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Ant community (Hymenoptera: Formicidae) associated with *Callisthene fasciculata* (Spr.) Mart. (Vochysiaceae) canopies in the Pantanal of Poconé, Mato Grosso, Brazil

L Yamazaki[1], J Dambros[1], E Meurer[2], VF Vindica[1], JHC Delabie[3], MI Marques[2], LD Battirola[1]

1 - Universidade Federal de Mato Grosso, Sinop-MT, Brazil

2 - Universidade Federal de Mato Grosso, Cuiabá-MT, Brazil

3 - Universidade Estadual de Santa Cruz, Ilhéus-BA, Brazil

Abstract

Ants act in different trophic levels and are important due to their abundance, distribution and diversity in a variety of habitats, exercising influence on many different organisms and ecosystems. Thus, this study compared temporal variation on the structure and composition of the ant community in canopies of *Callisthene fasciculata* (Spr.) Mart. (Vochysiaceae) during high water and dry periods, in the Pantanal of Poconé, Mato Grosso, Brazil. Ant sampling was performed on 12 specimens of *C. fasciculata*, in 2010 and 2011, using canopy fogging with insecticide, in a total of 120m² of sampled canopy. Altogether, 2,958 ants were collected. The 2,943 adults were distributed in four subfamilies, 12 genus and 26 species. Myrmicinae (18.7 ind./m²) was the most representative taxon, followed by Formicinae (3.2 ind./m²), Dolichoderinae (2.2 ind./m²) and Pseudomyrmecinae (0.3 ind./m²). The community is made up of six trophic groups, in which omnivorous (23.5 ind./m²) were the most prevalent, followed by minimum hypogeical generalists (0.5 ind./m²) and arboreal generalist predators (0.3 ind./m²). Although the results showed that ant community richness, associated to *C. fasciculata* canopies, does not represent a significant difference among the seasonal periods, there are differences as to species distribution on the host plant over the seasonal periods, indicating the influence of temporal variation, and therefore, habitat conditions on this community.

Introduction

The forest canopy is responsible for mechanisms that regulate key processes in ecosystems (Basset et al., 2002), such as high primary productivity (Lowman & Nadkarni, 1995). This productivity makes a high variety of resources possible, especially food, for different taxa, including arthropods (Novotny et al., 2002a,b), which represent the most abundant and diverse taxon associated with tropical forest canopies in all regions of the world (Stork & Grimbacher, 2006). In this way, tree canopies are characterized as a diverse environment and of considerable importance due to nutrient cycling processes and the ecological interactions among the species that live in them (Adis, 1997; Adis et al., 2010).

Among the arthropods, Formicidae is an important component of the communities inhabiting the tree layer of tropical forests, using same as habitat, foraging area and nesting (Corrêa et al., 2006). This association also allows plants to benefit because the ants provide materials which are rich in nitrogen, food waste and useful metabolic waste to plants (Delabie et al., 2003), as well as reducing herbivory activity by organisms that feed on these plants, influencing the structuring of the communities in these habitats (Hölldobler & Wilson, 1990).

Ants are predators and herbivores which are significant in many habitats, mainly due to their abundance, omnipresence and diversity (Fowler et al., 1990; Kaspari, 2003). In tropical forests, seasonality is a factor that determines the structure of

their communities (Simberloff & Dayan, 1991). The majority of the species appear to be opportunistic foragers, feeding on nectar, seeds, leaves and live or dead animals, while some may be specialized in their feeding habits (Kaspari, 2003).

Studies carried out in the Pantanal have demonstrated that ants are an important component of the arthropods communities, participating in ecological processes, developing different survival strategies and social behaviors in these areas (Adis et al., 2001; Battirola et al., 2005; Castilho et al., 2007; Santos et al., 2008; Marques et al., 2010, 2011; Soares et al., 2013). Considering the importance of conserving wetlands for the maintenance of biological diversity and the role played by this taxon in food chains associated with these habitats, this study evaluated the temporal variation in the structure and composition of the ant community in the canopy of *Callisthene fasciculata* (Spr.) Mart. (Vochysiaceae), during periods of high water and dry season in the Pantanal of Poconé, Mato Grosso, Brazil.

Material and Methods

Study area

Samples were collected in the Pantanal of Poconé, specifically on the Fazenda Alvorada (16°26'S and 56°24'W), Porto Cercado Road, in Poconé, Mato Grosso, Brazil. The local climate is characterized as Aw, according to the Köppen classification. This region has well defined seasons, with the rainy season between October and March, and the dry season between April and September, defining its water cycle in four distinct seasonal periods (high water, receding water, dry and rising water) (Heckman, 1998).

The samples were obtained in a monodominant, seasonally flooded forest, with predominance of *C. fasciculata*, locally known as "carvoal", which can reach 4 to 15m in height when mature and has dark, thick and rough bark (Pott & Pott, 1994). The flowering period is between September and October, occurring together with seed dispersal generated in the previous year (Custódio et al., 2014). It is a tree that is characterized as deciduous and with dormancy absent during the rising water season until the beginning of the dry season, partial dormancy in the dry season until the beginning of the rising water season, and total dormancy at the end of the dry season (Corsini & Guarim-Neto, 2000).

Field Procedures

Insecticide was applied by way of fogging on 12 *C. fasciculata* canopies in the high water season (tree numbers 1-6) and in the dry season (tree numbers 7-12), in 2010 and 2011, respectively. In each seasonal period six individual *C. fasciculata* were randomly selected keeping a minimum distance of 10m between each sample according to Adis et al. (1998) and Battirola et al. (2004). Initially, the entire diameter at the base of these trees was surrounded by nylon funnels

(1m² in diameter each), distributed according to the scope and architecture of the canopy, totaling 120m² of sample area (10m² per sampled tree). At the base of each collecting funnel a plastic bottle collector was installed with 92% alcohol which remained suspended at about 1m from the ground by means of cords tied to surrounding trees. During the high water period funnels were suspended at 1.5m above the soil due to flooding of part of the forest (water depth ranging between 0.1 and 0.3m).

The fogging procedure was carried out for ten minutes on each tree, using the synthetic pyrethroid Lambda-Cyhalothrin (Icon®) at 0.5%, diluted in two liters of diesel at a concentration of 1% (20ml), associated with the synergist (DDVP) 0.1% (2ml). The fogging used was the Swingfog SN50 model, which produces a strong jet of smoke that is directed from the ground to all parts of the canopy. These procedures took place, always, around 6:00am when the air circulation is less intense, allowing the insecticide cloud to rise slowly through the canopy and not disperse. In each sampled tree a fogging and a collection took place. The collection was carried out two hours after application of the insecticide, the recommended time for its action on arthropods (Adis et al., 1998), when the walls of the funnels were manually shaken and washed with the aid of sprayers containing alcohol at 92% so that the material could be gathered from the existing collector bottles at the basis of the hoppers.

Laboratory Procedures

All the material coming from the samples was transported to the Acervo Biológico da Amazônia Meridional (ABAM) of the Universidade Federal de Mato Grosso, Sinop - MT. Here all the ants were quantified and identified according to Fernández (2003a,b) and Bolton (2003, 2014). Then the ants were compared with the reference collection from the Laboratório de Ecologia e Taxonomia de Artrópodes (LETA) of the Instituto de Biociências of the Universidade Federal de Mato Grosso in Cuiabá, MT. The determination of trophic guilds was carried out according to Rojas and Fragoso (2000), Silvestre et al. (2003) and Brandão et al. (2009) and the material is deposited in the ABAM/UFMT/Sinop Entomological Collection.

Data Analysis

The estimate for species richness was evaluated by Bootstrap and Jackknife 1 estimators. Richness comparison between periods of high water level and dry was carried out using the t test. To assess the composition of species and guilds between the periods of high water and dry indirect sorting was carried out by Non-Metric Multidimensional Scaling (NMDS) using one axis for analysis. The sorting was carried out using quantitative data and the Bray-Curtis similarity measure. The Vegan (Oksanen et al., 2013) package was used for NMDS analysis and richness estimates, and all analyzes were performed using the R software, version 3.0.1 (R Core Team, 2013).

Results

Community composition

A total of 2,958 ants was collected in *C. fasciculata* canopies during the high water and dry periods in the Pantanal of Poconé, Mato Grosso, with a density of 24.6 ind./m^2. Of these individuals, 2,943 (99.5%; 24.5 ind./m^2) are adults, and only 15 (0.5%; 0.1 ind./m^2) are immature (larvae). The adults are distributed into four subfamilies, 12 genera and 26 species. Myrmicinae (2,250 ind.; 76.5%; 18.7 ind./m^2) was the dominant group, followed by Formicinae (391 ind.; 13.3%; 3.2 ind./m^2), Dolichoderinae (264 ind.; 9.0%; 2.2 ind./m^2) and Pseudomyrmecinae (37 ind.; 1.3%; 0.3 ind./m^2) (Fig 1). *Crematogaster* Lundi, 1831 and *Cephalotes* Latreille, 1802 were the most diverse genus, with five and four species, respectively (Table 1).
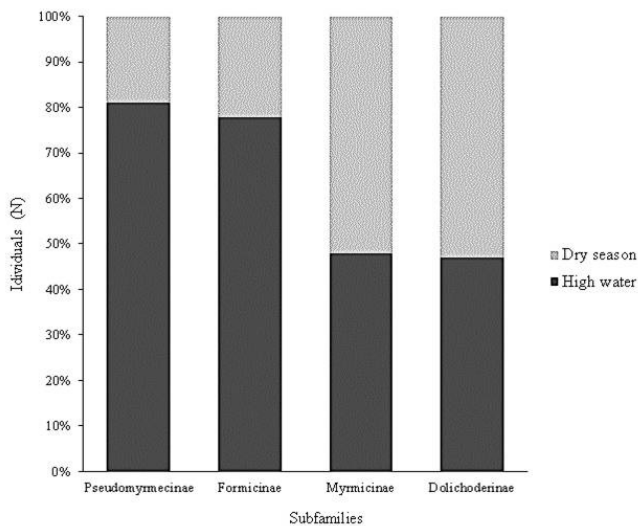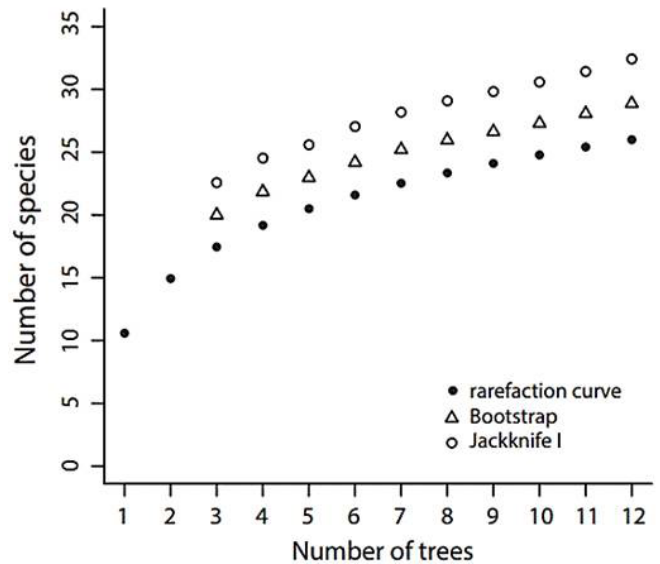

Fig 2. Species richness observed (rarefaction curve) and estimated (Bootstrap and Jackknife 1) for the ant community in *C. fasciculata* canopies, during high water (trees 1-6) and dry season (trees 7-12) in the Pantanal of Poconé, Mato Grosso.

Temporal variation

During the high water period 1,549 individuals (52.4%; 12.9 ind./m^2) were collected and 1,409 individuals (47.6%; 11.7 ind./m^2) were collected in the dry period. The number of species between high water and dry periods did not present any difference (t-test = -0.136; gl = 9.131; p = 0.894). The indirect ordering of data as to species occurrence (NMDS) between high water and dry periods resulted in a stress = 0.35. The result of the t-test, which compares the scores of the axis, showed a significant difference (t-test = -4.557; gl = 9.943; p = 0.001) between species distribution for the two periods (Fig 3). Among the 26 species living in canopies of *C. fasciculata*, *Camponotus melanoticus* Emery, 1894, *Crematogaster arcuata* Forel, 1899, all belonging to the *Cephalotes* genus, were found only during the high water period. All species of *Azteca* Forel, 1878, *Crematogaster quadriformis* Roger, 1863, *Pseudomyrmex termitarius* (F. Smith, 1855) and *Tapinoma* sp. 2 occurred exclusively during the dry period (Table 1), and 13 species are common to both seasonal periods evaluated.

Fig 1. Proportion of the number of Formicidae individuals spread over subfamilies in *C. fasciculata* canopies, between the periods of high water and dry season in the Pantanal of Poconé, Mato Grosso.

The community was represented by 26 species. The expected number according to the Bootstrap diversity estimator is 29 species and 32 for Jackknife 1, of which the sampled richness corresponded to 90% and 81% respectively of the species expected for the community (Fig 2). *Camponotus (Myrmaphaenus)* sp. 1, *Wasmannia auropunctata* Roger, 1863, *Crematogaster* sp. 2 and *Crematogaster* sp. 3 corresponded to the species with the highest frequency of occurrence on the *C. fasciculata* individuals (Table 1).

Myrmicinae was the subfamily with greater richness (13 spp.), followed by Dolichoderinae (6 spp.), Formicinae (4 spp.) and Pseudomyrmecinae (2 spp.). *Crematogaster* sp. 3 (1,196 ind.; 40.6%; 10.0 ind./m^2) was the most abundant species of the community and also among the Myrmicinae, followed by *W. auropunctata* (459 ind.; 15.6%; 3.8 ind./m^2) and *Crematogaster* sp. 2 (346 ind.; 11.8%; 2.9 ind./m^2).

Although there was no significant difference in the richness of the ant community between seasonal periods, variations are seen in the distribution of species, individually, however *W. auropunctata*, *Camponotus (Myrmaphaenus)* sp. 1, *Tapinoma* sp. 1, *Crematogaster* sp. 1, *Brachymyrmex heeri* Forel, 1874, and *Pseudomyrmex pallidus* (F. Smith, 1855) occurred in high abundance in the high water period (906 ind.; 59.0%; 15.1 ind./m^2) compared to the dry season (176 ind.; 12.5%; 2.9 ind./m^2). *Crematogaster* sp. 3, *Crematogaster* sp. 2, *Solenopsis globularia* (Smith, 1858) e *Dolichoderus voraginosus* Mackay, 1993 appear with high abundance in the dry period (1,064 ind.; 75.6%; 17.7 ind./m^2) when compared to the high water period (555 ind.; 36.1%; 9.2 ind./m^2).

Table 1. Taxa, number of individuals (N), relative abundance (%), density (Ind./m²) and frequency of occurrence per tree (%) of Formicidae obtained in *C. fasciculata* canopies, during high water and dry season in the Pantanal of Poconé, Mato Grosso, and its categorization in trophic guilds (Omnivorous (O); Pollinivores (P); Minimum Specialists (MS); Hypogeicals Generalists (HG); Minimum generalists hypogeicals (MGH); Generalist arboreal predators (GAP).

| Taxa	High water			Dry season			Total			Frequency	Trophic Guilds
	N	%	Ind./m²	N	%	Ind./m²	N	%	Ind./m²	%	
Dolichoderinae											
Dolichoderini											
Azteca instabilis F. Smith, 1862	-	-	-	3	0.2	0.1	3	0.1	<0.1	16.7	O
Azteca sp. 1	-	-	-	113	8.0	1.9	113	3.8	0.9	41.7	O
Azteca sp. 2	-	-	-	4	0.3	0.1	4	0.1	<0.1	16.7	O
Dolichoderus voraginosus Mackay, 1993	3	0.2	<0.1	17	1.2	0.3	20	0.7	0.2	58.3	O
Tapinoma sp. 1	121	7.9	2.0	2	0.1	<0.1	123	4.2	1.0	33.3	O
Tapinoma sp. 2	-	-	-	1	0.1	<0.1	1	<0.1	<0.1	8.3	O
Formicinae											
Brachymyrmicini											
Brachymyrmex heeri Forel, 1874	88	5.7	1.5	15	1.1	0.3	103	3.5	0.9	58.3	O
Camponotini											
Camponotus arboreus (F. Smith, 1858)	7	0.5	0.1	5	0.4	0.1	12	0.4	0.1	41.7	O
Camponotus melanoticus Emery, 1894	43	2.8	0.7	-	-	-	43	1.5	0.4	50.0	O
Camponotus (*Myrmaphaenus*) sp. 1	166	10.8	2.8	67	4.8	1.1	233	7.9	1.9	100.0	O
Myrmicinae											
Attini											
Cephalotes atratus (Linnaeus, 1758)	2	0.1	<0.1	-	-	-	2	0.1	<0.1	16.7	P
Cephalotes grandinosus (F. Smith, 1860)	1	0.1	<0.1	-	-	-	1	<0.1	<0.1	8.3	P
Cephalotes minutus (Fabricius, 1804)	1	0.1	<0.1	-	-	-	1	<0.1	<0.1	8.3	P
Cephalotes pavonii (Latreille, 1809)	1	0.1	<0.1	-	-	-	1	<0.1	<0.1	8.3	P
Wasmannia auropunctata Roger, 1863	384	25.0	6.4	75	5.3	1.3	459	15.6	3.8	91.7	O
Crematogastrini											
Carebara anophthalma (Emery, 1906)	3	0.2	0.1	3	0.2	0.1	6	0.2	0.1	25.0	HG
Crematogaster arcuata Forel, 1899	5	0.3	0.1	-	-	-	5	0.2	<0.1	8.3	O
Crematogaster quadriformis Roger, 1863	-	-	-	29	2.1	0.5	29	1.0	0.2	25.0	O
Crematogaster sp. 1	117	7.6	2.0	11	0.8	0.2	128	4.3	1.1	66.7	O
Crematogaster sp. 2	121	7.9	2.0	225	16.0	3.8	346	11.8	2.9	75.0	O
Crematogaster sp. 3	428	27.9	7.1	768	54.6	12.8	1,196	40.6	10.0	91.7	O
Nesomyrmex sp. 1	12	0.8	0.2	7	0.5	0.1	19	0.6	0.2	50.0	MS
Solenopsidini											
Solenopsis globularia (Smith, 1858)	3	0.2	0.1	54	3.8	0.9	57	1.9	0.5	66.7	MGH
Pseudomyrmecinae											
Pseudomyrmecini											
Pseudomyrmex pallidus (F. Smith, 1855)	30	2.0	0.5	6	0.4	0.1	36	1.2	0.3	75.0	GAP
Pseudomyrmex termitarius (F. Smith, 1855)	-	-	-	1	0.1	<0.1	1	<0.1	<0.1	8.3	GAP
Indeterminated											
Indeterminated	-	-	-	1	0.1	<0.1	1	<0.1	<0.1	8.3	-
Total adults	1,536	99.2	25.6	1,407	99.9	23.4	2,943	99.5	24.5	100.0	-
Total larvaes	13	0.8	0.2	2	0.1	<0.1	15	0.5	0.1	41.7	-
GENERAL TOTAL	1,549	100.0	25.8	1,409	100.0	23.5	2,958	100.0	24.6	100.0	-
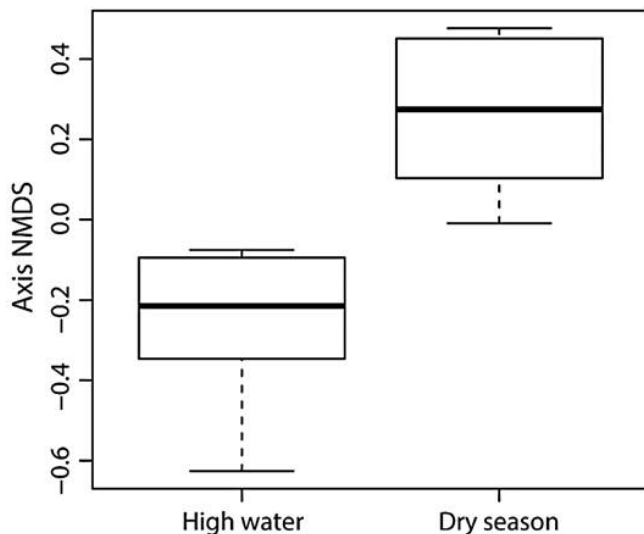
Fig 3. Comparison of scores on NMDS axis, generated from the distribution of 26 species of Formicidae in *C. fasciculata* canopies between the high water and the dry season in the Pantanal of Poconé, Mato Grosso.

Trophic guilds

Ants associated with *C. fasciculata* are distributed in six groups of trophic guilds. In total, the omnivorous were dominant (2,818 ind.; 18 sp.; 95.7%; 23.5 ind./m^2) over the general minimum hypogeicals (57 ind.; 1 sp.; 1.9%; 0.5 ind./m^2), general arboreal predators (37 ind.; 2 sp.; 1.3%; 0.3 ind./m^2), minimum specialists (19 ind.;1sp; 0.6%; 0.2 ind./m^2) and pollinivores (5 ind.; 4sp; 0.2%; < 0.1 ind./m^2). The indirect ordering of the community in relation to the trophic guilds (NMDS) between the high water and dry periods resulted in a stress = 0.29. The result of the t-test, comparing the scores of axis, did not show any difference (t-test = -0.797; gl = 8.844; p = 0.446) between the distribution of guilds for the two periods. As for the distribution of the guilds over the high water and dry periods, omnivores also predominated, 96.5% and 94.9%, respectively. As for the other trophic groups little variation occurred in relation to abundance in both seasonal periods. It is observed that the ants with general nutritional habits, such as those belonging to the omnivores, general minimum hypogeicals and general arboreal predators groups are more distributed among the trees and over the seasonal periods, while the pollinivores were restricted to the high water period.

Discussion

In canopies of the *C. fasciculata* Myrmicinae was the dominant subfamily, both in abundance as in species richness. This predominance was observed by Battirola et al. (2005) in the Pantanal of Poconé, MT, Corrêa et al. (2006), Soares et al. (2013) in the Pantanal of Mato Grosso do Sul, and by Castaño-Meneses (2014), in a dry tropical forest in Mexico. For Ribas et al. (2003), dominance behavior in ants can be observed according to the heterogeneity of host plants and availability of resources. A low availability of resources

causes the exclusion of some species due to competition, while a greater availability reduces competition and encourages the coexistence of a greater number of species, especially among non specific or generalist groups such as those existing on *C. fasciculata* canopies.

Fernández (1998) pointed out that the high abundance associated with a moderate diversity characterized communities of tropical tree ants. Such a pattern may be associated, according to Kaspari (2003), to the fact that, in the area around the dominant species, richness and density are often reduced because the subordinate species generally formed small colonies with low recruiting capacity and are located on the outskirts of the territories controlled by the dominant species.

Arboreal communities generally exhibit high richness of associated species in comparison with other habitats in the same areas. In the *C. fasciculata* canopies, 26 species were sampled, divided into four subfamilies. A similar result, using the same sampling methods was obtained in the study of ant community in the canopies of *Attalea phalerata* Mart. (Arecaceae) in the same region, with register of 29 species and 6 subfamilies (Battirola et al., 2005), including, inclusively, typically soil species such as *Atta* sp.. However, methodological variations influence these results, as observed by Conceição et al. (2014) in a study on cocoa plantations (*Theobroma cacao* L., Malvaceae) of different ages in Ilhéus, BA, where 113 species of ants were obtained using sardine baits and honey, entomological net and manual collection in trunks and foliage.

In Mexico, Castaño-Meneses (2014) while collecting ants using thermal fogging, verified the presence of 21 morphospecies. In Costa Rica, Longino and Nadkarni (1990) obtained 21 species on different host plants, while Schonberg et al. (2004) sampled 27 species in a comparison study between primary and secondary forest and grassland. Floren and Linsenmair (1997) captured 61 species on *Aporusa lagenocarpa* A. Shaw and *A. subcaudata* Merr. (Euphorbiaceae) in Malaysia, and Stork (1991) recorded 32 species in tree canopies in Borneo. It appears, therefore, that richness is similar in arboreal communities from different regions, despite the different sampling efforts, however, the compositions of the communities are extremely variable.

Cephalotes and *Crematogaster* were richer genus on *C. fasciculata*. In *A. phalerata, Solenopsis* Westwood, 1840 and *Camponotus* Mayr, 1861 predominated (Battirola et al., 2005). *Pheidole*, *Camponotus* and *Ectatomma* Smith, 1868 were the most diverse genres in trees in flooded and non-flooded areas in the Pantanal de Miranda, MS (Soares et al., 2013). *Pheidole*, *Ectatomma* and *Camponotus* were the most diverse groups in clumps of dry matter in the Pantanal, MS (Côrrea et al., 2006). *Crematogaster* and *Pheidole* presented greater presence in Ilhéus, BA (Conceição et al., 2014).

It is observed that *Camponotus* and *Pheidole* showed a significant proportion of species presence in several local communities (Brandão et al., 2009), probably because they are generalist species. *Cephalotes* despite being one of the genus with the greatest presence in number of species in this study

showed low abundance, which can be explained by Brandão et al. (2009), when affirming that these arboreal species nest exclusively within living or dead branches, making sampling by applying insecticides difficult (Adis et al., 1998).

The Pantanal is a stochastic environment, characterized by its seasonality, thus influencing the structure of the landscape and biological characteristics. Studies of arthropods in this region have indicated that their communities can vary over the seasonal periods due to environmental changes imposed the hydrological regime in the region (Battirola et al., 2004, 2005, 2007, 2009, 2014; Marques et al., 2006, 2007, 2011, 2014; Soares et al., 2013). The community of ants in *C. fasciculata* canopies did not show significant differences in the number of species between high water and dry periods. This may be related to the dominance exercised by some species, such as the *Crematogaster*, which totaled 56.7% of the community. In addition to dominance, factors such as the stability, availability, quantify and quality of resources, and nesting sites present in the habitats can affect the structuring of these communities (e.g. Ribas et al. 2003). However, there was a significant difference (t-test = -4.557; gl = 9.943; p = 0.001) in the distribution of species between *C. fasciculata* individuals during both seasonal periods evaluated.

The frequency of occurrence obtained for *Camponotus (Myrmaphaenus)* sp. 1, *W. auropunctata*, *Crematogaster* sp. 2 and *Crematogaster* sp. 3 shows that these species occur in many *C. fasciculata* individuals, indicating a close interaction with this habitat (Table 1). It is observed that, individually, *W. auropunctata* in the high water season, was the second most abundant species, representing 25.0% of the *C. fasciculata* community with 384 individuals, and in the dry season, accounted for only 5.3%, with 75 representatives. Extensive areas of undergrowth are used as natural habitat by this species, but individuals can secondarily move to the treetops, acquiring characteristics of a dominant arboreal species (Majer & Delabie, 1993; Majer et al., 1994), which would explain the significant variation in their occurrence in this habitat.

The greater abundance of *W. auropunctata* in *C. fasciculata* canopies in the high water period may indicate a possible vertical migration as a survival strategy of this species. Adis et al. (2001) observed soil shifts to tree trunks during periods of high water in the Pantanal de Mato Grosso for *Acromyrmex lundi carli* Santschi, 1925 (Fomicidae: Myrmicinae) shifting their ground nests to tree trunks. *Solenopsis saevissima* (F. Smith, 1865) also feature specific survival strategies, which in addition to vertical displacement, also move horizontally over the water, following the high water line in the Pantanal. The displacement between the soil, trunks and tree canopies associated with the flooding cycle was also observed for Polyxenida (Diplopoda) (Battirola et al., 2009) and *Plusioporus salvadorii* Silvestri, 1895 (Diplopoda: Spirostreptida) (Adis et al., 2001).

A dominant species often tolerates a number of non-dominant or subdominant species, creating positive associations between them (Majer et al., 1994; Delabie et al., 2007),

which may explain the few changes that have occurred in the structure and composition of the community in the two seasonal periods of this study. Castaño-Meneses (2014) verified that the abundance in tree canopies in the Biological Station of Chamela, Mexico, is greater during the dry period because many plant species flourish in this period. They also have epiphytes, which provide resources such as shelter, water and debris to be used by the ants.

These results differ from those obtained in *C. fasciculata*, because during the high water season, the *C. fasciculata* foliage matures, while in the dry season, the plant has partial dormancy (Corsini & Guarim-Neto, 2000), changing probably the availability of resources. It appears therefore, that the phenology of *C. fasciculata* did not influence directly on the number of individuals and species of the ant community, but indirectly, the falling leaves can change the habitat conditions, influencing the distribution of some species.

Ants can explore a wide variety of resources due to their diversity of eating habits (Castaño-Meneses, 2014), this fact favors the predominance of omnivorous ants in *C. fasciculata* canopies and in the most tree species canopies (Castaño-Meneses, 2014). The disturbed areas are dominated by opportunistic or generalist species, as the same present a competitive advantage due to the varying resources (Hoffmann & Andersen, 2003), which may explain the large amount of omnivorous in this study, indicating the existence of a few specialized groups as well as the predominance of generalist groups.

Rojas and Fragoso (2000) collected ants in the soil and on vegetation in the Chihuahuan Desert, Mexico, and 72% of the sampled individuals belonged to omnivorous and granivorous guilds, followed by predators, pollinivores and fungi cultivators, facts related by the authors to the availability of resources. Castaño-Meneses (2014) found in their collections groupings of omnivores (60%), granivores (17%), predators (14%), nectarivores (7%) and herbivores (2%), unlike the study in *C. fasciculata*, where granivores and nectarivores were separated from herbivores. They also found that predators were more abundant in the rainy months, herbivores were restricted to this same period and omnivores were more abundant during the dry season. Changes in the pattern of ant's composition at different times occur due to variations in eating habitats and in the specie's ability to use distinct resources (Meyer et al., 2010; Cook et al., 2011; Castaño-Meneses, 2014).

The results of this study showed that the temporal variation not influence the richness of ant arboreal community, however they influence the distribution of species between *C. fasciculata* canopies over the assessed seasonal periods. The richness of species in this habitat is similar to that obtained in another study of arboreal communities in the Pantanal (Battirola et al., 2005). It can be noted, therefore, that the *C. fasciculata* canopies are an important habitat, contributing to the maintenance of biological diversity in the Pantanal of Mato Grosso.

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