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Observação Científica

Is the reuse of abandoned nest material a characteristic of the genus *Parachartergus* Ihering, 1904 (Vespidae: Polistinae)?

A reutilização de material de ninho abandonado é uma característica do gênero *Parachartergus* Ihering, 1904 (Vespidae: Polistinae)?

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Abstract. The social wasp species of the genus *Parachartergus* Ihering, 1904 (Vespidae: Polistinae) use plant fibers and saliva to build their nests, although two species are known to reuse material from abandoned nests belonging to other wasps. This paper aims to report the species *Parachartegus pseudapicalis* Willink, 1959, which has reused material from an abandoned social wasp nest. The record occurred at random, in November 2023, in the Atlantic Forest and Cerrado transition area, in the municipality of Luminárias, southern Minas Gerais, Brazil. The reported behavior is similar to that observed in *Parachartegus fraternus* (Gribodo, 1892) and *Parachartegus colobopterus* (Lichtenstein, 1796). This reuse may be frequent in *Parachartergus*, but further studies are suggested in order to better elucidate this behavior and its evolutionary significance.

Keywords: Behavior; Nesting; Resource; Wasp.

Resumo. As espécies de vespas sociais do gênero *Parachartergus* Ihering, 1904 (Vespidae: Polistinae) utilizam fibras vegetais e saliva para construir seus ninhos, no entanto há duas espécies que reaproveitam material de ninhos abandonados de outras vespas. A partir disso, o objetivo deste trabalho é relatar uma espécie deste gênero, *Parachartegus pseudapicalis* Willink, 1959, que reaproveitou material de um ninho de vespa social abandonado. O registro ocorreu de forma aleatória, em novembro de 2023, na zona de transição da Mata Atlântica e Cerrado, no município de Luminárias, sul de Minas Gerais, Brasil. O comportamento relatado assemelha-se ao observado em *Parachartergus fraternus* (Gribodo, 1892) e *Parachartergus colobopterus* (Lichtenstein, 1796). Esta reutilização pode ser frequente em *Parachartergus*, mas estudos adicionais são sugeridos para melhor elucidar este comportamento e sua importância evolutiva.

Palavras-chave: Comportamento; Nidificação; Recurso; Vespa.

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Parachartergus Ihering, 1904 (Vespidae: Polistinae) is a neotropical social wasp genus (Richards 1978), with 13 species occurring in Brazil (Somavilla *et al*. 2021). The nests present an architectural pattern of the stelocyttarous and calyptodomous type (Richards & Richards 1951), attached to the substrate by one or more honeycombs and completely covered by a protective casing (Somavilla *et al*. 2012), fixed to different plant substrates, human constructions, among others (Francisco *et al*. 2018; Souza *et al*. 2020a; Ferreira *et al*. 2022). Such nests are built from plant fibers, collected from different plant species, which mixed with the saliva of the social wasp (Wenzel 1991), produces a resistant material, which is why the nests offer protection against predators and bad weather (Wenzel 1998).

During the collection of these plant fibers, there is a high energy expenditure for the workers to be able to locate, remove and transport the material (Jeanne 1986). One way to minimize this expense would be to reuse material from abandoned nests, already recorded for two species of the genus *Parachartegus* (Sarmiento 1999; Mateus 2011; Rubim *et al*. 2023). Therefore, the objective of this work is to report the species of this genus, *Parachartegus pseudapicalis* Willink, 1959, which reused materials from an abandoned social wasp nest.

The records took place in November 2023, at 10 am at the "Muda Pro Quintal" Hostel, located in a transition area between the Atlantic Forest and Cerrado, municipality of Luminárias, Minas Gerais, Brazil (21°32'19" S; 44°55'41" W). Behavioral observations were carried out using the *ad libitum* method (Del-Claro 2004), with approximately 15 continuous minutes of observation, recorded through photos and filming. Subsequently, individuals of the social wasp were captured with the aid of an entomological net (puçá), preserved in 70% alcohol and identified using dichotomous keys proposed by Richards (1978) and by comparison with the biological collection of social wasps (CBVS) at Instituto Federal de Educação, Ciência e Tecnologia de Minas Gerais - IFSULDEMINAS. To identify the tribe or genus of Polistinae that would have produced the abandoned nest, we adopted the dichotomous key of Barbosa *et al.* (2021).

The social wasp nest of the Epiponini tribe was nestled in a plant substrate, 1.7 m above the ground, with wasps of the species *P. pseudapicalis* removing parts of the external envelope (Figure 1).

Social wasps were observed with the following behavior: the individual landed on the nest and moved to the region of the envelope that was being removed; then, using his jaws, he removed part of the envelope (Figure 2), a behavior that lasted

around 1m10s; After removing the piece, the wasp chewed the material to form a pulp (Figure 2). Finally, the wasps were flying in the same direction, probably the location of the new nest. A maximum of six individuals were recorded performing this behavior simultaneously.

Figure 1. Abandoned nest of a social wasp from the Epiponini tribe with the presence of the species *Parachartegus pseudapicalis* in the municipality of Luminárias, southern Minas Gerais, Brazil.

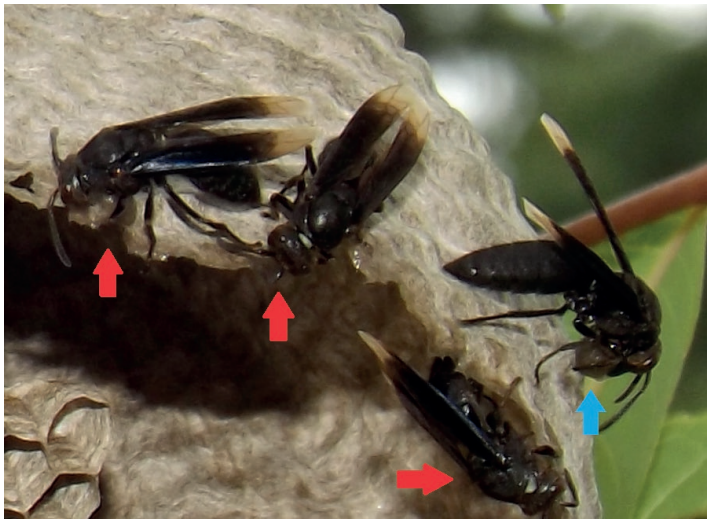

Figure 2. Three individuals of *Parachartergus pseudapicalis* cutting the outer envelope of an abandoned nest (red arrows); an individual of *P. pseudapicalis* forming a pulp with the material removed from the nest (blue arrow), in the municipality of Luminárias, southern Minas Gerais, Brazil.

Parachartergus pseudapicalis has a wide distribution in Brazil (Somavilla *et al*. 2021), and occupies different biomes such as Cerrado, Atlantic Forest (Souza *et al*. 2020b; 2020c) and Caatinga (Andena & Carpenter 2014). The nests of species of this genus are made up of long, uniform plant fibers, probably from a single plant source, which can make their extraction difficult (Sarmineto 1999), therefore the reuse of abandoned nest material can be a cost-saving strategy.

This strategy has been observed for other *Parachartergus* species (Sarmiento 1999; Mateus 2011; Rubim *et al*. 2023). *Parachartergus colobopterus* (Lichtenstein, 1796) and *Parachartergus fraternus* (Gribodo, 1892), in a tropical forest in Colombia, where parts of the envelope were cut and subsequently chewed until they formed a pulp (Sarmiento 1999). This reuse was also reported for *P. fraternus* in tropical forests in Brazil, without much detail, but in another study, carried out in the Brazilian Cerrado, there was greater ethological detail (Rubim *et al*. 2023), which was very similar to that observed in this work, including the same cutting process time and removal of material from the abandoned nest.

In our study, as in Rubim *et al.* 2023, it was not possible to identify the use of water in the pulp cutting or maceration process, as suggested by Sarmiento (1999). If confirmed, it could indicate a water saving in the process, as the social wasps to remove the fibers vegetables, they use water to soften them and then, with their jaws, they scrape off the moist pulp, which is taken to the nest (Wenzel 1991).

This is the first record of *P. pseudapicalis* reusing abandoned nest material, and the third record of species of this genus with this behavior. However, further studies are suggested to verify whether this reuse may be frequent for *Parachartergus* and to better elucidate this behavior and its evolutionary significance.

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References

Andena, SR & Carpenter, JM (2014). Checklist das espécies de Polistinae (Hymenoptera, Vespidae) do semiárido brasileiro, pp. 169-180. In: Bravo, F & Calor, A (Eds.). *Artrópodes do semiárido: Biodiversidade e Conservação*. Printmidia.

Barbosa, BC; Maciel, TT & Prezoto, F (2021). Nesting habits of neotropical social wasps, pp. 85-90. In: Prezoto, F; Nascimento, FS; Barbosa, BC & Somavilla, A. (Eds.). *Neotropical social wasps*. Springer. https://doi.org/10.1007/978-3-030-53510-0_5

Del-Claro, K (Ed.) (2004). *Comportamento animal. Uma introdução à ecologia comportamental*. Livraria Conceito.

Ferreira, EDF; de Oliveira, TMD; Teofilo-Guedes, GS & Souza, MM (2022). Nidificação de *Parachartergus pseudapicalis* Willink em substrato vegetal (Hymenoptera, Polistinae). *Entomology Beginners*, 3: e030. https://doi.org/10.12741/2675-9276.v3.e030

Francisco, GS; Souza, MM; Clemente, MA & Brunismann, AG (2018). Substrato vegetal utilizado para nidificação de vespas sociais (Hymenoptera, Vespidae) em Floresta Decidual. *Revista Agrogeoambiental*, 10(3): 35-45. https://doi.org.br/10.18406/2316-1817v10n320181162

Jeanne, RL (1986). The organization of work in *Polybia occidentalis*: the costs and benefits of specialization in a social wasp. *Behavioral Ecology and Sociobiology*, 19: 333-341. https://doi.org/10.1007/bf00295706

Mateus, S (2011). Observations on forced colony emigration in *Parachartergus fraternus* (Hymenoptera: Vespidae: Epiponini): new nest site marked with sprayed venom. Psyche. *A Journal of Entomology*, 2011: 157149. https://doi.org/10.1155/2011/157149

Richards, OW & Richards, MJ (Eds.) (1951). *Observations on the social wasps of South America (Hymenoptera, Vespidae), Transactions of the Royal Entomological Society of London*, 102: 1-169. https://doi.org/10.1111/j.1365-2311.1951.tb01241.x

Richards, OW (Ed.) (1978). *The social Wasps of the Americas, Excluding the Vespinae*. British Museum, Natural History.

Rubim, GTR; Araújo, LCS; Jacques, GC & Souza MM (2023). Reuse of abandoned social wasp nest material by *Parachartergus fraternus* (Gribodo, 1892) (Vespidae: Polistinae) in cerrado. *Acta Biológica Catarinense,*10(4): 82-85. https://doi.org/10.21726/abc.v10i4.2077

Sarmiento, MCE (1999). Nest material reuse by *Parachartergus* R. von Ihering (Hymenoptera: Vespidae). *Journal of the New York Entomological Society*, 107: 86-88.

Somavilla, A; Oliveira, ML & Silveira, OT (2012). Guia de identificação dos ninhos de vespas sociais (Hymenoptera, Vespidae, Polistinae) na Reserva Ducke, Manaus, Amazonas, Brasil. *Revista Brasileira de Entomologia*, 56(4): 405-414. https://doi.org/10.1590/s0085-56262012000400003

Somavilla, A; Barbosa, BC; Souza, MM & Prezoto, F (2021). List of Species of Social Wasps from Brazil. pp. 293-316. In: Prezoto, F; Nascimento, FS; Barbosa, BC & Somavilla, A. (Eds.), *Neotropical Social Wasps.* Springer. https://doi.org/10.1007/978-3-030-53510-0_16

Souza, MM; Clemente, MA & Teofilo-Guedes, GS (2020a). Nest camouflage records on five social wasp species (Vespidae, Polistinae) from southeastern Brazil. *EntomoBrasilis*, 13: e929. https://doi.org/10.12741/ebrasilis.v13.e929

Souza, MM; Teofilo-Guedes, GS; Milani, LR; De Souza, ASB & Gomes, PP (2020b). Social Wasps (Vespidae: Polistinae) from the Brazilian Atlantic Forest. *Sociobiology*, 67(1): 1–12. https://doi.org/10.13102/sociobiology.v67i1.4597

Souza, MM; Teofilo-Guedes, GS; Bueno, ET; Milani, LR & De Souza, ASB (2020c). Social wasps (Hymenoptera, Polistinae) from the Brazilian savanna. *Sociobiology*, 67(2): 129–138. https://doi.org/10.13102/sociobiology.v67i2.4958

Wenzel, JW (1991). Evolution of nest architecture, pp.480-519. In: Ross, KG & Matthews, RW (Eds.). *The social biology of wasps*. Cornell University.

Wenzel, JW (1998). A generic key to the nests of hornets, yellowjackets, and paper wasps worldwide (Vespidade, Vespinae, Polistinae). *American Museum Novitates*, 3224: 1-39.