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Short Communication

Twigs of *Albizia niopoides* (Spruce ex Benth.) Burkart as a nesting resource for ants (Hymenoptera: Formicidae)



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ABSTRACT

Ants can use twigs from fragments of tree branches as a nesting resource. The present study analyzed gatherings of ants in twigs of *Albizia niopoides*, a Fabaceae native to the Atlantic Forest that is used in landscaping in parks and squares in Brazil. Expeditions were performed in an urban park located in Atlantic Forest areas between February and June 2014. A total of 70 twigs with ants were collected and included 9357 workers, 2309 broods ants, 68 winged ants and 19 queens. Four subfamilies, 10 genera and 17 species/morphospecies were recorded. The species with the largest number of nests were *Nylanderia* sp.1, *Hypoponera* sp.4, and *Wasmannia auropunctata*. Ants of different species were found coexisting in the same twig, and *Pheidole* gr. *tristis* was the most common species found sharing a nest. Among the species recorded, only *Pseudomyrmex gracilis* and *P. phyllophilus* are arboreal; the others also live in litter. For some species, our results indicate that the twig occupation in the litter can be structured and not by chance. No correlation was found between the twig structure and the colony components.

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Albizia niopoides (Spruce ex Benth.) Burkart (Fabaceae: Mimosoideae) is found in tropical and subtropical areas of Brazil. It is a deciduous tree that reaches up to 35 m in height and 40–60 cm diameter at breast height (DBH), but its wood has low market value (Rossi and Sartoretto, 2014). In ecological succession, it is classified as pioneer to early or late secondary and is frequently found in pastures because it does not develop under the canopy shade (Lorenzi, 2002; Arce et al., 2008). In urban areas, it is used in squares and parks; it has a marked characteristic a smooth and powdery external bark, often showing holes made by wood boring beetles (Carvalho, 2009).

Usually, ants cannot excavate plant tissue to build their nests in tree twigs, with the exception of some *Pseudomyrmex* and *Azteca* species, which can bore into tree trunks when the plant is still young (Hölldobler and Wilson, 1990). Ants, including arboreal species, typically use cavities made by wood boring insects to maintain and expand their colonies (Deyrup et al., 2000). In the tropics, ants build their nests in different microhabitats, such as vegetation (arboreal ants), soil, and litter; other areas include under rocks, termite nests,

twigs or trunks in different decomposition stages, dead vegetation, dry fruits, and galls (Hölldobler and Wilson, 1990; Byrne, 1994; Cereto et al., 2011; Nakano et al., 2012; Almeida et al., 2014). Many such places serve as peripheral nests for protection or to search for resources (Lanan et al., 2012).

The twigs resulting from the fragmentation of tree branches represent a resource for many arboreal or litter ants (Carvalho and Vasconcelos, 2002; Fernandes et al., 2012; Nakano et al., 2012) and contribute to the maintenance of species diversity in tropical forests (Armbrecht et al., 2004). The present study recorded ant communities that use *A. niopoides* twigs as a nesting resource. In addition, we discuss the relationship between the structure of the twig, the abundance and the morphological characters of individuals of the colony.

Five collection expeditions were conducted between February and June 2014 in the Max Feffer City Park. This area is an urban park that belongs to the town of Suzano (S 23°31'57"; W 46°19'24") in the state of São Paulo, Brazil. The original vegetation is Atlantic Forest and is currently permeated by exotic species and an isolated grove (0.5 ha) composed only of 50 individuals of *A. niopoides* (DBH = 43.88 cm; SD = 6.44 cm). All twigs in the area were inspected, but we collected only those with ants in the area of *A. niopoides* and individually placed in plastic bags. The sampling effort lasted

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Table 1Demographic data of ant colonies registered in *A. niopoides* twigs in the Atlantic Forest in southeast Brazil and the twig structure of the twigs.

Species/ morphospecies	Number					Month flight	Twig		
	Nest	Worker	Immature	Queen	Winged ant ^a		Length range (cm)	Diameter range (cm)	Area range (cm ²)
<i>Brachymyrmex admotus</i> Mayr, 1887	1	383	15	1	–		30	1.33	128.06
<i>Camponotus</i> sp.19	1	133	5	1	–		17.5	0.79	44.56
<i>Camponotus</i> sp.20	1	9 ^b	34 ^b	–	–		68	0.83	177.44
<i>Camponotus</i> sp.5	1	73	12	–	6	June	29	1.30	121.89
<i>Crematogaster arata</i> Emery, 1906	1	6 ^b	28 ^b	–	–		20.5	1.03	67.76
<i>Crematogaster</i> sp.17	5	27–93	12–145	1	–		24.04 (17–29)	0.97 (0.72–1.34)	72.74 (57.17–89.33)
<i>Crematogaster curvispinosa</i> Mayr, 1862	3	5–140	28–38	1	–		34(13.5–20.5)	0.82 (0.60–1.03)	90.49 (26.26–67.76)
<i>Crematogaster rochai</i> Forel, 1903	1	29	–	–	–		23	0.76	55.50
<i>Hypoconera</i> sp.4	12	8–35	2–23	–	2–5	April	20.67 (7.5–28)	0.99 (0.72–1.45)	66.28 (21.73–133)
<i>Nylanderia</i> sp.1	22	10–254	2–74	1–4	1–17	February, April and June	20.23 (8–48)	1.11 (0.74–1.92)	72.11 (25–163.38)
<i>Pachycondyla lenis</i> Kempf, 1961	2	14–16	13	–	–		19.03 (14–24)	1.20 (1.08–1.32)	72.28 (61.11–83.46)
<i>Pheidole</i> pr. <i>aper</i>	1	132	–	–	1	June	12.5	0.85	34.62
<i>Pheidole</i> gr. <i>tristis</i>	7	6–868	2–95	1	–		21.67 (15–36)	1.09 (0.89–1.43)	75.79 (39.70–126.96)
<i>Pseudomyrmex gracilis</i> (Fabricius, 1804)	3	9–15	6–27	0–7	–		33.40 (25–48)	1.33 (0.73–1.68)	146.51 (63.45–240.03)
<i>Pseudomyrmex phyllophilus</i> (Smith, 1858)	5	5–50	5–51	–	–		22.40 (18–25)	1.12 (0.71–1.68)	83.40 (41.16–136.06)
<i>Solenopsis</i> sp.2	3	28–45	1–35	–	–		25.67 (18–37.5)	0.80 (0.62–0.98)	69.20 (35.82–116.78)
<i>Wasmannia auropunctata</i> (Roger, 1863)	7	171–2137	1–760	–	–		23.14 (9.5–38)	0.97 (0.71–1.42)	73.78 (38.06–173.22)

^a Without distinction of sex.^b Shared nest.

for 4 h and was performed by two individuals at each collection event. To characterize the structure of the twig, it were measured the diameter, length, and total area. The diameter was obtained with a digital caliper, and the length was obtained with a simple ruler. The total area was calculated using the formula: $At = 2\pi r(r + h)$, where At = total area, r = radius, and h = twig length. We opened each twig and adult and broods (eggs + larvae) ants were counted. We defined the presence of a colony on a twig when the number of workers was 10 or more or when broods ants were present on the twig (Fernandes et al., 2012); except when the nest was shared by two species of ants. It were measured head width, head length, and Weber's length (Silva and Brandão, 2010). We chose only those species with ≥ 5 nests, being measured three to five workers per nest. Ants were separated into subfamilies (Brady et al., 2014) and identified at the genus (Palacio and Fernández, 2003) and species level, and morphospecies were named according to Suguituru et al. (2015). The vouchers were deposited at Mogi das Cruzes University (SP). Spearman correlations were used to assess

the relationship between colony demographics (number of workers, broods or both), twig structure (diameter, length, and area) and character (head width, head length, and Weber's length). In all analyses, it was used the BioEstat 5.0 software (Ayres et al., 2007).

It was collected a total of 70 twigs, 9357 workers, 2309 broods ants, 68 winged ants, and 19 queens. It were registered four subfamilies, 10 genera, and 17 species/morphospecies. The species with the highest number of nests was *Nylanderia* sp.1 (20), followed by *Hypoconera* sp.4 (12) and *Wasmannia auropunctata* (Roger, 1863) (7). The colonies with the highest numbers of workers in total belonged to *W. auropunctata* (4257; mean: 608.14), *Nylanderia* sp.1 (2134; mean: 106.7), and *Pheidole* gr. *tristis* (1035; mean: 172.5). The twigs were an average of 1.04 cm in diameter (SD = 0.27 cm), 23.13 cm in length (SD = 11.32 cm), and 77.69 cm² in area (SD = 42.75 cm²). It were found four winged species; *Nylanderia* sp.1 showed the highest number of winged ants/colony, including more than one queen per nest (Table 1).

Table 2Demographic data of ant species that coexist with other species in *Albizia niopoides* twigs in the Atlantic Forest in southeast Brazil.

Species/morphospecies	Number of worker	Species/morphospecies	Number of worker	Number of brood ^a
<i>Pseudomyrmex gracilis</i>	50	<i>Pseudomyrmex phyllophilus</i>	14	27
<i>Crematogaster arata</i>	6	<i>Crematogaster curvispinosa</i>	5	28
<i>Hypoconera</i> sp.4	30	<i>Pheidole</i> gr. <i>tristis</i>	6	
<i>Nylanderia</i> sp.1	104	<i>Pheidole</i> gr. <i>tristis</i>	9	2
<i>Camponotus</i> sp.20	9	<i>Hypoconera</i> sp.4	8	5
		<i>Pheidole</i> gr. <i>tristis</i>	9	
		<i>Crematogaster curvispinosa</i>	72	34

^a Without distinction of species.

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