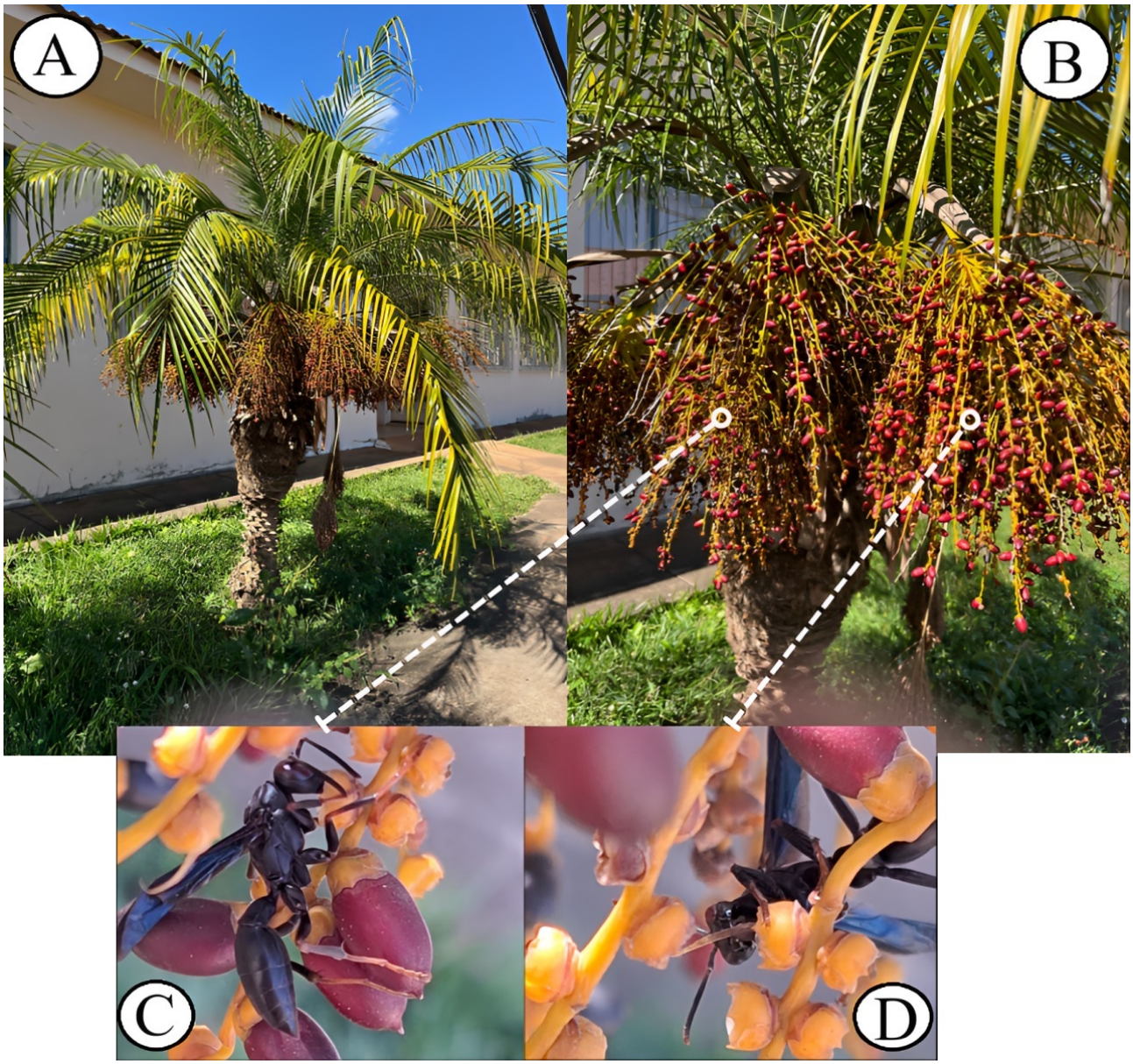


Figure 1: Consumption of exudate from the pulp (mesocarp) of the *Phoenix roebelenii* palm (Arecaceae) fruits (A-B) by the social wasp *Polistes satan* (Vespidae: Polistinae) (C-D). Source: Jacques, G.C.

The fruits of *P. roebelenii* are small, dark in colour when ripe and the pulp is rich in sugar (Iossi et al., 2007), which makes them high-quality energy sources for frugivorous birds (Omote et al., 2014) and, potentially, for social wasps as well. The frequent presence of birds feeding on these fruits may facilitate secondary access by wasps, ei-

ther through fallen fruit or damage caused to the pericarp.

The consumption of fruit by social wasps, as well as the use of nectar and honeydew, represents an important source of carbohydrates for adults (Hunt et al., 1987). Most of the available records relate to the consumption of commercially grown fruits of economic importance, such as guava (*Psidium guajava* L.) (Renne et al., 2024), cherries and grapes (*Prunus avium* (L.) L., *Vitis vinifera* L.) (Cranshaw et al., 2011), jabuticaba (*Plinia cauliflora* (Mart.) Kausel) (A. R. Souza et al., 2010), mango (*Mangifera indica* L.) (Barbosa et al., 2014) and jambo (*Syzygium malaccense* (L.) Merr. & L.M.Perry) (Brügger et al., 2017).

Polistes species may feed directly on ripe fruit, causing the cover membrane to rupture (Renne et al., 2024) and, in some cases, inflicting considerable damage to agricultural production (Cranshaw et al., 2011). However, they also opportunistically feed on previously damaged or fallen fruit, taking advantage of the easier access to the pulp and sugars (Renne et al., 2024). In the present case, *P. satan* did not feed directly on the intact fruit, but exploited the exudate from the mesocarp of the exposed fruits, possibly due to the firm and smooth epidermis of *P. roebelenii* (Iossi et al., 2007), which may limit the wasps' direct access to the interior of the fruit.

Polistes satan has a recorded distribution in the South-East and Central-West of Brazil (Hermes & Somavilla, 2025), occurring mainly in areas of Atlantic Forest and Cerrado (M. M. Souza, Teófilo-Guedes, et al., 2020; M. M. Souza, Teofilo-Guedes, et al., 2020). In faunal surveys carried out in Minas Gerais, the species is considered rare (Jacques et al., 2024). At the Bambuí Campus, however, it is frequent, nesting in buildings and other structures (Tavares et al., 2025), which facilitates its foraging on *P. roebelenii*, used as an ornamental plant near these buildings (Fig. 1A).

This wasp is a generalist predator, capturing a wide variety of prey, including insects from the orders Coleoptera, Diptera, Hymenoptera and Lepidoptera (Southon et al., 2019; Pinheiro et al., 2023). For this reason, it has potential as a biological control agent, contributing to the natural regulation of agricultural pest populations. The presence of additional resources, such as the fruit of exotic species, can prolong the survival of colonies during periods of reduced resource availability, thereby helping to maintain populations capable of fulfilling this regulatory role.

Whilst the presence of non-native species may have positive effects, providing food and shelter for native species (New, 2015), there are also potential ecological risks, such as facilitating the persistence of generalist species, thereby reducing the richness of the local community (Cook-Patton & Agrawal, 2014), or indirect competition with native plants that offer similar resources, thereby reducing seed dispersal (Cordero et al., 2023). Thus, this record contributes to our understanding of trophic interactions involving native species and exotic plants, whilst also reinforcing the need for studies that assess the long-term impacts of the presence of these plants on local fauna.

This study records, for the first time, the consumption of *Phoenix roebelenii* fruits by social wasps in Brazil. The wasps exploited previously damaged fruits, making use of a high-quality energy source present in an anthropised environment. The register reinforces the importance of exotic plants as potential food sources for native insects, but also highlights the need to assess their long-term ecological impacts

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