

State of Art of Ants (Hymenoptera: Formicidae) at Caxiuanã, Melgaco, Pará, Brazil

Ana Yoshi Harada

Coordination of Zoology, Museu Paraense Emílio Goeldi, Belem, Brazil
Email: ahara@museu-goeldi.br

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Abstract

The ants are one of the mega diverse insets found in all terrestrial environments, and occur in great diversity, richness and abundance, acting at all trophic levels. The present study was conducted to verify the knowledge of ant fauna at Caxiuanã National forest. All available ant literature and some collection in Caxiuanã were compiled and analyzed in EXCEL program. Caxiuanã is one Brazilian Amazonia forest that has good biological conservation. A total of 197 species belonging to 52 genera of the nine subfamilies are present in Caxiuanã. Many studies need to be done in this place to understand the ant community pattern to give base for other studies and proposal for use, management and conservation of this interesting Amazonia place.

Keywords

Ants, Amazonia, Diversity, Richness

1. Introduction

Ants are one of the mega diverse insects that dwell at altitudes between 80°N to 80°S [1]; they are found in all forest strata of terrestrial environments [2]-[4]. They live in society, so they are social, and occur in great diversity, richness and abundance [3], acting at all trophic levels [5]. Studies in the canopy of tropical trees reported that over 50% of the arthropod fauna of the strata constituted of ants [6]-[8]. Surveys over the past 30 years, using new techniques for collecting, mainly in tropical areas, recorded a great abundance and diversity of new and unknown genera and species in tree canopies [9]-[11], litter layer and soil [12]-[16] considerably expanding the bio ecological knowledge of the ant fauna that would serve as the basis for other studies.

In view of the above, a number of studies (bio ecological, behavioral, molecular, systematic, biogeographic,

etc.) conducted globally have shown the important contribution of these animals in the dynamics of natural processes and standards, which value and recognize them as important environmental indicators. This helps to develop proposals for ecological-economic planning and wildlife management and conservation [17]-[21].

Surveys of the ant fauna in the Brazilian Amazon, conducted primarily in biological reserves, the outskirts of large cities and in areas under environmental pressure, show that the taxonomic richness depends on the data collection methodology and habitat heterogeneity (Table 1). These studies do not confirm the theory that the richness and diversity increases towards east to west in the tropical areas.

Among the 110 genera of ants that dwell in Brazilian territory, 77 (70%) are rare, 31 (28.2%) are frequent, and 2 (1.2%) are abundant and have high species richness. On the other hand, 104 (80%) of the 110 genera known to Brazil dwell in the Brazilian Amazon, where 30 of them are represented by only one species; 54 of them by five or less and only one genus with more than 100 species (Table 2). This shows the need for increased collection efforts and other studies to better understand the dynamics of processes involving these communities.

However, the 21 genera, containing over 20 species, represent 69.08% (965 species) of species occurrence in Brazil, and only 11 of these, corresponding to 53.38% (560) of the species present and species richness similar in the Brazilian Amazon (Table 3). This shows the great gap in knowledge of this important group of insects in our area.

Today, science knows 13,188 ant species that belong to 16 subfamilies, 39 tribes, and 328 extant genera [22]. It is worth noting that from the 1980s, with the advent of new techniques for data collection, the number of species new to science increased noticeably, and these are being made available in the literature [22]-[32]. These studies are critical to know what exists and thus provide a basis for further research aiming to know the dynamics of patterns and processes developed by these insects in natural and disturbed environments.

Comparing the taxonomic richness of existing ants in the world, 27.64% (3646) of the species, 41.76% (137) of the genera and 81.25% (13) of the subfamilies dwell in the Neotropics; and, 10.59% (1397) of the species, 33.53% (110) of the genera and 81.25% (13) of the subfamilies are quoted in Brazilian territory [23] [24] [26] [27]. On the other hand, 7.95% (1049) of the species, 31.70% (104) of the genera and 81.25% (13) subfamilies occur in the Brazilian Amazon (Table 4). This shows the need to broaden the knowledge of this group in Brazilian Amazonia.

Meanwhile, those results show that the large amount of ant fauna knowledge in Brazilian Amazonia came from biological stations. Then, the aim of this work is to see the “status of ant fauna at Caxiuanã National Forest (Ferreira Penna Scientific Station).

2. Material and Methods

This work is a compilation of ant publications and some collection from Caxiuanã National Forest [2] [22] [23] [26] [29]-[42]. The ants were collected in six plots delimited by Tropical Assessment and monitoring Initiative (TEAM/Caxiuanã) project. The ants were collected in leaf litter from 100 m divided in 10 samples away 10m apart. Each sample was taken in 1 m² of leaf litter, sifted and transported to laboratory where was placed in mini-Winklers per 48 h [28]. All material was processed and identified at best taxonomic level in stereoscope Leica MZ12.5 by using keys and description of available literature [43]-[54], and comparing with pictures from antweb, antwiki, and Invertebrate collection of Museum Paraense Emilio Goeldi. All results and published literature were compiled in EXCEL sheet. Appendix 1 is a dynamic table results in EXCELL program.

3. Results and Discussion

3.1. Status of Caxiuanã Ant Fauna

Although knowledge of the ant fauna in the Amazon has grown considerably in the last thirty years, little is known about their contribution to the bioecological process for balance and maintenance of the ecosystems in this biome.

It is known that, due to the large geographical area occupied by the Amazon, most research occurs in biological reserves, close to the major urban centers and areas designed for large environmental impacts, leaving many places with peculiar characteristics lacking information that would in some cases, direct proposals for the man-

agement and conservation of this biome (**Table 1**).

In this context, “Flona de Caxiuanã”, with rich and complex, often peculiar characteristics, is studied since the 1990s in several areas of scientific, technological and social knowledge. It has shown a tremendous physical and biological potential to base further research to provide an understanding of the processes that maintains the natural tropical system [29]-[32].

Thus, the study of ants is being developed since the 1990s, approaching very interesting and important biological, ecological and taxonomic aspects to understand the patterns and processes that occur in these natural environments. Published and in development researches are detecting a great richness, diversity, and abundance in these communities composition, with the inclusion of several new species and over 30 new records at the genus level for this place, and others for the state of Pará and Brazil [13] [29]-[43].

3.2. Richness, Abundance and Composition of the Ant Fauna in Caxiuanã

In this study, we are including a list of 196 species belonging to 52 genera of 9 subfamilies of ants known for “Flona Caxiuanã” (**Appendix 1**). This richness is 5.40% of the species and 40.30% of the genera of the Neotropical Region; 14.10% and 53.36% of the species of the genera dwelling in Brazil, and 18.7% and 56.73% of the species of the genera of Amazon (**Table 4**).

Therefore, 21 of 52 genera are represented by three or more species, and concentrate 79.18% (156) of species (**Appendix 1**). However, 22 (37.29%) of the genera are represented by a single species. Otherwise, this richness is much lower than those quoted for the Ducke Reserve, in Manaus [1] [16] [55] and Catuaba Reserve in Acre [56]-[58]. It is noteworthy that only named species are on the list presented here, and there are undergoing studies to show a realistic scenario of bioecological aspects involving these insects to maintain the balance of this natural system [59] (**Table 5**).

Harada & Ketelhult [1] make an assessment on the quantification of regional ant fauna according to the capture methods and data analysis. They show that most of the results available in literature regarding Amazon are not comparable since it is a large variation between and within each method.

Moreover, Winkler collecting technique has a higher percentage of sampled specimens, including cryptic, rare, frequent and abundant species, even if it is timely and in a short time. It is believed that this happens because the sampled strata (leaf litter) are a complex mosaic and offer favorable resources (food and nesting) for the development of these insects. However, many species live in other strata (soil and vegetation) where they find all the necessities for their survival. In this context, as most collections made in Caxiuanã involved this substrate, it justifies the fact that 153 (79.18%) of the 197 known species for the area have been collected using the Winkler technique, 66 (26%) of them using the pitfall methodology and 37 (18.78%) manually (**Appendix 1**).

Biological aspects of the ant fauna in Caxiuanã-considering the different sampling effort employed in collection techniques used in Caxiuanã no comparison was made in this regard. Species richness and some biological aspects of ant fauna in Caxiuanã are presented in **Appendix 1**. The subfamilies with larger numbers of genera and species were Myrmicinae (25 genera and 85 species), Ponerinae (12, 45), Formicinae (7, 12), Dolichoderinae (5, 09), Dorylinae (4, 13) and Ectatomminae (3, 25) (**Appendix 1**).

The predominance of species of the genus *Crematogaster* Lund, 1831 (12), *Gnamptogenys* Roger, 1863 (19), *Neoponera* Emery, 1901 (10) and *Strumigenys* Smith, 1860 (24) is due to ecological and taxonomic studies in the area involving these groups and the availability of taxonomic review in the literature. In this context, subfamily Ectatomminae (*Ectatomma* Smith, 1858, *Gnamptogenys* Roger, 1863 and *Typhlomyrmex* Mayr, 1862) was studied by Siqueira & Harada [42], the genus *Crematogaster* Lund, 1831 by Felizardo & Harada [41], *Crematogaster* Lund, 1831, *Pachycondyla* and *Gnamptogenys* by Souza *et al.* [36] [37], *Odontomachus* Latreille, 1804 by Bastos & Harada [34], Dorylinae (Ecitonini) by Araújo & Overal [38] and Attini by Sanhudo *et al.* [39]. The genera *Leptogenys* Roger, 1861 was reviewed by Lattke [40] and *Pachycondyla* Smith, 1858 by Mackay [43] for the Neotropical region.

The ant fauna studied involves ants that live in leaf litter, soil and vegetation. Among the Ponerinae stands the *Neoponera* Emery, 1901 genus, which is distributed across the world. Most species are predators and build relatively simple nests in soil or litter, although some may nest in epiphytes and branches of plants in tropical areas. For example, *Neoponera commutata* (Roger, 1860), which is about 1.5 cm long, nests in soil, forages in small trails on the floor of primary forest, and, without showing great aggression, is predatory on termites (*Syntermes modestus*). Other species, such as *Mayaponera* (Mayr, 1884) and *Pachycondyla harpax* (Fabricius, 1804),

Table 1. Surveys of ant communities from various localities using different collection techniques in Amazonia region.

Locality Brazil	Sampling Area	Method	Strata	Genus/Species	Reference
AC, Senador Guiomard/Catuaba	9120 m ²	Pitfall	Litter	57/276	Oliveira <i>et al.</i> , 2009b
AC, Xapuri (PAE-CM)	10,440 m ²	Pitfall, Winkler	Litter	52/268	Miranda <i>et al.</i> , 2012.
AC, Xapuri (PAE-CM)/Senador Guiomard (Catuaba)	3000 m ²	Pitfall, Winkler	Litter	33/88	Miranda <i>et al.</i> , 2013.
AM, Manaus; Roraima, Maraca e Viruá	75 km ²	Bait	Litter/Veg.	/69	Bacarro & Souza, 2007
AM, Iranduba/Ilha Marchantaria		Berlese, Pitfall, Kempson	Litter/Soil		Ketelhut, 2004
AM, Manaus/Reserve Ducke	1 tree	Fogging	Canopy	30/100	Harada & Adis, 1997
AM, Manaus/Reserve Ducke	2.000 m ²	Fogging	Canopy	27/65	Harada & Adis, 1998
AM, Manaus/Reserve Ducke	2000 m ²	Manual	Litter	41/47	Fagundes, 2003
AM, Manaus/Reserve Ducke	Collections	Various	All	40/247	Harada & Ketelhut, 2009
AM, Manaus/Reserve Ducke	25 km ²	Bait, Pitfall, Winkler	Litter	54/152	Oliveira <i>et al.</i> , 2009a
AM, Manaus/Reserve Ducke	25 km ²	Bait	Litter	19/68	Bacarro <i>et al.</i> , 2011
AM, Manaus/Reserve Ducke/WWF	3000 m	Bait	Litter	?/112	Bacarro <i>et al.</i> , 2010
AM, Manaus/Reserve Ducke/WWF	??	Manual	sub canopy	7/10	Marini-Filho, O. J., 1999
AM, Manaus/WWF	10.800 m ²	Baits, Manual	Soil/Veg.	49/307	Benson & Harada, 1988
AM, Manaus/WWF	50 m ²	Manual	Litter	30/60	Carvalho, 1999
AM, Manaus/WWF	90 m ²	Various(3)	Soil/Litter	60/227	Vasconcelos & Delabie, 2000
AM, Manaus/WWF	2880 m ²	Manual	Litter	18/70	Carvalho & Vasconcelos, 2002
AM, Manaus/WWF	6.8 km	Bait, Pitfall, Winkler	Litter	28/117	Vasconcelos <i>et al.</i> , 2003
AM, Manaus/WWF	5.200 m	Bait	Litter/Veg.	/202	Bacarro, 2005
AM, Manaus/WWF	8 km ²	Bait, Pitfall	Litter	45/184	Vaconcelos, 1999
AM, PA, AP, Amazonas/Solimões valley	2000 km	Bait, Beating umbrella, Winkler	Litter/Veg.	42/166	Vasconcelos <i>et al.</i> , 2010.
AM, PA, AP, Amazonas/Solimões valley	61.2 km ²	Bait, Beating umbrella, Winkler	Litter/Veg.	58/268	Vasconcelos <i>et al.</i> , 2006a.
PA, Belem/Mocambo	?	Manual	Soil/Veg.	37/102	Kempf, 1970
PA, Belem/Mocambo	?	Bait	Soil/Veg.	14/22	Andrade Neto, 1987
PA, Melgaço/Caxiuanã	2400 m	Winkler, Pitfall	Litter/Veg.	2/29	Moura, 2006
PA, Melgaço/Caxiuanã	2400 m	Winkler, Pitfall	Litter/Veg.	1/7	Souza, 2006
PA, Melgaço/Caxiuanã	2400 m	Winkler, Pitfall	Litter	3/36	Souza <i>et al.</i> , 2007
PA, Melgaço/Caxiuanã	7200m	Winkler	Litter	8/60	Bastos, 2009
PA, Melgaço/Caxiuanã	5 Km	Manual	Litter	4/11	Araújo & Overal, 2009
PA, Melgaço/Caxiuanã	100 m ²	Pitfall	Litter	9/27	Sanhudo <i>et al.</i> , 2009
PA, Melgaço/Caxiuanã	1200 m ²	Winkler	Litter	1/10	Bastos & Harada, 2009
PA, Melgaço/Caxiuanã	480m	Pitfall, Winkler	Litter	8/53	Bastos & Harada, 2011
PA, Melgaço/Caxiuanã	?	Varias	Soil/Veg.	38/119	Overal <i>et al.</i> , 1997
PA, Oriximina/Taquera	205 ha	Winkler, Bait	Litter/ Veg.	21/85	Santos <i>et al.</i> , 2008
PA, Oriximina/Porto Trombetas	4000 m ²	Various(5)	Soil/Veg.	49/156	Majer & Delabie, 1994
PA, Paragominas/Agrosete Farm	18 tr. 200 m	Pitfall	Solo	42/134	Ketelhut, 1999
PA, Paragominas/Cauaxi Farm	5 m ²	Winkler	Litter	30/74	Kalif, 2001

Continued

PA, Santarem/Alter do Chao	3.75 ha	Manual, Bait	Litter/Veg.	/76	Leite, 2000
PA, Santarem/Alter do Chao	3.75 ha	Bait	Litter/Veg.	14/28	Vasconcelos & Vilhena, 2006
PA, Santarem/Taperinha	?	Bait	Subcanopy/Litter	21/77	Jeanne, 1979
PA, Oriximina/Porto Trombetas	2100 m ²	Bait, Pitfall	Litter	20/43	Oliveira & Della Lucia, 1992
RR (Maraca/Virua), AM, Manaus (Reserve Ducke)	75 km ²	Bait, Pitfall, Winkler	Litter	57/343	Souza <i>et al.</i> , 2012
RR, Boa Vista/Cata/Mucajai	500 m ²	Bait, Pitfall	Litter	24/77	Peixoto <i>et al.</i> , 2010
RR, Maraca	25 km ²	Bait	Litter	19/59	Bacarro <i>et al.</i> 2011
RR, Virua	25 km ²	Bait	Litter	24/58	Bacarro <i>et al.</i> 2011
PA, Melgaço, Caxiuana	330 km ²	Various(3)	Litter/Veg.	57/209	This study

OBS: Bait (sardine, atum, honey); PAE-CM= Project of "Agroestrativista Chico Mendes"; R, Ducke= Reserve Ducke; PDBF = Program of Biological Dynamic in Forest Fragments, INPA/Smithsonian Institution, Veg.: vegetation.

Table 2. Level of abundance and species richness of the genera known from Brazilian Amazon.

Locality	Brazil	Amazonia	Para
Abundance			
Abundant	2	1	0
Frequent	31	23	17
Rare	77	80	71
Genera Richness			
Lower	77	80	71
Higer	33	24	18

OBS: rare < 10, Frequent = 10 to 100, Abundant > 100; lower richness < 10, high richness > 10; number of genera in parenthesis [21].

Table 3. List of genera with more species richness known from Brazil and Amazon, 2014.

Genera	Brazil	Amazonia	Para state
<i>Pheidole</i>	163	122	62
<i>Camponotus</i>	120	67	34
<i>Pseudomyrmex</i>	72	58	43
<i>Strumigenys</i>	64	55	33
<i>Cephalotes</i>	60	47	33
<i>Azteca</i>	43	37	22
<i>Crematogaster</i>	55	42	31
<i>Neivamyrmex</i>	47	26	13
<i>Gnamptogenys</i>	43	35	30
<i>Solenopsis</i>	43	12	12
<i>Dolichoderus</i>	40	37	29
<i>Acromyrmex</i>	24	13	7
<i>Procryptocerus</i>	26	19	8
<i>Neoponera</i>	35	34	25
<i>Leptogenys</i>	22	18	14
<i>Brachymyrmex</i>	23	7	1
<i>Hypoconera</i>	22	4	2
<i>Trachymyrmex</i>	21	14	10
<i>Megalomyrmex</i>	21	20	13
<i>Cyphomyrmex</i>	21	15	10
Sum	965	682	432

Table 4. Ant richness comparison among areas (World, Neotropical region, Brazil, Amazônia) per taxonomic categories.

Area	Subfamily	Tribe	Genus	Species
World	16	39	328	13,188
Neotropical region	13	25	137	3646
Brazil	13	24	110	1397
Amazonia	13	23	104	1049
Para	12	22	94	818
Caxiuanã	9	12	59	197

Table 5. Genera with more species richness in Caxiuanã, 2014.

Subfamily	Genera	Number of species
Dolichoderinae	<i>Dolichoderus</i>	4
Dorylinae	<i>Labidus</i>	3
	<i>Eciton</i>	7
Ectatomminae	<i>Ectatomma</i>	4
	<i>Gnamptogenys</i>	19
Formicinae	<i>Camponotus</i>	5
Myrmicinae	<i>Acromyrmex</i>	3
	<i>Atta</i>	3
	<i>Cyphomyrmex</i>	3
	<i>Pheidole</i>	3
	<i>Lachnomyrmex</i>	3
	<i>Rogeria</i>	4
	<i>Trachymyrmex</i>	7
	<i>Crematogaster</i>	11
	<i>Strumigenys</i>	24
	Ponerinae	<i>Pachycondyla</i>
<i>Anochetus</i>		6
<i>Leptogenys</i>		8
<i>Odontomachus</i>		9
Pseudomyrmecinae	Neoponera	11
	<i>Pseudomyrmex</i>	7

are commonly found without much aggression, foraging in the leaf litter of the forest in the pristine Brazilian Amazon [36] [37] [43], and little is known of their biology.

Ants of Ectatomminae subfamily can be found in wet and dry, pristine and/or disturbed forest, showing great flexibility of habits and habitats [42] [60]. Generally, they are epigeic, nest in soil or tree layers, and are opportunistic and generalist, having arthropods as their main food source [42] [60]. Among the 24 species of this subfamily present in Caxiuanã, the most frequent and abundant in litter are *Ectatomma edentatum* (Roger, 1863), *Ectatomma lugens* Emery, 1894, *Gnamptogenys horni* (Santschi, 1929), *Gnamptogenys relicta* (Mann, 1916)

and *Gnamptogenys tortuolosa* (Fr. Smith, 1858) that nest in soil, decaying wood or leaf litter, feed on animal and plant protein, and may forage in leaf litter from inside or outside the forest; *E. edentatum* (Roger, 1863), *G. horni* (Santschi, 1929), and, *G. relicta* (Mann, 1916) are easily collected with Winkler. However, *E. lugens* Emery, 1894 and *G. tortuolosa* (Fr. Smith, 1858) are collected with pitfall and little is known of their biology [42]. Otherwise, *Ectatomma tuberculatum* (Olivier, 1792) is found in edge and in the forest vegetation, usually feeding on extrafloral nectaries and/or homopterans at the apex of small shrubs.

The Dorylinae of the genera *Eciton* Latreille, 1804, *Labidus* Jurine, 1807, *Neivamyrmex* Borgmeier, 1940 and *Nomamyrmex* Borgmeier 1936 that occur in the Neotropical region have nomadic and epigeic habits, have fast movements and trail under or over leaf litter in forests, disturbed or not [2] [38] [61]-[65]. The species *Eciton burchelli* (Westwood 1842), *Eciton hamatum* (Fabricius 1782) and *Labidus praedator* (Smith 1858) are very common and abundant in the Brazilian Amazon forests, and their diet consists of small invertebrates and vertebrates [1] [38]. During their nest changings they form trails of several kilometers on the ground and on fallen logs, and carry small vertebrates (amphibians, small reptiles) and invertebrates that are in their path. They also are accompanied by small birds, monkeys and several groups of invertebrates that feed on (spiders, insects, invertebrates) and parasite (Diptera, Phoridae) groups of fauna found in these tracks [61]-[65]. In Caxiuanã, they were collected manually and in pitfall traps [38].

Several species of the Myrmicinae subfamily are epigeic, live in leaf litter of primary and secondary forest, and present omnivorous habits. From the 12 species of the genus *Crematogaster* Lund, 1831, the most abundant species are *Crematogaster brasiliensis* Mayr 1878 *Crematogaster carinata* Mayr 1862, *Crematogaster limata* Fr. Smith 1858 and *Crematogaster tenuicula* Forel 1904, which present omnivorous habits, and forage in leaf litter. However, they can nest in trees, building carton and/or garden nests, except *C. brasiliensis* Mayr, 1878, which nests in hollow branches or decaying wood on the litter from tropical rainforests [41] [45]. Others very common in leaf litter Myrmicinae species are *Blepharidatta brasiliensis* Wheeler, 1915, *Octostruma balzani* (Emery, 1894), Roger, *Strumigenys elongate* (Roger, 1863), *Strumigenys perparva* Brown 1958, *Pheidole susannae* Forel, 1886 and *Wasmannia auropunctata* (Roger, 1863), which live and forage in leaf litter.

Blepharidatta brasiliensis (Wheeler, 1915) are ancestors of attini, live in tropical rainforests where they nest among leaves litter or under wood fallen on the forest floor with populations between 20 to 200 individuals [65]. In Caxiuanã, they are very frequent and abundant in litter throughout the year, and are mentioned for the first time to this area.

Strumigenys perparva (Brown, 1958) and *Strumigenys elongata* (Roger, 1863) are very common and abundant in leaf litter of primary forest in Caxiuanã; they are voracious predators, have long jaws, jump to catch the prey, and, like most species of this genus, feed on small invertebrates; they dwell in South America, and *S. elongata* (Roger, 1863) also occurs in Central America [56]-[58] [61] [62].

Pheidole susannae Forel 1886 is very common and abundant in leaf litter of primary forest in Caxiuanã and in many places in South America, but little is known about its bioecology. *Pheidole* is one of the genera with worldwide distribution and one of the richest in number of species, with a wide range of habits and habitats [46].

Some species are associated with myrmecophyte plants, like *Pheidole minutula* Mayr, 1878 which live in domatias of *Maieta guianensis* Aubl. in Central Amazonia and cultivate mealybugs [66]. *Wasmannia auropunctata* (Roger, 1863) is a common and abundant highly invasive species; it expels many native species in the tropical areas of the globe where it settles; considered a pest, it has omnivore habits, nests in soil and is highly aggressive [60].

The Formicinae dwells from the tree canopy to the soil, nesting on the ground, in hollow stems and decomposing branches on the soil surface, in myrmecophyte plants domatias, plant hollows, building “ant gardens”, “silk and carton nests” in forests and urban areas [67] [68]). The genus *Camponotus* Mayr, 1861 occurs throughout the world with 1098 species, over 400 of them occur in the Neotropics [25]; the species in this genus have diversified habits and habitats and may be predatory, phytophagous and omnivorous; they nest from the tree crowns to the ground and branches and hollow, living or dead trunks, building “carton nests”, “silk nests”, “ants gardens”, etc. *Camponotus femoratus* (Fabricius, 1804), very aggressive, often making large trails on the ground and branches of plants, in wetlands and forest border areas; building “ant gardens”, and, also, living in parabiosis with *Crematogaster levior* Longino, 2003 [45]. *Gigantiops destructor* (Fabricius, 1804), a species of Neotropical distribution, with bizarre and large eyes that occupy almost the entire side of the head, is fast and shows no aggression; it nests in cavities in the soil, usually at base of Fabaceae plant. It forages more intensely from 9 to 11 am, looking for nectaries and small arthropods, reducing time and route taken in its territory, which reduces the risk of being preyed upon by lizards, spiders and mantises [69] [70]. In Caxiuanã, it nests within the

nest of *Paraponera clavata* (Fabricius, 1775), reason why is known by the natives as slave of bullet ant.

Most species of the Dolichoderinae subfamily live associated to plants, but are found in great abundance foraging in leaf litter and on the surface of soil in the Brazilian Amazon. Species of the genus *Azteca* Forel, 1878, occur in Neotropical region and some are distributed from southern Mexico to Argentina; they can nest in plants (myrmecophytes), or build “carton nests” or “ant gardens” in trunks or branches of trees and shrubs [52] [53] [59] [71] [72]. They are generally very aggressive, possess fast movements on or off tracks, raise the posterior region of the body (gaster) when in motion, and when disturbed, gather in large groups, releasing unpleasant odor to ward off the enemy [52]. The myrmecophyte species, such as *Azteca alfari* Emery, 1893, are distributed throughout the Neotropics, nest and feed on structures of plants of the genus *Cecropia* Loefling and are little aggressive [52] [53] [71] [72]. On the other hand, the species of the genus *Dolichoderus* Lund, 1831 are, generally, over 5mm long, nest in trees, are little aggressive, move quickly, and can be found in all forest strata. For example, *Dolichoderus attelaboides* (Fabricius, 1775) forages in apical branches and extrafloral nectaries at vegetation of forest edge, lacks aggressiveness and nests in hollow trees within the forest. However, *Dolichoderus bidens* (Linnaeus, 1758) move around quickly and aggressively, can be found in open areas, feeds on live seafood, extrafloral nectaries, other plant structures and other insects; builds “cardboard nests” on branches and leaves of a variety of plants, and can migrate according to their nutritional need. However, *Dolichoderus bispinosus* (Olivier, 1792) and *Dolichoderus imitator* Emery, 1894 are fast and often collected by the methodology of Winkler, in primary forest leaf litter; *D. bispinosus* (Olivier, 1792) nests in soil, moves in several long trails on the leaf litter and logs, fallen or not, in the forest, and very often is abundant also in sardine baits. Little is known of the biology of *D. imitator* Emery, 1994.

Most species of the Pseudomyrmecinae subfamily have arboreal habits, nesting in domatias, trunks and hollow branches, fallen or not. Usually, they are predators, have an elongated body and move with great speed. Of the seven species recorded for “Flona Caxiuanã”, *Pseudomyrmex tenuis* (Fabricius, 1804) is very common in leaf litter and leaves of trees and shrubs, in shaded or sunny areas in the Brazilian Amazon; however, little is known about its biology. Also, *Pseudomyrmex viduus* (Smith, 1858), as all species that colonize domatias of plants of the genera *Tachigali* Juss. (Caesalpinaceae) Loefling and *Triplaris*. ex L. (Polygonaceae) keep mealybugs (Coccoidea) in the wall of domatias, releasing a sugary substance (“honeydew”), which is used by the ants as food. These ants are more aggressive than other species of the genus [54]. They can colonize other myrmecophytes, such as those of the genera *Cordia* L., *Coussapoa* Aubl., *Ocotea* Aubl., *Pseudobombax*, *Pterocarpus* Jacq. and *Sapium* P. Browne [54] [71].

3.3. Final Considerations

Although the study of the ant fauna of “Flona Caxiuanã” has been going for about 20 years, current knowledge is very incipient, considering the richness and diversity of habits and habitats found there.

The general aspects of the richness, diversity and abundance of the ant community know are based in some collection methods on the leaf litter layer, where, it is believed that occur higher richness and abundance of these animals. More detailed studies of this fauna are in development and will significantly improve the current status. However, much needs to be done to stabilize the community structure of this important group of insects in order to increase the knowledge to better understand their contribution on the dynamics of physical and biological processes that maintain this natural system.

Likewise, the capacity of the human resources at various academic levels is an important means to accelerate the production of the knowledge, and thus meet this demand.

4. Conclusions

The high ant species richness and diversity of ant fauna from Caxiuanã National forest is because of its high habitats heterogeneous and conservation forests.

Many studies need to be done in this place to understand the ant community pattern to give base for other studies and proposal for use, management and conservation of this interesting Amazonia place.

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Appendix 1. List of ant species from Caxiuana including collecting methods, habitat and status, 2015.

Species name	Method	Habitat	Status
Dolichoderinae			
<i>Azteca alfari</i> (Emery, 1893)	Manual	Tree	Abundant
<i>Azteca chartifex</i> (Emery, 1896)	Manual	Tree	Frequent
<i>Dolichoderus attelaboides</i> (Fabricius, 1775)	Manual, pitfall, Winkler	Tree, Litter	Rare
<i>Dolichoderus bispinosus</i> (Olivier, 1791)	Manual, pitfall, Winkler	Tree, Litter	Frequent
<i>Dolichoderus decollatus</i> (Fr. Smith, 1858)	Manual, pitfall	Tree	Rare
<i>Dolichoderus lutosus</i> (Fr. Smith, 1858)	Pitfall, Winkler	Tree, Litter	Rare
<i>Dorymyrmex brunneus</i> (Forel, 1908)	Manual	Litter	Rare
<i>Linepithema humile</i> (Mayr, 1868)	Winkler	Litter	Rare
<i>Tapinoma melanocephalum</i> (Fabricius, 1793)	Winkler	Litter	Rare
Dorylinae			
<i>Eciton burchellii</i> (Westwood, 1842)	Manual	Litter	Rare
<i>Eciton drepanophorum</i> (Fr. Smith, 1858)	Manual	Litter	Rare
<i>Eciton hamatum</i> (Fabricius, 1782)	Manual	Litter	Frequent
<i>Eciton mexicanum</i> (Roger, 1863)	Manual	Litter	Rare
<i>Eciton quadriglume</i> (Haliday, 1836)	Manual	Litter	Rare
<i>Eciton rapax</i> (Fr. Smith, 1855)	Manual	Litter	Rare
<i>Eciton vagans</i> (Olivier, 1792)	Manual	Litter	Rare
<i>Labidus coecus</i> (Latreille, 1802)	Manual, pitfall, Winkler	Litter	Rare
<i>Labidus praedator</i> (Fr. Smith, 1858)	Manual, pitfall, Winkler	Litter	Abundant
<i>Labidus spininodis</i> (Emery, 1890)	Manual, pitfall, Winkler	Litter	Abundant
<i>Neivamyrmex gibbatus</i> (Borgmeier, 1953)	Manual	Litter	Rare
<i>Neivamyrmex pseudops</i> (Forel, 1909)	Manual	Litter	Rare
<i>Nomamyrmex esenbeckii</i> (Westwood, 1842)	Manual, pitfall, Winkler	Litter	Rare
Ectatomminae			
<i>Ectatomma brunneum</i> (Fr. Smith, 1858)	Manual, pitfall	Litter	Frequent
<i>Ectatomma edentatum</i> (Roger, 1863)	Pitfall, Winkler	Litter, soil	Frequent
<i>Ectatomma lugens</i> (Emery, 1894)	Pitfall, Winkler	Litter, soil	Frequent
<i>Ectatomma tuberculatum</i> (Olivier, 1792)	Manual, Pitfall, Winkler	Litter, planta	Frequent
<i>Gnamptogenys acuminata</i> (Emery, 1896)	Winkler	Litter, soil	Rare
<i>Gnamptogenys annulata</i> (Mayr, 1887)	Pitfall, Winkler	Litter,	Rare
<i>Gnamptogenys bisulca</i> (Kempf & Brown 1968)	Winkler	Litter,	Rare
<i>Gnamptogenys enodis</i> (Lattke, Fernández & Palácio, 2004)	Winkler	Litter,	Rare
<i>Gnamptogenys fernandesi</i> (Lattke, 1990)	Winkler	Litter,	Rare
<i>Gnamptogenys haenschii</i> (Emery, 1902)	Pitfall, Winkler	Litter,	Rare

Continued

<i>Gnamptogenys hartmani</i> (Wheeler, 1915)	Winkler	Litter,	Rare
<i>Gnamptogenys haytiana</i> (Wheeler & Mann, 1914)	Pitfall, Winkler	Litter,	Rare
<i>Gnamptogenys horni</i> (Santschi, 1929)	Pitfall, Winkler	Litter,	Abundant
<i>Gnamptogenys kempfi</i> (Lenko, 1964)	Winkler	Litter,	Rare
<i>Gnamptogenys mediatrix</i> (Brown 1958)	Winkler	Litter,	Rare
<i>Gnamptogenys mina</i> (Brown 1956)	Winkler	Litter,	Rare
<i>Gnamptogenys moelleri</i> (Forel, 1912)	Pitfall, Winkler	Litter,	Frequent
<i>Gnamptogenys nana</i> (Kempf, 1960)	Winkler	Litter,	Rare
<i>Gnamptogenys perspicax</i> (Kempf & Brown, 1970)	Winkler	Litter,	Rare
<i>Gnamptogenys pleurodon</i> (Emery, 1896)	Winkler	Litter, soil	Rare
<i>Gnamptogenys relictata</i> (Mann, 1916)	Pitfall, Winkler	Litter,	Abundant
<i>Gnamptogenys tortuolosa</i> (Fr. Smith, 1858)	Pitfall, Winkler	Litter,	Frequent
<i>Gnamptogenys triangularis</i> (Mayr, 1887)	Pitfall, Winkler	Litter,	Rare
<i>Typhlomyrmex pusillus</i> (Emery, 1894)	Winkler	Litter, soil	Rare
<i>Typhlomyrmex rogenhoferi</i> (Mayr, 1862)	Winkler	Litter, soil	Rare
Formicinae			
<i>Acropyga fuhri</i> (Forel, 1914)	Winkler	Litter, vegetation	Rare
<i>Brachymyrmex heeri</i> (Forel, 1874)	Winkler	Litter	Rare
<i>Camponotus atriceps</i> (Fr. Smith, 1858)	Manual	Litter	Frequent
<i>Camponotus femoratus</i> (Fabricius, 1804)	Manual, Pitfall, Winkler	Litter, Tree	Frequent
<i>Camponotus novogranadensis</i> (Mayr, 1870)	Manual	Litter	Rare
<i>Camponotus rapax</i> (Fabricius, 1804)	Manual	Litter	Rare
<i>Camponotus renggeri</i> (Emery, 1894)	Manual	Litter	Frequent
<i>Camponotus senex</i> (Fr. Smith, 1858)	Manual	Litter, Tree	Rare
<i>Gigantiops destructor</i> (Fabricius, 1804)	Manual	Litter, soil	Frequent
<i>Myrmelachista bambusarum</i> (Forel, 1903)	Winkler	Litter	Rare
<i>Nylanderia fulva</i> (Mayr, 1862)	Winkler	Litter	Rare
<i>Paratrechina longicornis</i> (Latreille, 1802)	Winkler	Litter	Rare
Myrmicinae			
<i>Acromyrmex hystrix</i> (Latreille, 1802)	Pitfall	Litter	Rare
<i>Acromyrmex lundii carli</i> (Gonçalves, 1961)	Pitfall	Litter	Rare
<i>Acromyrmex subterraneus brunneus</i> (Forel, 1912)	Pitfall	Litter	Rare
<i>Allomerus decemarticulatus</i> (Mayr, 1878)	Winkler	Litter	Rare
<i>Apterostigma pilosum</i> (Mayr, 1865)	Pitfall	Litter	Rare
<i>Apterostigma urichii</i> (Forel, 1892)	Pitfall	Litter	Rare
<i>Atta cephalotes</i> (Linnaeus, 1758)	Manual	Litter, soil	Rare
<i>Atta laevigatta</i> (Fr. Smith, 1858)	Pitfall	Litter, soil	Rare

Continued

<i>Atta sexdens</i> (Linnaeus, 1758)	Manual	Litter, soil	Rare
<i>Blepharidatta brasiliensis</i>	Pitfall, Winkler	Litter, soil	Abundant
<i>Cardiocondyla emeryi</i> (Forel, 1881)	Winkler	Litter	Rare
<i>Carebara urichi</i> (Wheeler, 1922)	Winkler	Litter	Frequent
<i>Cephalotes atratus</i> (Linnaeus, 1758)	Pitfall, Winkler	Litter	Frequent
<i>Cephalotes depressus</i> (Klug, 1824)	Manual	Tree	Rare
<i>Crematogaster abstinens</i> (Forel, 1899)	Winkler	Litter	Rare
<i>Crematogaster brasiliensis</i> (Mayr, 1878)	Pitfall, Winkler	Litter	Abundant
<i>Crematogaster carinata</i> (Mayr, 1862)	Pitfall, Winkler	Litter, vegetation	Frequent
<i>Crematogaster crinosa</i> (Mayr, 1862)	Winkler	Litter, vegetation	Rare
<i>Crematogaster curvispinosa</i> (Mayr, 1862)	Winkler	Litter, vegetation	Frequent
<i>Crematogaster flavosensitiva</i> (Longino, 2003)	Isca, Pitfall, Winkler	Litter	Frequent
<i>Crematogaster levior</i> (Longino, 2003)	Pitfall, Winkler	Litter	Rare
<i>Crematogaster limata</i> (Fr. Smith, 1858)	Winkler	Litter, vegetation	Abundant
<i>Crematogaster nigropilosa</i> (Mayr, 1870)	Winkler	Litter, vegetation	Rare
<i>Crematogaster sotobosque</i> (Longino, 2003)	Bait, Pitfall, Winkler	Litter, vegetation	Abundant
<i>Crematogaster stollii</i> (Forel, 1885)	Manual	Tree	Frequent
<i>Crematogaster tenuicula</i> (Forel, 1904)	Pitfall, Winkler	Litter, vegetation	Abundant
<i>Cyphomyrmex hamulatus</i> (Weber, 1938)	Pitfall	Litter	Rare
<i>Cyphomyrmex laevigatus</i> (Weber, 1938)	Pitfall	Litter	Rare
<i>Cyphomyrmex rimosus</i> (Spinola, 1851)	Pitfall	Litter	Rare
<i>Daceton armigerum</i> (Latreille, 1802)	Manual	Litter, vegetation	Frequent
<i>Lachnomyrmex nordestinus</i> (Feitosa & Brandão, 2008)	Winkler	Litter	Rare
<i>Lachnomyrmex pilosus</i> (Weber, 1950)	Winkler	Litter	Rare
<i>Lachnomyrmex plaumani</i> (Borgmeier, 1957)	Winkler	Litter	Rare
<i>Monomorium pharaonis</i> (Linnaeus, 1758)	Winkler	Litter	
<i>Mycetarotes acutus</i> (Mahy�-Nunes, 1995)	Pitfall	Litter	Rare
<i>Mycetarotes parallelus</i> (Emery, 1906)	Pitfall	Litter	Rare
<i>Mycocepurus smithii</i> (Forel, 1893)	Pitfall	Litter	Rare
<i>Myrmicocrypta foreli</i> (Mann, 1916)	Pitfall	Litter	Rare
<i>Octostruma balzani</i> (Emery, 1894)	Winkler	Litter	Abundant
<i>Pheidole peltastes</i> (Wilson, 2003)	Winkler	Litter	Rare
<i>Pheidole subarmata</i> (Mayr, 1883)	Winkler	Litter	Frequent
<i>Pheidole susannae</i> (Forel, 1886)	Winkler	Litter	Abundant
<i>Procryptocerus goeldii</i> (Forel, 1899)	Winkler	Litter	Rare
<i>Rogeria belti</i> (Mann, 1922)	Winkler	Litter	Rare
<i>Rogeria curvipubens</i> (Emery, 1894)	Winkler	Litter	Rare

Continued

<i>Rogeria foreli</i> (Emery, 1894)	Winkler	Litter	Rare
<i>Rogeria lirata</i> (Kugler, 1995)	Winkler	Litter	Rare
<i>Sericomyrmex luederwaldti</i> (Santschi, 1925)	Pitfall	Litter	Rare
<i>Sericomyrmex parvulus</i> (Forel, 1912)	Pitfall	Litter	Frequent
<i>Solenopsis geminata</i> (Fabricius, 1804)	Winkler	Litter	Frequent
<i>Solenopsis saevissima</i> (Fr. Smith, 1855)	Winkler	Litter	Frequent
<i>Strumigenys alberti</i> (Forel, 1893)	Winkler	Litter	Rare
<i>Strumigenys auctidens</i> (Bolton, 2000)	Winkler	Litter	Rare
<i>Strumigenys beebei</i> (Wheeler, 1915)	Winkler	Litter	Rare
<i>Strumigenys borgmeieri</i> (Brown, 1954)	Winkler	Litter	Rare
<i>Strumigenys carinithorax</i> (Borgmeier, 1934)	Winkler	Litter	Rare
<i>Strumigenys cosmstela</i> (Kempf, 1975)	Pitfall, Winkler	Litter	Frequent
<i>Strumigenys crassicornis</i> (Mayr, 1887)	Winkler	Litter	Rare
<i>Strumigenys denticulata</i> (Mayr, 1887)	Winkler	Litter	Rare
<i>Strumigenys diabola</i> (Bolton, 2000)	Pitfall, Winkler	Litter	Rare
<i>Strumigenys elongata</i> (Roger, 1863)	Winkler	Litter	Abundant
<i>Strumigenys hadrodens</i> (Bolton, 2000)	Winkler	Litter	Rare
<i>Strumigenys hyphata</i> (Brown 1953)	Winkler	Litter	Rare
<i>Strumigenys inusitata</i> (Lattke, 1992)	Winkler	Litter	Rare
<i>Strumigenys perdita</i> (Bolton, 2000)	Pitfall, Winkler	Litter	Frequent
<i>Strumigenys perparva</i> (Brown 1958)	Winkler	Litter	Abundant
<i>Strumigenys precava</i> (Brown 1954)	Winkler	Litter	Rare
<i>Strumigenys ruta</i> (Bolton, 2000)	Winkler	Litter	Rare
<i>Strumigenys schulzi</i> (Emery, 1894)	Winkler	Litter	Rare
<i>Strumigenys smithii</i> (Forel, 1886)	Winkler	Litter	Rare
<i>Strumigenys splendens</i> (Borgmeier, 1954)	Winkler	Litter	Rare
<i>Strumigenys subdentata</i> (Mayr, 1887)	Winkler	Litter	Rare
<i>Strumigenys trinidadensis</i> (Wheeler, 1922)	Winkler	Litter	Frequent
<i>Strumigenys trudifera</i> (Kempf & Brown 1969)	Winkler	Litter	Abundant
<i>Strumigenys villiersi</i> (Perault, 1986)	Winkler	Litter	Rare
<i>Tetramorium bicarinatum</i> (Nylander, 1846)	Winkler	Litter	Rare
<i>Trachymyrmex bugnoni</i> (Forel, 1912)	Pitfall	Litter	Rare
<i>Trachymyrmex farinosus</i> (Emery, 1894)	Pitfall	Litter	Rare
<i>Trachymyrmex levis</i> (Weber, 1938)	Pitfall	Litter	Rare
<i>Trachymyrmex mandibularis</i> (Wheeler, 1938)	Pitfall	Litter	Frequent
<i>Trachymyrmex opulentus</i> (Mann, 1922)	Pitfall	Litter	Rare
<i>Trachymyrmex relictus</i> (Borgmeier, 1934)	Pitfall	Litter	Rare

Continued

<i>Trachymyrmex ruthae</i> (Weber, 1937)	Pitfall	Litter	Rare
<i>Wasmannia auropunctata</i> (Roger, 1863)	Pitfall, Winkler	Litter	Abundant
<i>Wasmannia scrobifera</i> (Kempf, 1961)	Pitfall, Winkler	Litter	Abundant
Paraponerinae			
<i>Paraponera clavata</i> (Fabricius, 1775)	Manual	Litter, soil	Rare
Ponerinae			
<i>Anochetus bispinosus</i> (Fr. Smith, 1858)	Manual	Litter, vegetation	Rare
<i>Anochetus diegensis</i> (Forel, 1912)	Winkler	Litter	Frequent
<i>Anochetus horridus</i> (Kempf, 1964)	Winkler	Litter	Frequent
<i>Anochetus mayri</i> (Emery, 1894)	Winkler	Litter	Abundant
<i>Anochetus neglectus</i> (Emery, 1894)	Winkler	Litter	Rare
<i>Anochetus targionii</i> (Emery, 1894)	Winkler	Litter	Frequent
<i>Dinoponera gigantea</i> (Perty, 1833)	Pitfall	Litter	Rare
<i>Hypoponera distinguenda</i> (Emery, 1890)	Winkler	Litter	Abundant
<i>Leptogenys famelica</i> (Emery, 1896)	Pitfall	Litter	Rare
<i>Leptogenys gaigei</i> (Wheeler, 1923)	Winkler	Litter	Rare
<i>Leptogenys guianensis</i> (Wheeler, 1923)	Winkler	Litter	Rare
<i>Leptogenys langi</i> (Wheeler, 1916)	Winkler	Litter	Rare
<i>Leptogenys linearis</i> (Fr. Smith, 1858)	Winkler	Litter	Rare
<i>Leptogenys paraense</i> (Lattke, 2011)	Winkler	Litter	Rare
<i>Leptogenys unistimulosa</i> (Roger, 1863)	Pitfall	Litter	Rare
<i>Leptogenys vogeli</i> (Borgmeier, 1933)	Winkler	Litter	Rare
<i>Mayaponera constricta</i> (Mayr, 1884)	Pitfall, Winkler	Litter	Abundant
<i>Neoponera apicalis</i> (Latreille, 1802)	Pitfall, Winkler	Litter	Frequent
<i>Neoponera bucki</i> (Borgmeier, 1927)	Winkler	Litter	
<i>Neoponera crenata</i> (Roger, 1861)	Winkler	Litter	Rare
<i>Neoponera laevigata</i> (Fr. Smith, 1858)	Manual	Litter	Rare
<i>Neoponera obscuricornis</i> (Emery, 1890)	Pitfall, Winkler	Litter	Frequent
<i>Neoponera unidentata</i> (Mayr, 1862)	Winkler	Litter	Frequent
<i>Neoponera verenae</i> (Forel, 1922)	Winkler	Litter	Rare
<i>Neoponera villosa</i> (Fabricius, 1804)	Manual	Tree	Rare
<i>Odontomachus bauri</i> (Emery, 1892)	Pitfall, Winkler	Litter, vegetation	Rare
<i>Odontomachus biumbunatus</i> (Brown 1976)	Pitfall	Litter	Rare
<i>Odontomachus brunneus</i> (Patton, 1894)	Winkler	Litter	Frequent
<i>Odontomachus caelatus</i> (Brown 1976)	Winkler	Litter	Rare
<i>Odontomachus haematodus</i> (Linnaeus, 1758)	Winkler	Litter	Frequent
<i>Odontomachus hastatus</i> (Fabricius, 1804)	Manual	Vegetation	Frequent

Continued

<i>Odontomachus laticeps</i> (Roger, 1861)	Winkler	Litter	Frequent
<i>Odontomachus meinerti</i> (Forel, 1905)	Winkler	Litter	Frequent
<i>Odontomachus scalptus</i> (Brown 1978)	Pitfall, Winkler	Litter	Abundant
<i>Pachycondyla commutata</i> (Roger, 1860)	Pitfall, Winkler	Litter	Rare
<i>Pachycondyla crassinoda</i> (Latreille, 1802)	Pitfall, Winkler	Litter	Frequent
<i>Pachycondyla harpax</i> (Fabricius, 1804)	Pitfall, Winkler	Litter	Abundant
<i>Pachycondyla impressa</i> (Roger, 1861)	Winkler	Litter	Rare
<i>Pachycondyla lenis</i> (Kempf, 1961)	Winkler	Litter	Frequent
<i>Pachycondyla magnifica</i> (Borgmeier, 1929)	Pitfall, Winkler	Litter	Rare
<i>Pachycondyla striata</i> (Fr. Smith, 1858)	Winkler	Litter	Rare
<i>Pseudoponera stigma</i> (Fabricius, 1804)	Winkler	Litter	Frequent
<i>Rasopone arhuaca</i> (Forel, 1901)	Pitfall, Winkler	Litter	Frequent
<i>Rasopone ferruginea</i> (Fr. Smith, 1858)	Pitfall, Winkler	Litter	Frequent
<i>Simopelta bicolor</i> (Borgmeier, 1950)	Winkler	Litter	Rare
<i>Thaumatomyrmex ferox</i> (Mann, 1922)	Winkler	Litter	Rare
Proceratiinae			
<i>Discothyrea sexarticulata</i> (Borgmeier, 1954)	Winkler	Litter	Rare
Pseudomyrmecinae			
<i>Pseudomyrmex elongatus</i> (Mayr, 1870)	Manual	Tree	Rare
<i>Pseudomyrmex faber</i> (Fr. Smith, 1858)	Manual	Tree	Rare
<i>Pseudomyrmex gracilis</i> (Fabricius, 1804)	Manual	Tree	Rare
<i>Pseudomyrmex sericeus</i> (Mayr, 1870)	Manual	Tree	Rare
<i>Pseudomyrmex tenuis</i> (Fabricius, 1804)	Manual, Winkler	Litter, Tree	Frequent
<i>Pseudomyrmex termitarius</i> (Fr. Smith, 1855)	Manual	Litter, soil	Frequent
<i>Pseudomyrmex unicolor</i> (Fr. Smith, 1855)	Manual	Tree	Rare