Nesting of *Partamona helleri* (Friese, 1900) (Apidae) in an abandoned nest of *Polybia scutellaris* (White, 1841) (Vespidae) in Southeastern Brazil

Nidificação de *Partamona helleri* (Friese, 1900) (Apidae) em ninho abandonado da vespa social *Polybia scutellaris* (White, 1841) (Vespidae) no Sudeste do Brasil

Eike Daniel Fôlha-Ferreira[I] | Diego Gonçalves dos Santos Renne[I] | Isabel Ribeiro do Valle Teixeira[I] | Diogo Silva Vilela[I] | Marcos Magalhães de Souza[I]

[I]Federal Institute of Southern Minas Gerais. Inconfidentes *campus*. Inconfidentes, Minas Gerais, Brazil

Abstract: Social wasp nests are frequently reused by different species for nesting, obtaining food, or protection from the elements and predators. However, there are few records of nest reuse by bees of the Meliponini tribe. Therefore, the aim of this study is to report the use of an abandoned nest of the social wasp *Polybia scutellaris* by the social bee *Partamona helleri*. The record was made opportunistically, on May 7, 2024, in a building within an anthropized area, adjacent to a regenerating Atlantic Forest fragment, in the municipality of Inconfidentes, southern Minas Gerais State, Brazil. The bees occupied the entire social wasp's nest, which was probably already abandoned. The bees did not use the brood cells of the nest for reproduction, but rather deposited material (a mixture of dirt and resins) inside the nest, which was covered on the top and sides, so that only the lower part of the nest was exposed. This reuse probably gave the bees energy savings and shelter for the colony in its early stages. Nevertheless, further studies are needed to understand the frequency of this reuse and whether the nests of social wasps are occupied when abandoned, usurped or shared by the bees.

Keywords: Meliponini. Hymenoptera. Nest biology.

Resumo: Os ninhos de vespas sociais são reutilizados por diferentes táxons, seja para nidificação e obtenção de alimento, seja para proteção contra intempéries e predadores. Todavia, há poucos registros desse fenômeno envolvendo abelhas da tribo Meliponini. O objetivo deste estudo é reportar o uso do ninho abandonado de vespa social *Polybia scutellaris* para a nidificação da abelha social *Partamona helleri*. O registro ocorreu ao acaso, em sete de maio de 2024, em um prédio localizado em área antropizada, próximo a um fragmento de Mata Atlântica em regeneração, no município de Inconfidentes, sul do estado de Minas Gerais, Brasil. A abelha ocupou todo o ninho da vespa social, provavelmente já abandonado. As abelhas não utilizaram as células de cria do vespeiro para reprodução, mas depositaram material (mistura de terra e resinas) no interior do vespeiro, que foi envolvido na porção superior e lateral, com apenas a parte inferior do ninho exposta. Essa reutilização provavelmente conferiu à abelha economia de energia e abrigo para a colônia em sua fase inicial. Entretanto, são necessários mais estudos para compreender a frequência dessa reutilização e se os vespeiros são ocupados quando abandonados, usurpados ou compartilhados pelas abelhas.

Palavras-chave: Meliponini. Hymenoptera. Biologia do ninho.

Fôlha-Ferreira, E. D., Renne, D. G. S., Teixeira, I. R. V., Vilela, D. S., & Souza, M. M. (2025). Nesting of *Partamona helleri* (Friese, 1900) (Apidae) in an abandoned nest of *Polybia scutellaris* (White, 1841) (Vespidae) in Southeastern Brazil. *Boletim do Museu Paraense Emílio Goeldi*. *Ciências Naturais*, *20*(2), e2025-0985. http://doi.org/10.46357/bcnaturais.v20i2.0985

Corresponding author: Eike Daniel Fôlha-Ferreira. Instituto Federal de Educação, Ciência e Tecnologia do Sul de Minas Gerais. Praça Tiradentes, 416. Inconfidentes, MG, Brasil. CEP 37576-000 (eikedanieel98@gmail.com).

Received on 05/29/2024
Approved on 02/14/2025
Editorial responsibility: Valéria Juliete da Silva

CC BY

INTRODUCTION

Social wasps usually build their nests from saliva and cellulose (Wenzel, 1998), with variable architecture (Richards & Richards, 1951). In the Epiponini tribe, except for the genera *Agelaia* and *Apoica*, nests have an external envelope that provides greater protection against predators, a plesiomorphic characteristic of the tribe (Wenzel, 1998; Somavilla et al., 2012; Noll et al., 2021). In addition, this envelope promotes thermal regulation of the colony (Hozumi et al., 2005, 2010), as well as hampering waterlogging during rains due to its hydrophobic composition (Hozumi et al., 2010).

Due to these characteristics, nests can be reused by various other arthropods when abandoned, such as: spiders (Araujo et al., 2008), ants (Souza et al., 2022), termites (Jacques et al., 2023), bees and wasps with solitary habits (Pinto, 2005; Jacques et al., 2022). However, there are few studies demonstrating the reuse of social wasp nests by social Meliponini bees. These bees nest in dead tree cavities (Hubbell & Johnson, 1977), anthills (Kerr et al., 1967), soil cavities, active or abandoned termite mounds (Camargo & Pedro, 2003), human buildings (Netto et al., 2007), gullies and cracks in walls (Siqueira et al., 2012).

The swarming process of social bees begins with the choice of nesting site, which involves the workers visiting potential sites to build their nest. The selection of nesting substrate is related to several factors, including chemical affinity, when the colony is built on plant substrate, or energy saving and low temperature variation (Roubik, 2006; Jones & Oldroyd, 2006).

The occupation of unusual places for nesting can be stimulated by the ongoing degradation of the natural environments where they would otherwise be built. Such disturbances are caused by cutting down trees, burning, urbanization and farming, among other factors (Kerr et al., 2001). Reports indicate extreme behavior in such situations of environmental pressure, such as the attempted occupation by the bee *Melipona quadrifasciata* Lepeletier, 1836 in active nests of another aggressive bee *Scaptotrigona bipunctata* (Lepeletier, 1836) (Hymenoptera: Apidae) (Barbosa et al., 2015). This may indicate that the predictable cost of this invasive behavior should be offset by the energy savings resulting from occupying existing nests. From what was presented, the aim of this study is to report on the use of the abandoned nest of *Polybia scutellaris* (White, 1841), a social wasp, by the social bee *Partamona helleri* (Friese, 1900).

MATERIAL AND METHODS

The record was made on May 7, 2024, at random, on the school farm of the Federal Institute of Southern Minas Gerais - Inconfidentes *campus* (22° 18' 32.7" S, 46° 19' 46.1" W), in a building within an anthropized area, next to a regenerating Atlantic Forest fragment.

Photographs were taken using a Nikon Coolpix P600 camera. The nest was collected using an extensive ladder, a saw, and beekeeper's clothes. After removal, the nest was placed in a plastic bag for transportation. In the laboratory, the specimens found within were sorted and we proceed with detailed photographs of the nest, using the same camera. The length, width and diameter of the nest were measured.

The bee specimens were identified by Professor David Silva Nogueira, from the Federal Institute of Education, Science and Technology of Amazonas (IFAM) - São Gabriel da Cachoeira *campus*. The identification of the social wasp nest was based on the descriptions by Richards and Richards (1951) and Richards (1978). In addition, this colony had previously been recorded at the site, which facilitated the identification of the species.

RESULTS

A colony of *Partamona helleri* was recorded enclosing an abandoned nest of *Polybia scutellaris*, fixed to a wooden beam in a shed, about 5.6 meters above the ground (Figure 1). The *P. helleri* colony had an oval shape, a diameter of 27.6 cm, with an external opening similar to a frog's mouth with a 7 cm diameter (Figure 2A).

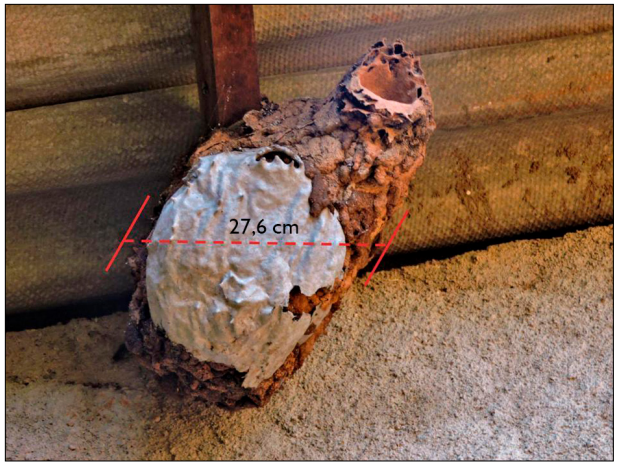

Figure 1. The nest of *Partamona helleri* fixed to a wooden beam, completely enveloping the nest of *Polybia scutellaris*. Photo: image by the authors (2024).

The nest of *P. scutellaris* was almost completely occupied and enveloped by the bee colony, which was only visible in the lower part of the nest (Figure 1). Furthermore, the opening of the nest was completely blocked by material deposited by the bees (Figure 2B).

Inside the bee's nest, no eggs, pupae, or adults were found in the remaining cells of the hornet's nest (Figure 2C). The bee colony expanded throughout the social wasp's nest, filling almost all the combs, but laid no eggs in the brood cells. In several areas, we observed that perhaps the casing of the social wasp's nest was reused and incorporated into the new structure of the bee colony, which can be seen in the new structure of the bee colony (Figures 2D-2E). In addition, it is possible that some of the wasp's nest envelope has been reused and mixed with dirt and resin as part of the bee's nest architecture, where the coloration of the structure is greyish (Figure 2F).

DISCUSSION

The reuse of an abandoned social wasp nest can provide several benefits to bees, such as energy and material savings for building a new colony, as has been suggested for other insects and arachnids (Rocha & Raw, 1982; Jacques et al., 2022). Vespid nests provide thermal comfort and reduce waterlogging during rains (Hozumi et al., 2010). In addition,

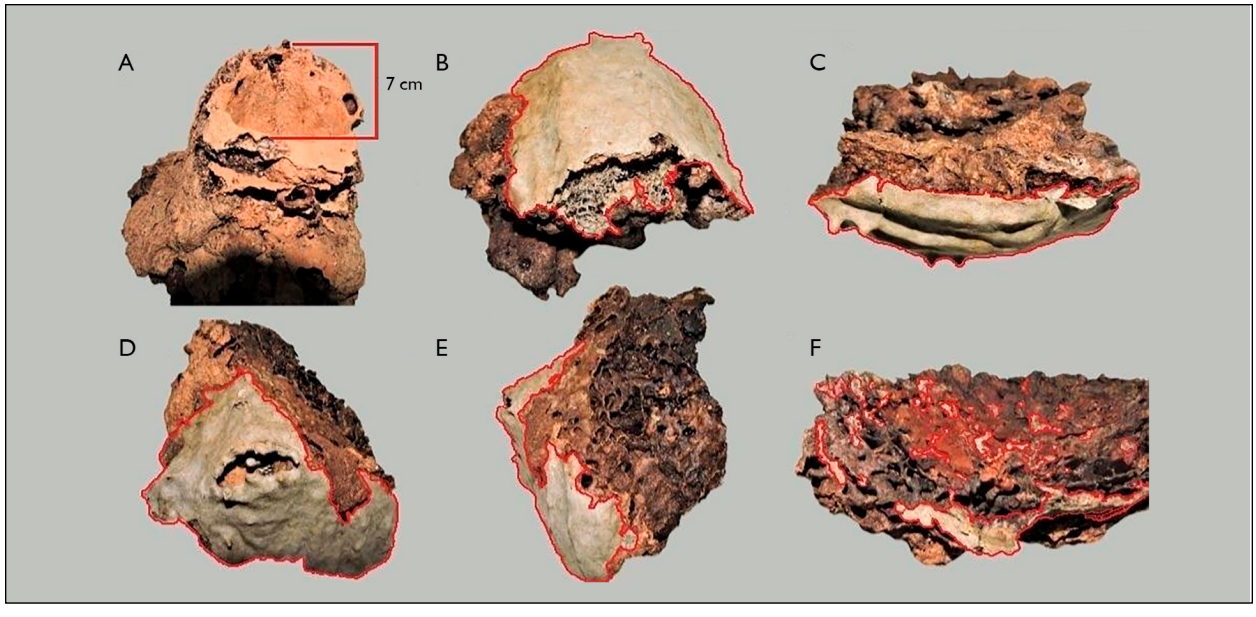

Figure 2. Fragmented nest of *Polybia scutellaris* (highlighted in red): (A) ornament at the entrance to *Partamona helleri*'s nest; (B) opening of the nest of *P. scutellaris* covered with clay; (C) envelope with cells of the nest of *P. scutellaris* not filled with clay, eggs or pupae; (D-E) external cellulose envelope filled internally with clay; (F) residuals of clay covering the internal layers of the combs in the *P. scutellaris* nest, and possible reuse of the cellulose to build the structure (Resin, Clay and Envelope). Photos: image by the authors (2024).

the occupation of a pre-existing nest can offer immediate protection against bad weather and predators, which increases the colony's chance of survival in its early stages, as already reported for *Partamona* species that occupy nests of other social insects (Barreto & Castro, 2007).

Partamona bees naturally occupy a vast territory, being recorded from Mexico to southern Brazil, found in different environments including the Cerrado, the Atlantic Forest and the Andes (Camargo & Pedro, 2003). One feature that indicates *Partamona*'s flexibility in occupying the nests of other social insects is that many species in this genus intrinsically perform this behavior, as they are obligate termitophiles (Camargo & Pedro, 2003). All the nests of *Partamona* are composed of dirt cemented with resin, except for the internal elements, such as the brood discs and the honey and pollen pots (Ferreira, 2011). It is also common to see fragments of plants in the nest structure, such as dried stems and leaves (Camargo & Pedro, 2003).

Partamona helleri is the only Meliponini species in southeastern Brazil not nesting in termite mounds. Its nests are exposed, commonly found in urban or rural buildings, and in unmodified environments. It is common to find them associated with the roots of epiphytes (Ferreira, 2011). Building exposed nests, such as those developed by *P. helleri*, offers the advantage of reducing the environmental restrictions imposed using pre-existing cavities formed in logs, soil and other substrates, as the size of the colony is limited to the spaces in these cavities (Rasmussen & Camargo, 2008).

Nests of *P. helleri* are easily identifiable due to their unique funnel-shaped entrance, which is why they are popularly known in Brazil as "Boca de Sapo", or frog's mouth. This design, according to Shackleton et al. (2019), resolves an evolutionary conflict between foraging efficiency and defense, as it allows many foragers to pass through, while the narrow internal entrance requires few guards for defense. Although there are no records of *P. helleri* reusing social wasp nests, there are reports of them occupying bird nests (Camargo & Pedro, 2003).

This information may explain the records of other Meliponini species that have reused social wasp nests, including *P. scutellaris* (Table 1). All the social wasp species reported have protective casings in their nests (Richards, 1978; Carpenter & Marques, 2001), which reinforces the hypothesis that this structure offers protection against the weather and predators for the bee colony in its early stages.

The occupation of the hornet's nest by *P. helleri* described in this study may have occurred after it was abandoned by the social wasps, since it is common for stingless bees to establish their nests in available cavities. In addition, the absence of traces of social wasps in the nest suggests the possibility that the bees did not invade or usurp the nest, although other explanations cannot be completely ruled out.

Although the occupation of the abandoned nest is suggested, the usurpation of the colony by should be also considered. The study of Rasmussen (2004), reported that *Trigona cilipes* (Fabricius, 1804) invaded the *Epipona tatua* (Cuvier, 1797) colony, established antagonistic behavior and expelled part of the hornet population, and occupied a certain region of the nest. After the initial conflict, the author described the sharing of the structure, where the bees and social wasps occupied different portions of the nest, which may result in protection for the bees, promoted

Table 1. Bee species that use social wasp nests for nesting, author and year of publication of the study, and location of the record.

Social wasp	Bee	Author and year	Locality
Polybia scutellaris (White, 1841)	*Paratrigona* sp.	Lucas (1889)	Minas Gerais, Brazil
Brachygastra sp.	*Trigona cilipes* (Fabricius, 1804)	Silva-Matos et al. (2000)	Mato Grosso, Brazil
Epipona tatua (Curvier, 1797)	*Trigona clipes* (Fabricius, 1804)	Rasmussen (2004)	San Martín, Peru

by the defensive behavior of the wasps (Rasmussen, 2004; Souza et al., 2013).

This benefit of mutual occupation of nests has already been observed between *Partamona seridoensis* (Camargo & Pedro, 2003) and termites of the genus *Microcerotermes* (Oliveira, 2016). The protection offered by social wasps explains the harmonious interactions established with other insects, such as the social wasp *Polybia rejecta* (Fabricius, 1798) and the ant *Azteca chartifex cearensis* Forel, 1903 (Souza et al., 2013). This interaction was reported even with vertebrates, such as the bird *Tolmomyias sulphurescens* (Spix, 1825) and the social wasp *Protonectarina sylveirae* (Saussure, 1854) (Carvalho et al., 2023).

Partamona helleri bees, as well as other species of the genus, use a mixture of dirt and resins as the basic material for building their nests. These substances are applied to specific parts of the nest, such as the entrance structure, pillars, and connectors of the vestibule, as well as the pillars supporting the brood combs and food jars (Camargo & Pedro, 2003). In addition to these materials, here it was observed that cellulose from the wasp's nest may have been incorporated into the nest wall, indicating that the bees may have reused this material along with the clay and resin to build part of the colony's structure. This reuse suggests the ecological efficiency and architectural plasticity of bees when building their nests.

CONCLUSION

Here we have expanded information on the occupation of social wasp nests by other species, confirming the ecological importance of these structures in ecosystems. The nests of *P. scutellaris* and other Polistinae species may be attractive to *P. helleri*, especially in degraded environments, as these nests have a protective shell that probably facilitates and protects the bees during nesting. We suggest further studies to verify the frequency of this reuse and to see if the hornets' nests are only occupied when abandoned or if they are usurped by *P. helleri*.

ACKNOWLEDGEMENTS

We would like to thank Dr. Claus Rasmussen from Aarhus University for providing the document and professor David Silva Nogueira for identifying the bee specimens.

REFERENCES

Araujo, D. P., & De Maria, M. (2008). Nesting of jumping spiders (Araneae, Salticidae) inside abandoned wasps nests (Hymenoptera, Aculeata). *Revista Brasileira de Zoociências*, *10*(2), 171-173. https://periodicos.ufjf.br/index.php/zoociencias/article/view/24065

Barbosa, B. C., Vieira, K. M., & Prezoto, F. (2015). Interações agressivas em abelhas sem ferrão: *Melipona quadrifasciata* (Lepeletier) invadindo ninho de *Scaptotrigona bipunctata* (Lepeletier). *EntomoBrasilis, 8*(2), 152-154. https://doi.org/10.12741/ebrasilis.v8i2.472

Barreto, L. S., & Castro, M. S. (2007). Ecologia de nidificação de abelhas do gênero *Partamona* (Hymenoptera: Apidae) na caatinga, Milagres, Bahia. *Biota Neotropica*, *7*, 87-92. https://doi.org/10.1590/S1676-06032007000100012

Camargo, J. M., & Pedro, S. R. (2003). Meliponini neotropicais: o gênero *Partamona* Schwarz, 1939 (Hymenoptera, Apidae, Apinae) bionomia e biogeografia. *Revista Brasileira de Entomologia*, *47*(3), 311-372. https://doi.org/10.1590/S0085-56262003000300001

Carpenter, J. M., & Marques, O. M. (2001). *Contribuição ao estudo dos vespídeos do Brasil (Insecta, Hymenoptera, Vespoidae)* (Série Publicações Digitais, Vol. 2). Universidade Federal da Bahia.

Carvalho, J. B., Vieira, L. R., Castro Jacques, G., & Souza, M. M. (2023). Nesting of birds associated with social wasps (Hymenoptera, Vespidae) in Brazilian Cerrado. *Ornithology Research*, *31*(3), 240-243. https://doi.org/10.1007/s43388-023-00136-2

Ferreira, K. M. (2011). *A colonização de uma* área *por espécies de abelhas sem ferrão. Um Estudo de Caso: Partamona helleri (Friese, 1900) (Hymenoptera: Apidae: Meliponini)* [Tese de doutorado, Universidade Federal de São Carlos].

Hozumi, S., Yamane, S., Miyano, S., Mateus, S., & Zucchi, R. (2005). Diel changes of temperature in the nests of two *Polybia* species, *P. paulista* and *P. occidentalis* (Hymenoptera, Vespidae) in the subtropical climate. *Journal of Ethology, 23*, 153-159. https://doi.org/10.1007/s10164-004-0141-3

Hozumi, S., Mateus, S., Kudô, K., Kuwahara, T., Yamane, S., & Zucchi, R. (2010). Nest thermoregulation in *Polybia scutellaris* (White) (Hymenoptera: vespidae). *Neotropical Entomology, 39*(5), 826-828. https://doi.org/10.1590/S1519-566X2010000500024

Hubbell, S. P., & Johnson, L. K. (1977). Competition and nest spacing in a tropical stingless bee community. *Ecology*, *58*(5), 949-963. https://doi.org/10.2307/1936917

Jacques, G. C., Ferreira, W. D., Moura, P. A., Teofilo-Gudes, G., & Souza, M. M. (2022). Nesting of the keyhole wasp *Pachodynerus nasidens* (Latreille, 1812) (Vespidae, Eumeninae) in a nest of a paper wasp (Vespidae, Polistinae). *Journal of Hymenoptera Research*, *93*, 125-130. https://doi.org/10.3897/jhr.93.91298

Jacques, G. C., Francisco, S. C. C., Rubim, L. G. T., & Souza, M. M. (2023). Occupation of *Synoeca surinama* (L.) (Vespidae, Polistinae) nests by *Nasutitermes obscurus* (Holmgren) (Termitidae, Nasutitermitinae) in the Cerrado. *EntomoBrasilis*, *16*, e1054. https://doi.org/10.12741/ebrasilis.v16.e1054

Jones, J. C., & Oldroyd, B. P. (2006). Nest thermoregulation in social insects. *Advances in Insect Physiology*, *33*, 153-191. https://doi.org/10.1016/S0065-2806(06)33003-2

Kerr, W. E., Sakagami, S. F., Zucchi, R., Portugal-Araújo, V., & Camargo, J. M. F. (1967). Observações sobre a arquitetura dos ninhos e comportamento de algumas espécies de abelhas das vizinhanças de Manaus, Amazonas (Hymenoptera, Apoidea). In H. Lent (Ed.), *Atas do simpósio sobre a biota amazônica* (pp. 255-309). Conselho Nacional de Pesquisas. https://www.biodiversitylibrary.org/item/209633#page/1/mode/1up

Kerr, W. E., Carvalho, G. A., Silva, A. C., & Assis, M. G. P. (2001). Aspectos pouco mencionados da biodiversidade amazônica. *Parcerias Estratégicas*, *12*, 20-41.

Lucas, P. H. (1889). Communique la note suivante relative a des Hyménopteres sociaux de la division des Méliponides. *Bulletin Entomologique*, *9*, 107–108.

Netto, P., Guimarães, T., & Faria-Mucci, G. M. (2007). Levantamento da fauna urbana de meliponídeos (Hymenoptera: Apoidea: Apidae) em Cataguases–MG. In *Anais do VIII Congresso de Ecologia do Brasil*, Sociedade de Ecologia do Brasil. https://www.seb-ecologia.org.br/revistas/indexar/anais/viiiceb/pdf/440.pdf

Noll, F. B., Silva, M., Soleman, R. A., Lopes, R. B., Grandinete, Y. C., Almeida, E. A. B., Wenzel, J. W., & Carpenter, J. M. (2021). Marimbondos: systematics, biogeography, and evolution of social behaviour of neotropical swarm-founding wasps (Hymenoptera: Vespidae: Epiponini). *Cladistics*, *37*(4), 423-441. https://doi.org/10.1111/cla.12446

Oliveira, T. F. F. N., Silva, L. L., & Hrncir, M. (2016). Opportunistic occupation of nests of *Microcerotermes* spp. Silvestri (Termitidae, Termitinae) by *Partamona seridoensis* Camargo & Pedro (Apidae, Meliponini) in the brazilian tropical dry forest. *Sociobiology*, *63*(1), 731-734. https://periodicos.uefs.br/index.php/sociobiology/article/view/975

Pinto, N. P. O. (2005). Estudo de caso: a reutilização de células de ninho abandonado de *Polistes (Aphanilopterus)* simillimus Zikán, 1951 (Hymenoptera: Vespidae, Polistinae) por *Tetrapedia (Tetrapedia) diversipes* Klug, 1810 (Hymenoptera: Apidae, Apinae). *Revista de Etologia*, *7*(2), 67-74. https://pepsic.bvsalud.org/scielo.php?script=sci_abstract&pid=S1517-28052005000200003

Rasmussen, C. (2004). A stingless bee nesting with a paper wasp (Hymenoptera: Apidae, Vespidae). *Journal of the Kansas Entomological Society*, *77*(4), 593-601. https://doi.org/10.2317/E29.1

Rasmussen, C., & Camargo, J. M. F. (2008). A molecular phylogeny and the evolution of nest architecture and behavior in *Trigona* sp. (Hymenoptera: Apidae: Meliponini). *Apidologie*, *39*(1), 102-118. https://doi.org/10.1051/apido:2007051

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

Richards, O. W. (1978). *The social wasps of the Americas excluding the Vespinae*. British Museum (Natural History).

Rocha, I. R. D., & Raw, A. (1982). Dinâmica das populações da vespa solitária *Zeta argizzaaea* (Linnaeus, 1758) (Hymenoptera: Eumenidae). *Anais da Sociedade Entomológica do Brasil*, *11*(1), 57-78. https://doi.org/10.37486/0301-8059.v11i1.264

Roubik, D. W. (2006). Stingless bee nesting biology. *Apidologie*, *37*(2), 124-143. https://doi.org/10.1051/apido:2006026

Shackleton, K., Balfour, N. J., Toufailia, H. A., Alves, D. A., Bento, J. M., & Ratnieks, F. L. W. (2019). Unique nest entrance structure of *Partamona helleri* stingless bees leads to remarkable 'crash-landing' behaviour. *Insectes Sociaux, 66*, 471-477. https://doi.org/10.1007/s00040-019-00709-9

Silva-Matos, E. V., Noll, F. B., & Zucchi, R. (2000). Sistemas de regulação social encontrados em abelhas altamente eussociais (Hymenoptera: Apidae: Meliponinae). In *Anais do IV Encontro sobre Abelhas*, Universidade de São Paulo. https://rge.fmrp.usp.br/encontro/esb04.php

Siqueira, E. N. L., Bartelli, B. F., Nascimento, A. R. T., & Nogueira-Ferreira, F. H. (2012). Diversity and nesting substrates of stingless bees (Hymenoptera, Meliponina) in a forest remnant. *Psyche: A Journal of Entomology*, *2012*, 370895. https://doi.org/10.1155/2012/370895

Somavilla, A., Oliveira, M. L. D., & Silveira, O. T. (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

Souza, M. M., Junqueira, L. A., Jacques, G. C., Teófilo-Guedes, G. S., & Zanuncio, J. C. (2022). *Camponotus renggeri* (Formicidae) predated *Agelaia vicina* (Vespidae) nest and occupied *Parachartergus pseudapicalis* (Vespidae) nest. *Sociobiology, 69*(2), e7883. https://doi.org/10.13102/sociobiology.v69i2.7883

Souza, M. M., Pires, E. P., & Prezoto, F. (2013). Nidification of *Polybia rejecta* (Hymenoptera: Vespidae) associated to *Azteca chartifex* (Hymenoptera: Formicidae) in a fragment of Atlantic Forest, in the state of Minas Gerais, southeastern Brazil. *Biota Neotropica*, *13*(3), 390-392. https://doi.org/10.1590/S1676-06032013000300038

Wenzel, J. W. A. (1998). A generic key to the nests of hornets, yellowjackets, and paper wasps worldwide (Vespidae: Vespinae, Polistinae). *American Museum Novitates*, *3224*, 1-39. http://hdl.handle.net/2246/3502

AUTHORS' CONTRIBUTION

E. D. Fôlha-Ferreira contributed to conceptualization, investigation, writing (original draft); D. G. S. Renne contributed to investigation and writing (original draft); I. R. V. Teixeira contributed to writing (original draft, review and editing); D. S. Vilela contributed to writing (review and editing); and M. M. Souza contributed to methodology, resources, writing (review and editing).