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Floristic composition and dispersal syndromes at an urban remnant from the Atlantic forest in Brazilian Northeast

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ABSTRACT. Floristic composition and dispersal syndromes were determined along one year in an open ombrophilous forest fragment in the Municipal Park of Maceió, Alagoas State, Brazil. A total of 178 species belonging to 61 families were examined. Fabaceae was the most species-rich family, with 24 species. Among sampled species, 123 had their syndromes of diaspore dispersal determined, and most of them (69%) were zoochoric. Anemochoric and autochoric plants represent 11 and 20% from the total, respectively. The data about reproductive phases indicate coincident peaks of flowering and fruiting in August, at the end of the rainy season. The results are in accordance to those expected for ombrophilous forest with poorly defined seasonality.

Keywords: Atlantic forest, ombrophilous forest, phenology.

RESUMO. Composição florística e síndromes de dispersão em um fragmento urbano da Mata Atlântica do Nordeste Oriental, Brasil. A composição florística e as síndromes de dispersão foram determinadas no presente estudo, ao longo de um ano, em um fragmento de floresta ombrófila aberta no Parque Municipal de Maceió, Estado da Alagoas. Foram amostradas 178 espécies, pertencentes a 61 famílias. Fabaceae foi a família de maior riqueza florística, com 24 espécies. Das espécies coletadas, 123 tiveram sua síndrome determinada e a maioria delas (69%) é zoocórica. As plantas anemocóricas e autocóricas representam 11 e 20%, respectivamente. Os dados sobre a fase reprodutiva apontam um pico de floração e de frutificação coincidente, no mês de agosto, no final da estação chuvosa. Os resultados encontrados estão de acordo com o esperado para florestas ombrófilas de sazonalidade pouco evidente.

Palavras-chave: Mata atlântica, floresta ombrófila, fenologia.

Introduction

The interaction between plants and animals is quite intense, decisive for the structuring of the ecosystem (KAGEYAMA; GANDARA, 2001). About 50 to 90% of tree and shrub species found in tropical forests produce fruits with seed that are dispersed by animals (FLEMING, 1979). The dispersal ecology is an important base to understand the structure and functioning of communities in Neotropical forests (GENTRY, 1983), besides that, the absence of dispersal processes in degraded areas is a limiting factor to forest recovery.

In Northeast Brazil, studies on dispersal syndromes have been accomplished mainly in Caatinga (BARBOSA et al., 2003; GRIZ; MACHADO, 2001; LEAL, 2003; MACHADO et al., 1997) and less often in dense ombrophilous forest (GRILLO et al., 2006) and sandbanks (ALMEIDA-JÚNIOR et al., 2007). In the Alagoas State, the studies began in 2005, in a Cerrado enclave from Mata do Catolé, Maceió (BARBOSA, 2005). Nevertheless, no research about diaspore dispersal had been done in the open ombrophilous forest. The present study also contributes for the knowledge about the floristic composition in a forest remnant of the State, which despite integrating one of the most threatened areas of endemism, had only six fragments surveyed, with results presented in master theses (MACHADO, 2003; MENDONÇA, 1996; OLIVEIRA, 2003; OLIVEIRA et al., 2004; PINHEIRO, 2005; RODRIGUES, 2002) and completion monographs (COSTA et al., 2007).

Information about floristic composition and reproductive strategies of species from Atlantic Forest in the Alagoas State is essential since most of the fragments in the State that are inserted in

Atlantic realm is composed by open ombrophilous forest, whose composition and dispersal patterns in the Northeast are scarcely known. This study accomplished an investigation about the floristic composition and dispersal syndromes in an open plant community at the Municipal Park of Maceió, Alagoas State. Therefore, the study presents a descriptive character, also contributing to understand the processes of flora distribution in the Atlantic Forest in Eastern Northeast, as well as the strategies and periods of reproduction.

Material and methods

The Municipal Park of Maceió is a conservation unit with 82 hectares, covered by remnants from Atlantic Forest. This park is located within an urban area, in the West region of Maceió city (9º35´ - 9º36´S and 35º45´-35º46´W), inserted in the Silva Stream microbasin, in the bioclimatic range between zero and ninety days biologically dry (ASSIS, 2000). The area presents high temperatures with mean values between 30.2 and 20.9ºC and, annual rainfall between the isolines of 1,300 and 1,500 mm; with rainy period from March to August and, dry period from September to February.

During 12 months (October 2004 to September 2005), along pre-existing tracks, we collected specimens at flowering or fruiting. The obtained material was processed according to standard techniques (FIDALGO; BONONI, 1989) and stored in the MAC Herbarium, from the Environmental Institute of Alagoas State (IMA/AL). The identifications were made using analytical keys, with the assistance of experts and by comparison with material from the MAC Herbarium.

In the collections of botanical materials we registered the following data: habit (tree, small tree, bush, subshrub, herb, vine, epiphyte, liana, hemiparasite); presence of flowers, fruits, latex and dispersal syndromes, according to fruit morphology. According to the presented syndrome, the fruits were characterized in zoochoric – dispersion by animals; anemochoric – dispersion by the wind; and autochoric - auto-dispersion by explosion or gravity (PIJL, 1982).

In this study, we considered the presence of flowers as flowering, without distinction between bud and open flower, at least in one individual (FERRAZ et al., 1999). The same occurred for the fruiting, regardless the maturation stage of the fruits, only the presence or absence. Data of flowering and fruiting from some species previously collected and identified were only recorded in field cards.

Species such as *Antigonon leptopus* Hook. & Arn. and *Bombacopsis glabra* (Pasq.) A. Robyns, although non native, were included in the analysis, since they occur subspontaneously in the park.

Besides the collected species during the field work, we analyzed species previously collected and placed at MAC Herbarium from the study area.

The species that presented flower, but without fruiting during the collection period, were not excluded in the analysis of flowering phenology. In the same way, we did not discard those recorded only at fruiting.

Results and discussion

In the total, 178 species were collected, among them 130 were identified until species level. The other species were identified at genus level (38) or family (10). The habit with greater number of species was the herbaceous (37%). The other species are arboreal (20%), shrubs (16%), subshrubs (11%), vines (8%), small trees (3%), epiphytes and lianas (2% each) and hemiparasites (1%). The collected species belong to 61 families (Table 1). The *checklist* was made according to the classification system from Cronquist (1981). Fabaceae was the most species-rich family, with 24 species, followed by Rubiaceae and Asteraceae, with 16 species each, Melastomataceae and Myrtaceae, with nine, Malvaceae and Verbenaceae, with seven and Cyperaceae, with six species. The eight families with higher number of species make up 55% from the total. Fabaceae (Leguminosae *Sensu Lato*) is pointed by Gentry (1988) as dominant in Neotropical lowland forests and Africa forests. In Alagoas State, this family is regarded as the most species-rich family (COSTA et al., 2007; GRILLO et al., 2006; RODRIGUES, 2002). Pinheiro (2005), studying the Murici Forest, Alagoas State, also found Fabaceae, along with Sapotaceae and Melastomataceae, among the families with higher species richness. However, these studies considered only woody species, impairing comparisons of floristic similarity.

Table 1. Floristic list, reproductive phenology and dispersal syndromes of species from the Municipal Park of Maceió, Alagoas State. (zoo = zoochoric; auto = autochoric; ane = anemochoric; ⋆= species not recorded at fruiting; ? = undetermined syndrome). Fl and Ft = number of months, along a year, when the plant was found with flower and fruit, respectively.

Family	Species	Fl	Ft	S
Acanthaceae	*Ruellia asperula* (Mart. ex Nees) Lindau	10	-	⋆
Amaranthaceae	*Alternanthera* sp.	11	11	zoo
Anacardiaceae	*Anacardium occidentale* L.	10,11	11	zoo
Annonaceae	*Anaxagorea dolichocarpa* Sprague & Sandwith	-	10	auto
	Rollinia pickelii Diels	-	2	zoo
	Xylopia frutescens Aubl.	-	10	zoo
Apocynaceae	*Himathantus phagedaenicus* (Mart.) Woodson	05	05	ane
Aristolochiaceae	*Aristolochia brasiliensis* Mart. & Zucc.	7	7,8	ane
Asteraceae	*Ageratum conyzoides* L.	10,5,8	10,5-7	ane
	Conocliniopsis prasiifolia (DC.) R. M. King & H. Rob.	8	8	ane
	Elephantopus mollis Kunth	8	8	ane
	Emilia sonchifolia (L.) DC. ex Wight	7	-	⋆
	Emilia sp.	-	10	ane
	Platypodanthera melissifolia (DC.) R. M. King & H. Rob.	-	10,3	ane
	Platypodanthera sp.	12	12	auto
	Pluchea quitoc DC.	11	-	⋆
	Pterocaulon interruptum DC.	12	12	ane
	Rolandra argentea Rottb.	8	8,9	?
	Synedrella nodiflora (L.) Gaertn.	7,8	7,8	zoo
	Synedrella sp.	10	10	auto
	Tilesia baccata (L.f.) Pruski	4	4	zoo
	Vernonia scorpioides (Lam.) Pers.	10,11,6-9	10,11, 6-9	ane
	Wedelia paludosa DC.	10	-	⋆
	Zexmenia rudis Baker	7	-	⋆
Begoniaceae	*Begonia* sp.	-	9	ane
Bignoniaceae	*Lundia cordata* (Vell.) DC.	7	-	⋆
	Bignoniaceae 1	-	9	?
Bombacaceae	*Bombacopsis glabra* (Pasq.) A. Robyns	-	1,2	auto
Boraginaceae	*Cordia multispicata* Cham.	5,7	7	zoo
	Cordia nodosa Lam.	5,8	8	zoo
	Cordia superba Cham.	1	1	zoo
Bromeliaceae	*Aechmea stelligera* L.B. Sm.	11,8,9	-	⋆
	Aechmea sp.	2	-	⋆
Burseraceae	*Protium heptaphyllum* (Aubl.) Marchand	12	2,3	Zoo
Capparaceae	*Cleome spinosa* Jacq.	11	11	Zoo
Cecropiaceae	*Cecropia pachystachya* Trécul	6,7	10	Zoo
Celastraceae	*Maytenus distichophylla* Mart. ex Reissek	-	4-9	Zoo
Chrysobalanaceae	*Hirtella racemosa* Lam.	10,3	10,3	Zoo
Commelinaceae	*Dichorisandra* sp.	6	6,7	Zoo
Costaceae	*Costus spiralis* (Jacq.) Roscoe	6,7	-	⋆
Cucurbitaceae	*Luffa cylindrica* M. Roem.	9	9	auto
	Momordica charantia L.	11	11	zoo
	Cucurbitaceae 1	10	10	zoo
Cyperaceae	*Cyperus gardneri* Ness.	11	-	⋆
	Cyperus luzulae (L.) Rottb. ex Retz.	9	9	auto
	Rhynchospora cephalotes (L.) Vahl	11	5	auto
	Rhynchospora ciliata Vahl	5,8	10	auto
	Scleria bracteata Cav.	11,3	11,3	zoo
	Cyperaceae 1	-	8	ane
Dilleniaceae	*Doliocarpus dentatus* (Aubl.) Standl.	-	11	zoo
	Tetracera sp.	-	10	zoo
Euphorbiaceae	*Chamaesyce hyssopifolia* (L.) Small	10,8	10,8	auto
	Croton triqueter Lam.	6	-	⋆
	Euphorbia sp.	-	7	auto
	Margaritaria nobilis L. f.	-	7	auto
	Ricinus communis L.	-	10,9	zoo
Erythroxylaceae	*Erythroxylum citrifolium* A. St.-Hil.	-	5-8	zoo
	Erythroxylum sp.	8	7,8	?
Fabaceae	*Bauhinia outimouta* Aubl.	11	-	⋆
Caesalpinoideae	*Cassia semicordata* A. Lima	10,11	-	⋆
	Senna alata (L.) Roxb.	8	-	⋆
	Senna australis (Vell.) H. S. Irwin & Barbeby	9	-	⋆
	Senna lechriosperma H. S. Irwin & Barbeby	11	11	?
	Fabaceae 1	7	7	auto
Fabaceae	*Inga capitata* Desv.	6	-	⋆
Mimosoideae	*Inga fagifolia* (L.) Willd. ex Benth.	11	5	zoo
	Inga sp.	-	5,6	auto
	Mimosa pudica L.	5	8	?
	Mimosa sp.	11,12	12	auto
	Samanea tubulosa (Benth.) Barneby & J.W. Grimes	-	11	auto
Fabaceae	*Aeschynomene histrix* Poir.	-	10	zoo

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Family	Species	Fl	Ft	S
Papilonoideae	*Clitoria* sp.	8	8	auto
	Crotalaria stipularia Desv.	10,7,8	7,8	auto
	Desmodium adscendens (Sw.) DC.	8	8	zoo
	Desmodium barbatum (L.) Benth.	8	8	zoo
	Dioclea reflexa Hook. f.	12	-	⋆
	Dioclea virgata (Rich.) Amshoff	10	11	auto
	Mucuna sloanei Fawc. & Rendle	9	9	zoo
	Stylosanthes gracilis Kunth	10	10	auto
	Stylosanthes sp.	8	-	⋆
	Zornia diphylla (L.) Pers.	7,8,10	8,10	zoo
	Fabaceae 2	-	9	zoo
Gesneriaceae	*Paliavana* sp.	10	10	zoo
Guttiferae	*Vismia guianensis* (Aubl.) Choisy	11,9	6	zoo
Heliconiaceae	*Heliconia pendula* Wawra	7	9	zoo
	Heliconia psittacorum L. f.	12,5-7,9	5,7	zoo
	Heliconia sp.	9	9	zoo
Lamiaceae	*Hyptis* sp.	7	7	auto
	Marsypianthes sp.	7,8	7,8	auto
Lecythidaceae	*Eschweilera ovata* (Cambess.) Mart. ex Miers	-	2,3,5	auto
Liliaceae	Liliaceae 1	7,8	7,8	zoo
Loranthaceae	*Psittacanthus dichrous* Mart.	2	-	⋆
Lythraceae	*Cuphea racemosa* (L. f.) Spreng.	10,4,8	4,8	zoo
	Cuphea sp.	6,9	-	⋆
Malpighiaceae	*Byrsonima sericea* DC.	12	3-5	zoo
Malvaceae	*Pavonia fruticosa* (Mill.) Fawc. & Rendle	11	-	⋆
	Pavonia sp. 1	7	7	zoo
	Pavonia sp. 2	-	8	zoo
	Sida linifolia Cav.	10	10	?
	Sida planicaulis Cav.	-	10	zoo
	Sida rhombifolia L.	7,8	-	⋆
	Malvaceae 1	12	12	zoo
Maranthaceae	*Maranta divaricata* Roscoe	11,5-7	11,7	zoo
Melastomataceae	*Clidemia debilis* Crueg.	-	6	zoo
	Clidemia hirta (L.) D. Don.	12,4,8	12,8	zoo
	Henriettea succosa (Aubl.) DC.	3,5	1-9	zoo
	Miconia ciliata (Rich.) DC.	5	6,7,9	zoo
	Miconia hypoleuca (Benth.) Triana	10,11	-	⋆
	Miconia minutiflora (Bonpl.) DC.	11,6-8	11,6-8	zoo
	Miconia prasina (Sw.) DC.	4	1-10	zoo
	Miconia serialis DC.	-	5,7	zoo
	Miconia sp.	10,7	-	zoo
Meliaceae	*Guarea macrophylla* Vahl	7	-	⋆
Moraceae	*Ficus gomelleira* Kunth & C. D. Bouché	-	9	zoo
	Moraceae 1	-	8	zoo
Myrtaceae	*Calyptranthes* sp.	-	5	zoo
	Eugenia ligustrina (Sw.) Willd.	-	7	zoo
	Eugenia sp. 1	11	-	⋆
	Eugenia sp. 2	-	9	zoo
	Eugenia sp. 3	-	7	zoo
	Myrcia ovata Cambess.	4	-	⋆
	Myrcia fallax (Rich.) DC.	-	7	zoo
	Myrcia guianensis (Aubl.) DC.	11,3,5	3-8	zoo
	Psidium guianensis Sw.	-	11	zoo
Nyctaginaceae	*Pisonia* sp.	-	6	zoo
Onagraceae	*Ludwigia* cf. *hyssopifolia* (G. Don.) Exell	7	7	?
Piperaceae	*Piper marginatum* Jacq.	6-9	7,9	zoo
Poaceae	*Lasiacis ligulata* Hitchc. & Chase	-	5,9	zoo
	Paspalum sp.	-	6	zoo
Polygalaceae	*Polygala paniculata* L.	8-10	8-10	?
Polygonaceae	*Antigonon leptopus* Hook. & Arn.	9	-	⋆
	Coccoloba rosea Meisn.	-	6,7	zoo
Rubiaceae	*Borreria humifusa* Mart.	-	9	?
	Borreria verticillata (L.) G. Mey.	10	-	⋆
	Borreria sp.	4,9	-	⋆
	Chomelia obtusa Cham. & Schltdl.	-	7	zoo
	Chomelia sp.	7	-	⋆
	Genipa americana L.	-	6	zoo
	Gonzalagunia dicocca Cham. & Schltdl.	10	10	zoo
	Palicourea crocea (Sw.) Roem. & Schult.	5,7	7	zoo
	Psychotria capitata Ruiz & Pav.	-	6,7	zoo
	Psychotria hoffmannseggiana (Willd. ex Roem. & Schult.) Müll. Arg.	11,6	11,3,6-8	zoo
	Psychotria ruelliifolia (Cham. & Schltdl.) Müll. Arg.	3-7	3-,7	zoo
	Psychotria sp. 1	-	10,9	zoo
	Psychotria sp. 2	-	8	zoo
	Sabicea grisea Cham. & Schltdl.	-	7,8	zoo

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Family	Species	Fl	Ft	S
Rubiaceae	Rubiaceae 1	8	-	⋆
	Rubiaceae 2	10	10	zoo
Sapindaceae	*Allophylus edulis* (A. St.-Hil. et al.) Radlk.	-	5	auto
	Cupania racemosa (Vell.) Radlk.	-	8	zoo
	Cupania sp.	-	2	zoo
	Serjania corrugata Radlk.	-	5	ane
	Serjania sp.	-	5	ane
Sapotaceae	*Pradosia lactescens* (Vell.) Radlk.	-	1,2	zoo
Scrophulariaceae	*Scoparia dulcis* L.	11	11	?
	Stemodia trifoliata (Link) Rchb.	8	-	⋆
Simaroubaceae	*Simarouba amara* Aubl.	12	-	⋆
Solanaceae	*Brunfelsia uniflora* (Pohl) D. Don	-	8	zoo
	Cestrum laevigatum Schltdl.	9-11	11	zoo
	Solanum americanum Mill.	11	11,12	zoo
	Solanum paniculatum L.	8	8	zoo
	Solanum sp.	-	9	zoo
Sterculiaceae	*Guazuma ulmifolia* Lam.	-	11	?
	Waltheria viscosissima A. St.-Hil.	8	8	zoo
Tiliaceae	*Apeiba tibourbou* Aubl.	-	5	zoo
	Luehea divaricata Mart.	11	11	ane
Turneraceae	*Turnera subulata* Sm.	10,11	-	⋆
	Turnera sp.	8	-	⋆
Ulmaceae	*Trema micrantha* (L.) Blume	-	10,7	zoo
Urticaceae	*Laportea aestuans* (L.) Chew	-	10	?
Verbenaceae	*Aegiphila vitelliniflora* Klotzsch ex. Walp.	7	12	zoo
	Clerodendrum sp.	8	-	⋆
	Lantana camara L.	11,5	10,5,8	zoo
	Lantana radula Sw.	5,6,8	5,6,8	zoo
	Priva sp.	10	-	⋆
	Stachytarpheta cayennensis (Rich.) Vahl	10,4,7	10,4,7	auto
	Stachytarpheta sp.	8	8	auto
Vitaceae	*Cissus erosa* Rich.	11, 3, 9	11,3,5	zoo

In the examined community, we recorded species at flowering and fruiting in all months of the year (Table 1). Peaks of reproductive phenophases coincided, occurring in August, and the frequency of occurrence of these phenophases throughout the year presented a considerable synchrony (Figure 1).

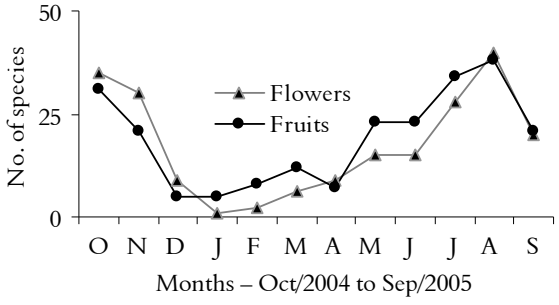

Figure 1. Number of species at flowering and fruiting throughout studied year (October 2004 to November 2005), in Municipal Park of Maceió, Alagoas State.

In the Caatinga from Pernambuco State, Griz and Machado (2001) and Machado et al. (1997) reported flowering peaks in the dry period. In a Cerrado enclave in Maceió, Alagoas State, Barbosa (2005) registered peaks of flowering and fruiting during the rainy period (March to August). Locatelli and Machado (2001), analyzing a mountain forest in Pernambuco State, observed that, despite blooming during the entire year, there was a remarkable peak of flowering from October to January and of fruiting in February and March, coinciding with the dry period. The data found in the present study are consistent with that recorded for tropical areas with tropical humid climate relatively uniform and poor defined seasons, where it is expected that flowering is more pronounced in the wet period (MORELLATO et al., 1990; MORELLATO et al., 2000), unlike dry areas, with defined seasonality, where the peaks are predominantly verified during the dry season.

In relation to dispersal syndromes, the three main types were registered: zoochoric, autochoric and anemochoric. From the 178 species, 55 (30%) did not have their syndromes determined, or because they were collected during flowering phase or analyzed from dehydrated material, available at MAC Herbarium. Considering the species with determined syndromes (123), the zoochory predominated in all habits, corresponding to 69%, followed by autochory with 20% and anemochory with 11% (Figure 2). Separating by habit, the zoochory was especially important in shrubs, since all species with determined syndrome were classified as zoochoric. Among the subshrubs, zoochoric species represented 69% and among the trees and small trees, 60%. Regarding herbs and vines, 35 and 33%, respectively, have their seeds dispersed by animals. Of the three registered lianas,

one was not found with fruit and the other two presented zoochoric syndrome. Relative to three epiphytes recorded, only one was determined concerning the dispersal mode (zoochoric), and the single registered hemiparasite, *Psittacanthus dichrous* Mart. (Loranthaceae), although recorded without fruits, was categorized as zoochoric, based on literature (CAZZETA; GALETTI, 2003).

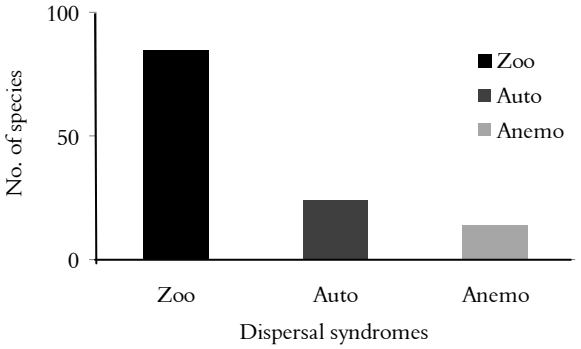

Figure 2. Proportion of dispersal mode among the 123 species whose syndrome was determined.

The autochoric dispersal was the second most common syndrome, among the species with identified syndrome, with emphasis on herbs (24%); also occurring in trees and small trees (14%) and vines (13%), but without record for the other habits. The anemochory was relevant in vines, with 27% from the total; and in the other habits corresponded to 10% of herbs, 5% of trees and small trees and 5% of subshrubs (Figure 3).

Several authors highlighted the predominance of zoochoric species in forests (MIKICH; SILVA, 2001; MORELLATO; LEITÃO-FILHO, 1992) including in the Northeastern Atlantic Forest (ALMEIDA-JÚNIOR et al., 2007; GRILLO et al., 2006). Barbosa (2005), investigating a community from a cerrado patch in the environmental protection area of Catolé, Alagoas State, found a percentage of 58% of species whose seeds are dispersed by animals. In the dense ombrophilous forest in Alagoas and Pernambuco States, at an analysis of 12 fragments, Grillo et al. (2006) verified percentages of 64 to 94% of zoochoric species, respectively. In a mountain forest, Locatelli and Machado (2001) registered a proportion of 66%. In the dry forests or mountain forests with pronounced seasonality, the proportion of zoochoric species is lower. Studies carried out in caatinga (GRIZ; MACHADO, 2001; MACHADO et al., 1997) showed that zoochoric species correspond to proportions from 26 to 36%.

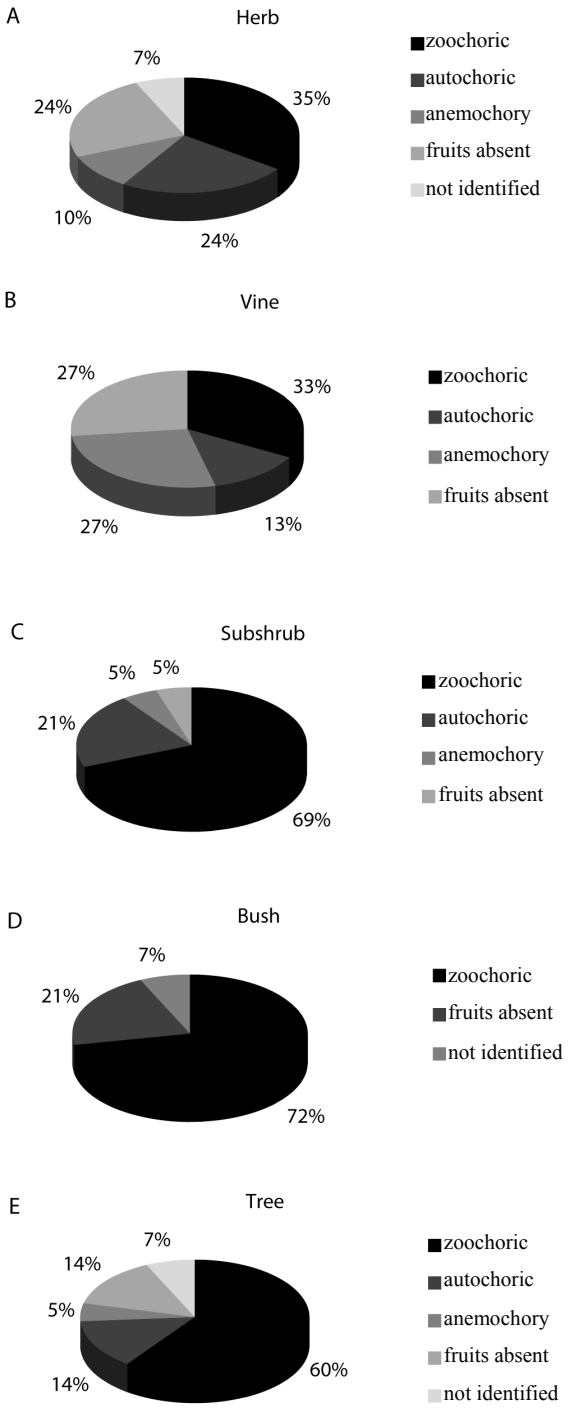

Figure 3. Proportion of dispersal syndromes found in the different habits from the studied community. (A) Herb; (B) Vine; (C) Subshrub; (D) Bush and; (E) Tree.

Vicente et al. (2003), studying the dispersal mode of woody species, over a rainfall gradient between dry and rain forest in Northeastern Brazil, suggested that there is a constant and predictable variation in the dispersal mode in relation to the rainfall gradient, with the species dispersed by vertebrates,

and more numerous in more humid areas (11% in the area with lower precipitation and 19.8% in that with higher precipitation).

In accordance to Gentry (1983), species dispersed by the wind in dry forests tend to present a wider range of distribution, and species dispersed by animals in rain forests have a greater tendency to local endemism. Indeed, the patterns of species distribution are highly dependent on dispersal strategies (VICENTE et al., 2003).

There are several biotic and abiotic factors that may influence on the predominance of a specific dispersal strategy within a community. Both the availability of water and other environmental factors, as the presence or absence of disperser animals and fruit predators may be determinant (MORELLATO; LEITÃO-FILHO, 1992). For instance, edaphic and topographic differences may support higher or lower density of zoochoric species (GENTRY, 1983), and the size of diaspore from zoochoric fruits influences significantly on the selection of dispersal agents and local faunistic composition (MIKICH; SILVA, 2001).

The fruiting period may be controlled by the moment with more favorable conditions for seed germination (FERRAZ et al., 1999). The production and drop of fruits, at the end of the dry period and beginning of the rainy period, would be advantageous since it would increase the possibilities of germination and growth of the plantlets (JANZEN, 1967 apud FERRAZ et al., 1999), because they would have all the rainy period to develop the root system before the next dry period (MORELLATO; LEITÃO-FILHO, 1992).

There is a strong relationship between the fruiting period, fruit type (dry or fleshy) and the dispersal syndrome of the species (MORELLATO; LEITÃO-FILHO, 1992). On the other hand, despite numerous evidences and hypotheses already accumulated, the complex interaction between the fruit production and vectors dependent on them is still uncertain (VICENTE et al., 2003). Martin-Gajardo and Morellato (2003) emphasized that, for a more accurate assessment of the factors regulating the phenophases, it would be necessary further studies that register variables such as light, temperature and humidity, along with information about pollinators, predators and fruit dispersers, associating them with phenological data collected.

Conclusion

Despite located within an urban area, the Municipal Park of Maceió still presents a considerable floristic richness, reflected in the high number of species collected (178). The highest species richness of the Fabaceae family is in accordance with other studies for tropical forests. This result has been consistent in the forests from Alagoas State, although the existence of a reduced number of researches and differences in inclusion criteria hinder the comparisons of similarity between the fragments in the State.

Although there is species at flowering and fruiting during all months of the year, there is a quite evident peak in August, even during the rainy period, as expected for ombrophilous forests. Also according to the expected pattern, we verified the predominance of species with zoochoric dispersal, stressing the importance of native species from local fauna for the maintenance of the vegetal community.

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