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Lists of Species

Ants (Formicidae) and Spiders (Araneae) listed from the Metropolitan Region of Salvador, Brazil

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Abstract: We present an ant and spider species list from five localities of the Metropolitan Region of Salvador (MRS). The MRS is placed in an Atlantic Forest area classified as dense broadleaf forest, considered to be of high biological importance and priority for conservation. We determined 198 species of ants (8 of these are considered to be synanthropic and/or exotic), distributed across nine subfamilies. We determined 164 species of spiders (14 of them being synanthropic and/or exotic), distributed across thirty families. Therefore, this survey shows that the urban environment of the MRS still harbors a large number of native fauna species.

Introduction

Among the major causes of biodiversity loss are changes in natural environments caused by cities emergence (McKinney 2002, McKinney 2006, Faeth *et al.* 2011). Urban environments favor species that are adapted to degraded environments (McKinney 2006; Shochat *et al.* 2010; Faeth *et al.* 2011), although, they can also contribute to the maintenance of native biodiversity (Dearborn and Kark 2010; Kowarik 2011) and rare and threatened species as well (Lundholm and Richardson 2010; Kowarik 2011). For integrated urban planning (Niemela 1999), faunal inventories focusing on management and conservation of biodiversity are of remarkable importance (Byrne 2007) since the first step to conserve a certain area is, undoubtedly, to know its fauna and flora (Pearson 1994).

Regarding the fauna of urban environments, arthropods deserve main attention for several reasons: (1) they provide a picture of the global biological diversity of a certain area; (2) generally, these species have short reproductive cycles and rapidly respond to anthropogenic disturbances; (3) they are easily sampled; (4) they characterize different tropic levels and (5) they are important elements to infer sociologic, agronomic and economic conditions (McIntyre 2000). However, for arthropods, specifically ants and spiders, previous studies investigating patterns of distribution in urban habitats are scarce (McIntyre 2000, Pacheco and Vasconcelos 2007; Faeth *et al.*, 2011).

Ants add a large portion of the total animal biomass in most tropical terrestrial ecosystems (Hölldobler and Wilson 1990), representing a dominant group of invertebrates in tropical regions with 15,626 described species and subspecies (Bolton 2013). By feeding on a wide variety of living and dead organisms, ants play a role in nutrient cycling, soil ventilation, regulation of populations of terrestrial invertebrates, and seed dispersal (Fernández 2003). Spiders are a mega-diverse group with 44,032 described species (Platnick 2013), distributed in all environments, except for oceanic and polar regions (Foelix 2011). They present relevant ecological function as regulators of other invertebrate populations (Aguilar 1988, Flórez 2000).

The Metropolitan Region of Salvador (MRS), capital city of the state of Bahia, is among the largest and oldest metropolitan regions of Brazil (IBGE 2010). The MRS, which is constituted by thirteen municipalities, is inserted in the Atlantic Forest domain and is severely altered by urbanization process (IBGE 2010). Classified as moist broadleaf forest, the Atlantic Forest remnants of MRS are of high biological importance and priority for conservation of invertebrates (MMA 2002). Studies on ant and spider fauna are scant, except for ants occurring in houses or hospitals in different localities of the state (Delabie 1993, Delabie *et al.* 1995, 2002, Aquino *et al.* 2013), and for spiders occurring in forest fragments and houses in the capital (Brazil *et al.* 2005, Melo *et al.* 2011). Consequently, the aim of this study is to present a list of ant and spider species found in urban habitats (forest fragment, vacant lots and garden/residential backyards) from five cities of the MRS.

Materials and Methods

The MRS covers a territory of 4,337.72 km^2 and has a population of 3,799,589 inhabitants (SEDUR 2011). The climate is hot with annual mean temperatures above 18°C and a maximum of two dry months per year (IBGE 2002). The survey was carried out from July to October 2012 in forest fragments embedded in urban matrix of

the following localities: Salvador, Lauro de Freitas, Simões Filho, Camaçari and Mata de São João. In Salvador, we also sampled vacant lots and gardens/residential backyards in residential areas. In the forest remnants we collected ants and spiders in a total of 100 sampling points, besides 20 points in vacant lots and others 20 in gardens/residential backyards (Table 1). Per sampling point we collected these invertebrates using: Winkler traps (50x50 cm samples of soil or leaf litter for 24 h), diurnal manual sampling (15 minutes) and entomological umbrella (three shrubs with 1 m^2 of fabric) (Bestelmeyer *et al.* 2000). We used the same sampling scheme and effort in the three habitat types (forests fragments, vacant lots and gardens/residential backyards).

Specimen collection was approved and received license number 33828-1 from MMA/SISBIO and 15-2012 from INEMA/DIRUC. Ants were identified and deposited in the collection of the Laboratory of Myrmecology (acronym CPDC), under the number#5703. Spiders were identified and are deposited in the spider collection of Butantan Institute, São Paulo (IBSP) (curator D.M. Barros Battesti), under the number #164953.

Results

Ants

198 species distributed across nine subfamilies were identified (Table 2). The highest richness of ant species was found in Salvador city (n=164) (which was also the site with the highest sampling effort), followed by Lauro de Freitas (78), Mata de São João (76), Simões Filho (75) and Camaçari (66). The richest families were Myrmicinae (111 species), Formicinae (27) and Ponerinae (26) and the richest genera *Pheidole* (42), *Camponotus* (16) and *Pseudomyrmex* (13). Eight ant species were considered to be synanthropic and/or exotic (Table 2).

Spiders

We collected 164 species from 30 families (Table 3). The highest spider richness was found at Salvador (n=116) (which was too the city with the highest sampling effort), followed by Mata de São João (55), Simões Filho (54), Lauro de Freitas (50) and Camaçari (48). The richest families were Salticidae (32 species), Theridiidae (32) and Araneidae (25). The richest genera were *Dipoena*, *Episinus*, *Micrathena* and *Theridion*, with four species each. Between all these spider species, 14 are considered to be synanthropic and/or exotic (Table 3).

Discussion

Ants

Previous studies (using different methodologies and duration of sampling) conducted in urban environments of the Atlantic Forest ecoregion recorded 86 (Munhae *et al.* 2009), 67 (Iop *et al.* 2009), 55 (Benati *et al.* 2011) and 33 species (Dáttilo *et al.* 2011), 21 species in cities of the Amazonian rainforest (Marques *et al.* 2002) and 143 species in urban sites of Cerrado (Pacheco and Vasconcelos 2007). Besides revealing the highest record of ant diversity for an urban matrix in Brazil, this study presents an ant diversity similar and even higher to other studies conducted in natural habitats of the Atlantic Forest (Feitosa and Ribeiro 2005, Santos *et al.* 2006, Rosumek *et al.* 2008, Coelho *et al.* 2009, Figueiredo *et al.* 2012).

In the MRS, the subfamilies Formicinae, Myrmicinae and Ponerinae showed the greatest number of species that are among the subfamilies with the highest species richness in the world (Bolton 2013). It is worthy to note that this pattern is maintained in urban or disturbed natural sites (Iop *et al.* 2009, Benati *et al.* 2011, Dáttilo *et al.* 2011).

Spiders

In the MRS, we recorded 5.1% of the spider richness of Brazil (Brescovit *et al.* 2011). Studies performed (using different methodologies and sampling time) in Atlantic Forest fragments inserted in urban centers recorded: 170 species in Salvador (Melo *et al.* 2011), 166 species in João Pessoa (Dias *et al.* 2006), 151 species in Recife (Peres *et al.* 2007) and 46 species in São Paulo (Candiani *et al.* 2005). A survey conducted in a fragment of Atlantic Forest in the RMS, but outside the urban matrix, found 130 species (Pinto-Leite *et al.* 2008). These results show that a richness of 164 species found in the MRS is rather similar to the values observed in other metropolis of the Brazilian Northeast.

In the MRS, Araneidae, Salticidae and Theridiidae presented the highest number of species. This group of spiders are among the richest spider families in the world (Platnick 2013), and particularly for non-natural areas or disturbed environments, the pattern is maintained (Candiani *et al.* 2005, Dias *et al.* 2006, Peres *et al.* 2007, Melo *et al.* 2011).

Synanthropic and Exotic Species

In the MRS, 22 species are synanthropic and/or exotic (Tables 2 and 3). This high number of species could be related to environmental disturbances originated by cities inserted in either biome (Kowarik 2011), which favor introduction and prevalence of non-native and synanthropic species (McKinney 2006). Such species are good competitors that efficiently exploite resources from urban or highly impacted environments (McKinney 2006).

Exotic ants recorded here originated, in general, from Asia or Africa (Delabie 1993), while introduced spider species are from Europe and Asia (Brescovit *et al.* 2011). In our survey, it is to be noted that the exotic ant *Monomorium pharaonis* Linnaeus, 1958 was not recorded, nor either the spider *Physocyclus globosus* Taczanowski, 1874. We know that these species are frequent in the state of Bahia (*M. pharaonis*) and at Salvador (*P. globosus*), where they are easily found in house interiors (Delabie 1993, Delabie *et al*. 1995, Brazil *et al.* 2005), however, these sites were not sampled in this study. Despite the high incidence of exotic and synanthropic ants and spiders recorded, these species only represented 6% of the total species collected in the MRS (362 ant and spider species). In conclusion, our survey shows that the urban environment of the MRS still harbors a large number of native fauna species.

Table 1. Sampling sites of ants and spiders in the Metropolitan Region of Salvador during the months of July and October, 2012.

MUNICIPALITY	MUNICIPAL HEAD OFFICE COORDINATES	TOTAL SAMPLING POINTS	SAMPLED HABITATS	FRAGMENT COORDINATES
Salvador	12.97°S, 38.51°O	100	6 forest fragments, 20 vacant lots, 20 gardens/ residential backyards	12°58′30″ S, 38°26′35″ W 12°55′55″ S, 38°26′07″ W 12°59′57″ S, 38°28′16″ W 13°00′18″ S, 38°30′21″ W 12°53′49″ S, 38°28′11″ W 12°57′47″ S, 38°24′44″ W
Lauro de Freitas	12.89°S, 38.32°O	20	2 forest fragments	12°54′29″ S, 38°20′04″ W 12°53′42″ S, 38°21′48″ W
Simões Filho	12.78°S, 38.4°O	20	2 forest fragments	12°48′09″ S, 38°22′55″ W 12°48′17″ S, 38°23′50″ W
Camaçari	12.69°S, 38.32°O	20	2 forest fragments	12°41′00″ S, 38°17′10″ W 12°40′25″ S, 38°20′00″ W
Mata de São João	12.52°S, 38.29°O	20	2 forest fragments	12°31′02″ S, 38°16′22″ W 12°29′55″ S, 38°16′11″ W

Table 2. Ant species collected in the Metropolitan Region of Salvador between July and October of 2012 in the cities: Salvador (SA), Lauro de Freitas (LF), Simões Filho (SF), Camaçari (CA) and Mata de São João (MSJ). Habitats types: Forest Fragments (FF), Vacant Lots (VL) and Garden/residential Backyards (GB). *Exotic species. †Synanthropic species.

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
AMBLYOPONINAE							
Prionopelta sp.1			X				
CERAPACHYINAE							
Cerapachys splendens Borgmeier, 1957						X	
DOLICHODERINAE							
Azteca alfari Emery, 1894		X					
Azteca ovaticeps Forel, 1904		X					X
Azteca sp.1	X			X			X
Azteca sp.2	X	X				X	X
Dolichoderus attelaboides (Fabricius, 1775)				X			X
Dolichoderus imitator Emery, 1894	X				X		
Dolichoderus lutosus (Fr. Smith, 1858)				X	X		X
Dorymyrmex sp.1	X	X	X				
Dorymyrmex thoracicus Gallardo, 1916		X	X				
Linepithema neotropicum Wild, 2007	X	X	X	X		X	X
Tapinoma melanocephalum (Fabricius, 1793) *	X	X	X	X	X		X
Tapinoma sp.1	X			X	X	X	
ECITONINAE							
Neivamyrmex gibbatus Borgmeier, 1953							X
Neivamyrmex pilosus (Smith, 1858)				X			
ECTATOMMINAE							
Ectatomma muticum Mayr, 1870	X	X	X	X		X	X
Ectatoma opaciventre Roger, 1861					X		
Ectatomma tuberculatum (Olivier, 1791)	X	X		X	X	X	X
Gnamptogenys striatula Radoskowsky, 1884						X	X
Gnamptogenys sulcata (Fr. Smith, 1858)					X		
FORMICINAE							
Acropyga decedens Mayr, 1887	X					X	
Brachymyrmex heeri Forel, 1874	X		X	X	X	X	X
Brachymyrmex patagonicus Mayr, 1868		X	X				
Brachymyrmex sp.1		X	X				
Brachymyrmex sp.2		X	X				
Camponotus arboreus (Fr. Smith, 1858)	X	X	X	X			
Camponotus atriceps (Fr. Smith, 1858)	X		X				
Camponotus bidens Mayr, 1870	X				X		X
Camponotus blandus (Fr. Smith, 1858)		X	X				
Camponotus cingulatus (Mayr, 1862)	X			X	X		

Table 2. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
Camponotus fastigatus Roger, 1863	X	X	X	X	X		X
Camponotus melanoticus Emery, 1894		X	X			X	X
Camponotus novogranadensis Mayr, 1870	X	X	X	X			X
Camponotus rectangularis Emery, 1890	X	X		X	X	X	X
Camponotus renggeri Emery, 1894				X			X
Camponotus senex (Smith, 1858)	X	X	X				X
Camponotus sexguttatus (Fabricius, 1793)					X		
Camponotus sp.1	X						
Camponotus sp.2		X		X			
Camponotus trapezoideus Mayr, 1870				X			X
Camponotus vittatus Forel, 1904		X					
Nylanderia sp.1	X		X	X	X	X	X
Nylanderia sp.2	X	X	X	X	X		X
Nylanderia sp.3	X		X	X	X	X	X
Nylanderia sp.4				X			
Nylanderia sp.5				X			
Paratrechina longicornis (Latreille, 1802) *		X	X				
MYRMICINAE							
Acanthognathus rudis Brown & Kempf, 1969						X	
Acromyrmex rugosus (Fr. Smith, 1858)		X	X				
Acromyrmex subterraneus brunneus Forel, 1911	X	X	X		X		X
Acromyrmex subterraneus subterraneus Forel, 1893		X	X	X			
Apterostigma sp.1	X				X		X
Atta cephalotes Linnaeus, 1758		X					X
Atta opaciceps Borgmeier, 1939	X	X	X	X		X	X
Basiceros balzani Emery, 1894	X						
Basiceros iheringi Emery, 1888	X			X		X	
Basiceros rugifera (Mayr, 1887)	X						
Basiceros sp.1	X						
Cardiocondyla obscurior Wheeler, 1929 *	X	X	X				
Carebara sp.1	X	X		X		X	
Carebara urichi Wheeler, 1922	X						X
Cephalotes atratus (Linnaeus, 1758)						X	X
Cephalotes minutus (Fabricius,1804)	X	X	X	X	X		X
Cephalotes pallidoides De Andrade, 1999	X					X	
Cephalotes pinelii De Andrade, 1999			X				
Cephalotes pusillus (Klug, 1824)							X
Cephalotes umbraculatus (Fabricius, 1804)				X			
Crematogaster abstinens Forel, 1899		X	X		X		
Crematogaster carinata Mayr, 1862	X			X	X	X	X
Crematogaster curvispinosa Mayr, 1862	X	X		X		X	
Crematogaster erecta Mayr, 1866	X	X	X	X		X	
Crematogaster limata Fr. Smith, 1858	X			X	X	X	X
Crematogaster sp.1	X						
Crematogaster tenuicula Forel, 1904	X				X	X	X
Crematogaster victima Fr. Smith, 1858	X		X				
Cyphomyrmex rimosus (Spinola, 1853)	X		X	X	X	X	X
Cyphomyrmex transversus Emery, 1894	X	X	X		X	X	
Lachnomyrmex victori Feitosa & Brandão, 2008	X				X		
Megalomyrmex sp.1	X						
Monomorium destructor (Jerdon, 1851) *	X			X			
Monomorium floricola (Jerdon, 1852) *	X	X	X	X		X	X
Mycocepurus goeldii Forel, 1893	X				X	X	X
Mycocepurus smithi Forel, 1893	X				X		X
Nesomyrmex spininodis Mayr, 1887	X						
Nesomyrmex tristani Emery, 1896	X			X		X	
Pheidole (complex *flavens*) sp.2	X	X	X	X	X	X	X

Table 2. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
Pheidole (complex *flavens*) sp.3	X					X	
Pheidole (group *diligens*) sp.1	X	X	X				
Pheidole (group *diligens*) sp.12		X			X		X
Pheidole (group *diligens*) sp.17							X
Pheidole (group *diligens*) sp.27	X					X	
Pheidole (group *diligens*) sp.28		X				X	
Pheidole (group *diligens*) sp.29							X
Pheidole (group *diligens*) sp.30					X		
Pheidole (group *diligens*) sp.32	X				X		
Pheidole (group *diligens*) sp.8							X
Pheidole (group *fallax*) sp.13	X	X	X				
Pheidole (group *fallax*) sp.24			X				
Pheidole (group *fallax*) sp.31		X					
Pheidole (group *fallax*) sp.5	X	X	X	X			X
Pheidole (group *fallax*) sp.6	X	X	X	X			
Pheidole (group *fallax*) sp.7	X		X	X	X	X	X
Pheidole (group *fallax*) sp.8			X				
Pheidole (group *fallax*) sp.9			X			X	
Pheidole (group *flavens*) sp.10				X			
Pheidole (group *flavens*) sp.21	X	X			X	X	
Pheidole (group *flavens*) sp.22	X			X			
Pheidole (group *flavens*) sp.23	X				X		
Pheidole (group *tristis*) sp.11			X				
Pheidole (group *tristis*) sp.14					X		
Pheidole (group *tristis*) sp.15	X			X			
Pheidole (group *tristis*) sp.16	X			X	X		
Pheidole (group *tristis*) sp.19		X	X				
Pheidole (group *tristis*) sp.20	X						X
Pheidole (group *tristis*) sp.25		X	X		X	X	
Pheidole (group *tristis*) sp.26	X				X		
Pheidole (group *tristis*) sp.33					X		
Pheidole (group *tristis*) sp.34			X				
Pheidole (group *tristis*) sp.35	X						X
Pheidole diligens (Smith, 1858)	X	X		X	X	X	X
Pheidole fimbriata Roger, 1863	X	X			X		
Pheidole midas Wilson, 2003	X			X	X		X
Pheidole obscurithorax Naves, 1985	X	X				X	
Pheidole radoszkowskii Mayr, 1884	X			X	X	X	X
Pheidole sp.4	X						
Pheidole synarmata Wilson, 2003	X	X	X	X	X	X	X
Pheidole transversostriata Mayr, 1887	X			X	X	X	X
Rogeria besucheti Kugler, 1994	X					X	
Rogeria foreli Emery, 1894				X			
Rogeria germaini Emery, 1894		X					
Sericomyrmex sp.1	X						
Sericomyrmex sp.2	X					X	
Solenopsis geminata (Fabricius, 1804)	X		X				
Solenopsis globularia (Fr. Smith, 1858)			X				
Solenopsis sp.1	X	X	X	X	X	X	X
Solenopsis sp.2	X		X				
Solenopsis sp.3	X	X	X				
Solenopsis sp.4	X	X	X	X	X	X	X
Solenopsis sp.5	X			X	X	X	X
Solenopsis sp.6	X						
Strumigenys carinithorax Borgmeier, 1934				X			
Strumigenys conspersa Emery, 1906		X		X		X	
Strumigenys denticulata Mayr, 1887	X	X	X	X	X	X	X

Table 2. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
Strumigenys diabola Bolton, 2000	X						
Strumigenys elongata Roger, 1863	X				X	X	
Strumigenys ogloblini Santschi, 1936	X	X	X	X			X
Strumigenys sp.1	X						
Strumigenys subedentata Mayr, 1887	X			X	X	X	X
Strumigenys trinidadensis Wheeler, 1922		X					
Tetramorium bicarinatum (Nylander, 1846) *		X					
Tetramorium lucayanum Wheeler, 1905 *	X	X	X				
Tetramorium simillium (Fr. Smith, 1851) *		X					
Trachymyrmex sp.1	X	X	X		X		
Trachymyrmex sp.2	X						X
Trachymyrmex sp.3							X
Trachymyrmex sp.4	X		X	X			
Wasmannia auropunctata (Roger, 1863)	X	X	X	X	X	X	X
Wasmannia rochai Forel, 1912	X		X	X	X		X
PONERINAE							
Anochetus simoni Emery, 1890	X						
Anochetus targionii Emery, 1894	X	X	X	X			
Hypoponera foreli Mayr, 1887				X	X		
Hypoponera sp.1	X					X	X
Hypoponera sp.2	X	X		X	X		X
Hypoponera sp.3	X	X	X	X	X	X	X
Hypoponera sp.4	X			X			
Hypoponera sp.5	X	X			X	X	X
Hypoponera sp.6	X						
Leptogenys arcuata Roger, 1861		X	X				
Leptogenys bohlsi Emery, 1896						X	
Odontomachus bauri Emery, 1891		X	X			X	
Odontomachus brunneus (Patton, 1894)			X				X
Odontomachus haematodus (Linnaeus, 1758)	X	X	X	X	X		
Odontomachus meinerti Forel, 1905	X			X	X	X	X
Pachycondyla prox. *magnifica*	X						
Pachycondyla apicalis (Latreille, 1802)	X				X		X
Pachycondyla arhuaca (Forel, 1901)					X		
Pachycondyla concava MacKay & MacKay, 2010	X				X		
Pachycondyla constricta (Mayr, 1883)	X			X	X		
Pachycondyla crassinoda (Latreille, 1802)	X				X	X	X
Pachycondyla ferruginea (Fr. Smith, 1858)					X		
Pachycondyla harpax (Fabricius, 1804)	X	X	X	X			
Pachycondyla impressa Roger, 1861	X	X					
Pachycondyla verenae (Forel, 1922)	X					X	
Thaumatomyrmex sp.2	X				X		X
PSEUDOMYRMECINAE							
Pseusdomyrmex elongatus (Mayr, 1870)	X	X	X		X	X	
Pseudomyrmex (group *pallidus*) sp.1	X	X	X	X	X	X	X
Pseudomyrmex (group *pallidus*) sp.2				X	X		
Pseudomyrmex (group *pallidus*) sp.3				X			
Pseudomyrmex (group *pallidus*) sp.4							X
Pseudomyrmex filiformis (Fabricius, 1804)	X	X		X			X
Pseudomyrmex gracilis (Fabricius, 1804)	X	X		X	X	X	
Pseudomyrmex oculatus (Fr. Smith, 1855)	X	X	X	X	X	X	X
Pseudomyrmex rochai (Forel, 1912)	X						
Pseudomyrmex simplex (Fr. Smith, 1877)	X	X	X		X	X	
Pseudomyrmex tenuis (Fabricius,1804)	X	X		X	X	X	X
Pseudomyrmex tenuissimus (Emery, 1905)		X					
Pseudomyrmex termitarius (Fr. Smith, 1855)	X	X	X				
RICHNESS		**164**		**78**	**75**	**66**	**76**

Table 3. Spider species collected in the Metropolitan Region of Salvador between July and October of 2012 in the cities: Salvador (SA), Lauro de Freitas (LF), Simões Filho (SF), Camaçari (CA) and Mata de São João (MSJ). Habitats types: Forest Fragments (FF), Vacant Lots (VL) and Garden/residential Backyards (GB). *Exotic species. †Synanthropic species.

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
ANAPIDAE							
Pseudanapis sp.1		X			X		
ANYPHAENIDAE							
Hibana melloleitaoi (Caporiacco, 1947)	X			X			
Wulfila sp.1	X			X		X	
ARANEIDAE							
Alpaida sp.1					X		
Alpaida tayos Levi, 1991	X					X	
Alpaida truncata (Keyserling, 1861)	X						
Araneidae sp.1							X
Araneidae sp.2	X						
Araneus guttatus (Keyserling, 1861)	X					X	
Araneus tijuca Levi, 1991	X			X	X	X	
Argiope argentata (Fabricius, 1771)*		X	X	X		X	
Bertrana sp.1	X				X		
Chaetacis picta (C. L. Koch, 1836)						X	
Chaetacis sp.1					X		
Cyclosa filililineata Hingston, 1932					X	X	
Eriophora sp.1				X			
Eustala sp.1	X						
Eustala sp.2	X						
Eustala sp.3	X						
Gasteracantha cancriformis (Linnaeus, 1718)*	X	X	X				
Hypognatha sp.1	X						
Mangora sp.1				X	X	X	
Metazygia aff. *rogenhoferi*	X						
Metazygia dubia (Keyserling, 1864)	X						
Micrathena fissispina (C. L. Koch, 1836)	X			X	X	X	X
Micrathena horrida (Taczanowski, 1873)		X		X			
Micrathena schreibersi (Perty, 1833)	X		X	X	X		
Micrathena triangularispinosa (De Geer, 1778)	X		X	X			
CAPONIIDAE							
Nops sp.1	X						
CORINNIDAE							
Corinna sp.2						X	X
Corinna sp.3			X				
Corinna sp.4						X	X
Orthobula sp.1	X						X
Trachelopachys sp.1					X		
CTENIDAE							
Celaetycheus sp.1	X				X		
Ctenus rectipes F. O. P. Cambridge, 1897				X		X	X
Enoploctenus sp.1	X			X			
Isoctenus sp.1				X			X
DICTYNIDAE							
Dictyna sp.1	X			X			X
HAHNIIDAE							
Hahniidae sp.1							X
LINYPHIIDAE							
Lepthyphantes sp.1						X	
Linyphiidae sp.1	X				X	X	
Meioneta sp.1				X	X	X	
Moyosi sp.1					X		
LYCOSIDAE							
Allocosa sp.1		X				X	

Table 3. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
MIMETIDAE							
Gelanor sp.1	X						
MYGALOMORPHAE							
Mygalomorphae sp.1				X			
MYSMENIDAE							
Microdipoena sp.1	X						X
Mysmena sp.1	X						
NEPHILIDAE							
Nephila clavipes (Linnaeus, 1767)*	X			X		X	X
OCHYROCERATIDAE							
Theotima sp.1	X	X	X	X	X	X	X
OECOBIIDAE							
Oecobius concinnus Simon, 1893*		X	X	X			
OONOPIDAE							
Ischnothyreus peltifer (Simon, 1891) *	X						
Neotrops sp.1	X		X		X		X
Neoxyphinus sp.1	X	X					
Oonopidae sp.1					X		
Oonops gr. *reticulatus*		X					
Opopaea deserticola Simon, 1891*	X	X	X	X	X		
Orchestina sp.1					X		X
Orchestina sp.2		X	X				
Triaeris stenaspis Simon, 1891*	X			X			X
PALPIMANIDAE							
Fernandezina sp.1	X						
PHOLCIDAE							
Mesabolivar sp.1	X			X	X		X
Mesabolivar togatus (Keyserling, 1891)	X			X		X	X
Metagonia sp.1							X
Metagonia sp.2	X						X
Pholcidae sp.1	X				X		X
Pholcidae sp.2							X
Tupigea sp.1	X	X					
Tupigea sp.2		X					
PISAURIDAE							
Architis sp.1						X	
SALTICIDAE							
Chirothecia sp.1							X
Cotinusa sp.1							X
Cylistella sp.1	X						
Dendryphantinae sp.1	X	X	X	X	X	X	X
Dendryphantinae sp.2	X		X	X	X	X	X
Lyssomanes sp.1	X	X			X	X	X
Lyssomanes sp.2	X			X			
Menemerus bivittatus (Dufour, 1831)*			X				
Myrmarachne sp.1	X			X	X	X	
Myrmarachne sp.2	X			X	X		X
Myrmarachne sp.3	X			X	X	X	X
Noegus sp.1					X		
Noegus sp.2					X		X
Noegus sp.3	X						
Psecas aff. *chapoda*					X		
Salticidae sp.1	X						
Salticidae sp.6		X	X				
Salticidae sp.7	X						
Salticidae sp.10	X	X					
Salticidae sp.14		X			X		X

Table 3. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
Salticidae sp.15	X		X	X		X	
Salticidae sp.17	X		X		X		
Salticidae sp.18		X	X			X	
Salticidae sp.19	X						
Salticidae sp.20	X				X		
Salticidae sp.21	X		X				
Salticidae sp.22	X		X				
Salticidae sp.26		X					
Synemosyna sp.1	X				X		X
Synemosyna sp.2	X				X		
Synemosyna sp.3						X	
Thiodina sp.1	X		X		X	X	X
SCYTODIDAE							
Scytodes fusca Walckenaer, 1837*	X		X	X	X	X	
SENOCULIDAE							
Senoculus sp.1	X					X	
SYMPHYTOGNATHIDAE							
Anapistula sp.1	X			X			
TETRAGNATHIDAE							
Chrysometa sp.1	X						
Leucauge argyra (Walckenaer, 1841)	X		X	X			
Leucauge sp.1	X	X		X			
Leucauge sp.2	X	X		X		X	
Tetragnatha sp.1	X				X		
Tetragnathidae sp.1	X						
THERIDIIDAE							
Achaearanea hirta (Taczanowski, 1873)*				X			X
Achaearanea sp.1	X						
Achaearanea trapezoidalis (Taczanowski, 1873)							X
Anelosimus sp.1	X						
Argyrodes aff. *elevatus*	X					X	X
Argyrodes elevatus Taczanowski, 1873*	X			X			X
Argyrodes sp.3						X	
Ariamnes aff. *elongatus*							X
Chrysso pulcherrima (Mello-Leitão, 1917)	X			X	X	X	
Chrysso sp.1	X						X
Chrysso sp.2	X	X					
Coleosoma floridanum Banks, 1900*	X	X	X	X	X		
Dipoena sp.1						X	X
Dipoena sp.2					X		
Dipoena sp.3							X
Dipoena sp.4						X	
Episinus sp.1	X			X	X	X	
Episinus sp.2	X				X	X	X
Episinus sp.3			X				
Episinus sp.4	X			X	X		X
Euryopis sp.1				X			
Nesticodes rufipes (Lucas, 1846)*	X				X		
Platnickia mneon (Bösenberg & Strand, 1906)*		X	X	X			
Spintharus gracilis Keyserling, 1886	X					X	
Theridion sp.1	X	X	X	X		X	X
Theridion sp.2						X	X
Theridion sp.3					X		
Theridion sp.4					X		
Thymoites sp.1							X
Thymoites sp.2	X	X	X		X	X	X
Tidarren aff. *fordum*	X				X	X	X

Table 3. ***Continued.***

TAXON	CITY						
	SA			LF	SF	CA	MSJ
	FF	VL	GB				
Tidarren sp.1				X			
THERIDIOSOMATIDAE							
Chthonos sp.1	X			X			
Chthonos sp.2	X						
Chthonos sp.3	X						
Plato sp.1					X		
THOMISIDAE							
Aphantochilus taurifrons (O. P.-Cambridge, 1881)							X
Epicadinus sp.1	X					X	X
Epicadinus sp.2	X						
Misumenops sp.1		X	X				
Misumenops sp.2	X	X					
Titidius sp.1		X			X		
Tmarus sp.1	X					X	
ULOBORIDAE							
Conifaber sp.1	X			X			X
Miagrammops sp.1						X	X
Miagrammops sp.2							X
Uloborus sp.1	X				X		X
Uloborus sp.2							X
Zosis sp.1	X			X			
ZODARIIDAE							
Tenedos sp.1	X			X	X	X	X
Tenedos sp.2	X				X		
Tenedos sp.3				X			
RICHNESS		**116**		**50**	**54**	**48**	**55**

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Literature Cited

Aguilar, P.G.F. 1988. Las arañas como controladoras de plagas insectiles em la agricultura peruana. *Revista Peruana de Entomologia* 31: 1–8.

Aquino, R.S.S., S.S. Silveira, W.F.B. Pessoa, A. Rodrigues, J.L. Andrioli, J.H.C. Delabie and R. Fontana. 2013. Filamentous fungi vectored by ants (Hymenoptera: Formicidae) in a public hospital of northeastern Brazil. *Journal of Hospital Infection* 83: 200–204.

Benati, K.R., M.C.L. Peres, A.D. Brescovit, F.D. Santana and J.H.C. Delabie. 2011. Avaliação de duas técnicas de translocação de serrapilheira sobre as assembléias de aranhas (Arachnida: Araneae) e formigas (Hymenoptera: Formicidae). *Neotropical Biology and Conservation* 6: 13–26.

Bestelmeyer, B.T., D. Agosti, L.E. Alonso, C.R.F. Brandão, W.L. Brown Jr., J.H.C. Delabie, and R. Silvestre. 2000. Field techniques for the study of ground-living ants: an overview, description, and evaluation; pp. 122–144, in: D. Agosti, J.D. Majer, L. Tennant de Alonso and T. Schultz (ed.). *Ants: Standart Methods for Measuring and Monitoring Biodiversity*. Washington: Smithsonian Institution.

Bolton, B. 2013. *AntWeb*, versão 5.1.5. Accessible at http://www.antweb.org. Captured on 19 August 2013.

Brazil, T.K., L.M. Almeida-Silva, C.M. Pinto-Leite, R.M. Lirada-Silva, M.C.L. Peres, and A.D. Brescovit. 2005. Aranhas sinantrópicas em três bairros da cidade de Salvador, Bahia, Brasil (Arachnida, Araneae). *Biota Neotropica* 5: 1–7.

Brescovit, A.D., U. Oliveira and A.J. Santos. 2011. Aranhas (Araneae, Arachnida) do Estado de São Paulo, Brasil: diversidade, esforço amostral e estado do conhecimento. *Biota Neotropica* 11: 1–31.

Byrne, L.B. 2007. Habitat structure: A fundamental concept and framework for urban soil ecology. *Urban Ecosystems* 10: 255–274.

Candiani, D.F., R.P. Indicatti and A.D. Brescovit. 2005. Composição e diversidade da araneofauna (Araneae) de serapilheira em três florestas urbanas na cidade de São Paulo, São Paulo, Brasil. *Biota Neotropica* 5: 1–13.

Coelho, M.S., G.W. Fernandes, J.C. Santos and J.H.C. Delabie. 2009. Ants (Hymenoptera: Formicidae) as bioindicators of land restoration in Brazilian Atlantic Forest fragment. *Sociobiology* 54: 51–63.

Dáttilo, W., N. Sibinel, J.C.F. Falcão and R.V. Nunes. 2011. Mirmecofauna em um fragmento de floresta atlântica urbana no município de Marília, SP, Brasil. *Bioscience Journal* 27: 494–504.

Dearborn, D.C. and S. Kark. 2010. Motivations for conserving urban biodiversity. *Conservation Biology* 24: 432–440.

Delabie, J.H.C. 1993. Formigas exóticas na Bahia. *Bahia Análise e Dados* 3: 19–22.

Delabie, J.H.C., I.C. Nascimento, P. Pacheco and A.B. Casimiro. 1995. Community structure of house-infesting ants in southern Bahia, Brazil (Hymenoptera, Formicidae). *The Florida Entomologist* 78: 264–270.

Delabie, J.H.C., R. Fontana, T.A. Brito and S.L. Ferreira. 2002. Infeção hospitalar e formigas no Brasil: o caso de um hospital do sudeste da Bahia. *O Biológico* 64: 41–42.

Dias, S.C., A.D. Brescovit, E.C.G. Couto and C.F. Martins. 2006. Species richness and seasonality of spiders (Arachnida, Araneae) in an urban Atlantic Forest fragment in Northeastern Brazil. *Urban Ecosystems* 9: 323–335.

Faeth, S.H., C. Bang and S. Saari1. 2011. Urban biodiversity: patterns and mechanisms. *Annals of New York Academy of Sciences* 1223: 69–81.

Feitosa, R.S.M. and A.S. Ribeiro. 2005. Mirmecofauna (Hymenoptera, Formicidae) de serapilheira de uma área de Floresta Atlântica no Parque Estadual da Cantareira – São Paulo, Brasil. *Biotemas* 18: 51–71.

Fernández, F. 2003. Introducción a las Hormigas de la Región Neotropical. Bogotá: Instituto de Investigación de Recursos Biológicos Alexander von Humboldt. 398 pp.

Figueiredo, C.J., R.R. Silva, C.B. Munhae and M.S.C. Morini. 2012. Fauna de formigas (Hymenoptera: Formicidae) atraídas a armadilhas subterrâneas em áreas de Mata Atlântica. *Biota Neotropica* 13: 176–182.

Flórez, E.D. 2000. Comunidades de arañas de la Región Pacífica del departamento del Valle del Cauca, Colômbia. *Revista Colombiana de Entomologia* 26: 77–81.

Foelix, R.F. 2011. *Biology of Spiders*. New York: Oxford University Press. 428 pp.

Hölldobler, B. and E.O. Wilson. 1990. The ants. Massachusetts: Harvard University Press. 732 p.

IBGE. 2002. Mapa de Clima do Brasil. Accessible at http://www.ibge.gov.br/mapas_ibge/tem.php. Captured on 03 November 2011.

IBGE. 2010. *Cidades*. Accessible at http://www.ibge.gov.br/cidadesat/topwindow.htm?1. Captured on 03 November 2011.

Iop, S., V.M. Caldart, J.A. Lutinski and F.R.M. Garcia. 2009. Formigas urbanas da cidade de Xanxerê, Santa Catarina, Brasil. *Biotemas* 22: 55–64.

Kowarik, I. 2011. Novel urban ecosystems, biodiversity, and conservation. *Environmental Pollution* 159: 1974–1983.

Lundholm, J.T. and P.J. Richardson. 2010. Habitat analogues for reconciliation ecology in urban and industrial environments. *Journal of Applied Ecology* 47: 966–975.

Marques, A.P.C., R. Ale-Rocha and J.A. Rafael. 2002. Levantamento de formigas (Hymenoptera: Formicidae) em residência de Manaus, Estado do Amazonas, Brasil. *Acta Amazonica* 32: 133–140.

McIntyre, N.E. 2000. Ecology of Urban Arthropods: A Review and a Call to Action. *Annals of the Entomological Society of America* 9: 825–835.

McKinney, M.L. 2002. Urbanization, biodiversity, and conservation. *BioScience* 52: 883–890.

McKinney, M.L. 2006. Urbanization as a major cause of biotic homogenization. *Biological Conservation* 127: 247–260.

Melo, T.S., A.R.S. Andrade, K.R. Benati, M.C.L. Peres and M.A. Dias. 2011. Panorama da araneofauna de fragmentos florestais em Salvador, Bahia, Brasil. *Sitientibus série Ciências Biológicas* 11: 37–47.

MMA. 2002. Biodiversidade Brasileira: Avaliação e identificação de áreas e ações prioritárias para conservação, utilização sustentável e repartição dos benefícios da biodiversidade nos biomas brasileiros. Brasília: Secretaria de Biodiversidade e Florestas. 404 pp.

Munhae, C.B., Z.F.N. Bueno, M.S.C. Morini and R.R. Silva. 2009. Composition of the ant fauna (Hymenoptera: Formicidae) in public squares in Southern Brazil. *Sociobiology* 53: 455–472.

Niemela, J. 1999. Ecology and urban planning. *Biodiversity and Conservation* 8: 119–131.

Pacheco, R. and H.L. Vasconcelos. 2007. Invertebrate conservation in urban areas: Ants in the Brazilian Cerrado. *Landscape and Urban Planning* 81: 193–199.

Pearson, D.L. 1994. Selecting indicator taxa for the quantitative assessment of biodiversity. *Philosophical Transactions of the Royal Society of London* 345: 75–79.

Peres, M.C.L, J.M.C. Silva and A.D. Brescovit. 2007. The influence of treefall gaps on the distribution of web-building and ground hunter spiders in an Atlantic Forest remnant, northeastern Brazil. *Studies on Neotropical Fauna and Environment* 42: 49–60.

Pinto-Leite, C.M., A.C. Guerrero and T.K. Brazil. 2008. Nonrandom patterns of spider species composition in an Atlantic rainforest. *The Journal of Arachnology* 36: 448–452.

Platnick, N.I. 2013. The World Spider Catalog, Version 14.0. Accessible at http://research.amnh.org/iz/spiders/catalog/. Captured on 19 August 13.

Rosumek, F.B., M.A. Ulysséa, B.C. Lopes, J. Steiner and A. Zillikens. 2008. Formigas de solo e de bromélias em uma área de Mata Atlântica, Ilha de Santa Catarina, sul do Brasil: Levantamento de espécies e novos registros. *Biotemas* 21: 81–89.

Santos, M.S., J.N.C. Louzada, N. Dias, R. Zanetti, J.H.C. Delabie and I.C. Nascimento. 2006. Riqueza de formigas (Hymenoptera, Formicidae) da serapilheira em fragmentos de floresta semidecídua da Mata Atlântica na região do Alto do Rio Grande, MG, Brasil. *Iheringia Série Zoologia* 96: 95–101.

SEDUR 2011. *Região Metropolitana de Salvador*. Accessible at http://www.sedur.ba.gov.br/hotsite_folder_rms/index.htm. Captured on 03 November 2011.

Shochat, E., S.B. Lerman, J.M. Anderies, P.S. Warren, S.H. Faeth and C.H. Nilon. 2010. Invasion, competition, and biodiversity loss in urban ecosystems. *BioScience* 60: 199–208.

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