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Arboreal community of an Atlantic Forest hillside fragment in São Sebastião/SP

Ana Beatriz Carvalho Terra[1]
Gabriele Calle Bouças[2]
Marco Antônio Alves Garcia[3]

Abstract

The urban expansion and the growth of economic activities related to tourism added to the port and maritime ones, resulted in the occupation of the Serra do Mar, in the municipality of São Sebastião/SP, increasing environmental degradation. The objective of the study was to evaluate the arboreal patterns in a 0.111 ha fragment around a 4.8 ha clearing in an area of Atlantic Forest in the city of São Sebastião (SP), allowing the revegetation plan to include native species observed in the region. The phytosociological analyses used the Point-Centered Quarter Method (PCQM), using 50 sampling points (30 in close areas, 10 in the forest edge, and 10 near one of the areas drains), with a minimum distance of 20 meters between them. The main variables analyzed were commercial height, diameter to chest height, successional category, and dispersion syndrome. Also, the number of individuals of each species was observed, as well as their basal area (G), absolute and relative density (DA and DR) and dominance (DoA and DoR), relative frequency (FR), and importance value (VI). The results indicate a higher proportion of non-pioneer species, with *Guapira opposite* (Vell.) presenting the highest value of importance and density, and the *Schizolobium parahyba* (Vell.) Blake with the highest basal area. The survey data indicate the richness of species in the study area, serving as a basis for strategies for management and conservation of the environment. Phytosociological studies, although scarce, are important to support the analysis of preservation and the use of nature.
Keywords: Degradation. Environment. Phytosociology. Recomposition.

Introduction

In Brazil, the economic growth by activities such as agriculture, livestock, mining, urbanization, and industrialization was not always related to the preservation of the environment (AZEVEDO-SANTOS *et al.*, 2017; SOARES-FILHO *et al.*, 2014). Throughout its history, this continuous process of predatory interaction has led to a high amount of degraded areas and compromised provision of essential ecosystem services, as a major associated restoration liability (BRANCALION *et al.*, 2016; REZENDE *et al.*, 2018). Degradation levels vary between phytogeographic domains depending on the occupation history, with the Atlantic domain standing out concerning the others in association with the old occupation and its economic importance (BRANCALION *et al.*, 2016; JOLY *et al.*, 2014; REZENDE *et al.*, 2018).

1 Universidade José do Rosário Vellano (UNIFENAS). Doutoranda em Agricultura Sustentável. anabeatriz.terra@hotmail.com.
2 Universidade Federal do Paraná (UFPR). Engenheira Florestal. gabrielecalleb@gmail.com.
3 Universidade Federal de Alfenas (UNIFAL). Professor Doutor. marco.garcia@unifal-mg.edu.br.

The Atlantic Forest corresponds to the second largest mass of tropical forests in South America, extending in narrow bands along the entire east coast of Brazil and in the southeast and south of the country (NEVES *et al.*, 2017; OLIVEIRA-FILHO; FONTES, 2000; RIBEIRO *et al.*, 2009; TABARELLI *et al.*, 2005). It is an area of great biological diversity with high levels of endemism, being classified as a priority area for the conservation of biodiversity and tropical ecosystem services (JOLY *et al.*, 2014; MYERS *et al.*, 2000; TABARELLI *et al.*, 2005). However, due to the ancient occupation and the different economic cycles to which it was subjected, it is currently concentrated in small fragments (REZENDE *et al.*, 2018; RIBEIRO *et al.*, 2009). It is estimated that the Atlantic Forest has only 7.6 % of its original extension, which represents 98,800km^2 (MORELLATO; HADDAD, 2006), with more than 80% concentrated in small fragments of up to 50 ha (RIBEIRO *et al.*, 2009). It is a worrying situation due to the possibility of compromising the provision of ecosystem services, considering that about two-thirds of the population and the country's gross domestic product (GDP) are concentrated in the region (JOLY *et al.*, 2014; REZENDE *et al.*, 2018).

Considering the entire conservation context of the Atlantic domain, efforts have been made to build knowledge that can assist in the restoration of its ecosystems (JOLY *et al.*, 2014; SCARANO; CEOTTO, 2015). There is a huge environmental liability in the region, in areas that have been subjected to past economic activities related to various sectors of the economy, such as agribusiness, forestry production, mining, among others (REZENDE *et al.*, 2018; TABARELLI *et al.*, 2005). Such restoration contexts offer different challenges and possibilities, in which certain regions have liabilities related to rural properties, while others are more related to mining activity (JOLY *et al.*, 2014; REZENDE *et al.*, 2018). The impacts carried out in each of the activities will determine the local characteristics, depending on the impacting agent (cattle, soil removal etc.), which will be crucial to think about the strategies to be implemented so that the success of the restoration is enhanced (CHAZDON, 2014).

Within the domain, there is still a high heterogeneity of environmental, social, and economic conditions, which will determine directions, difficulties, and opportunities for environmental conservation (NEVES *et al.*, 2017). The northern coastal region of the state of São Paulo is associated with the remarkable presence of the Serra do Mar in all its extension, which has been a natural barrier to the urban expansion of cities close to the region. This context hindered the region's relations with the others present in the state, which contributed to the partial preservation of forests, with some conservation units such as the "Trecho da Serra" in the city of São Sebastião, which is the focus of this study. However, the growth of tourism-related economic activities plus ports and maritime activities resulted in higher labor demand, increasing migration to the region (MARANDOLA JR *et al.*, 2013). Thus, the occupation of the naturally unstable slopes of the Serra do Mar, without adequate protection works, led to the emergence of risk areas.

In this region, restoration activities are associated with areas that have suffered past mining activities, with areas with rugged relief that hinder even alternative land uses. Thus, studies are needed to build knowledge related to the region's vegetation that can serve as a basis for efficient and effective restoration activities. Studies are needed that explore the floristic composition of the region, as well as the ecological strategies present and that condition success, so that possible interventions can be planned to reach stages closer to restoration. (CHAZDON, 2014).

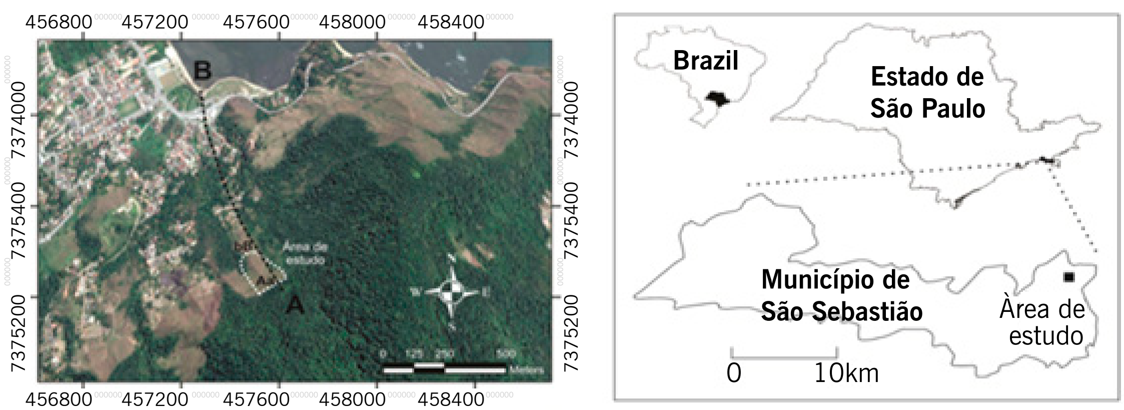
In this sense, the objective of the study was to evaluate the arboreal patterns in a 0.111 ha fragment around a 4.8 ha clearing in an area of Atlantic Forest in the city of São Sebastião/SP. This work aims to offer knowledge about the regional vegetation, which can be supported by the environmental recovery of the adjacent degraded areas.

Materials and methods

Study area

The study site is in the municipality of São Sebastião, southeast of São Paulo state on its north coast. It occupies approximately 410 km^2, of which about 70 % are in Serra do Mar state park. It is limited to the north with the municipality of Caraguatatuba, west-northwest with Salesópolis, and west with Bertioga (GARCIA, 2005). It is bathed by the Atlantic Ocean throughout the south and east-northeast sector by the São Sebastião Channel (FIGURE 1). The area is located near an Atlantic Forest fragment with 4,8 hectares, where the original vegetation was composed of a dense ombrophilous forest (JOLY *et al.*, 2012). Nowadays the fragment is covered by pastures surrounded by native vegetation, both in the lateral and upstream slopes, where are the highest altitudes.

Figure 1 – The figure indicates the location of the city of São Sebastião in the State of São Paulo, as well as the study area within the municipality. Points A refers to "*Serra do DOM*" and point B represents "*Praia da Enseada*".



Source: Elaborated by the authors (2020).

The beginning of fragmentation and opening of areas for agricultural and urban exploration in the region began about 40 years ago slowly and gradually, by the residents themselves with the palm exploitation, the extract of wood for construction and daily use and also for the occupation for subsistence agriculture. Nowadays, the native population is aware of the importance of ecological balance, as they have noticed large differences in the environment after vegetation removal, being water scarcity one of the major concerns, as local supplies are largely linked to the springs that surround the area.

Pereira and Nunes (1997), analyzing data from 25 years (1970-1994), made the rainfall compartmentalization of the municipality of São Sebastião/SP. The study area, according to the survey of the above-mentioned authors, is located where the annual average rainfall is about 1,702.0 mm.

Data collection and analysis

The Point-Centered Quarter Method (PCQM) was used for the elaboration of the vegetal recomposition model of the clearing, data were obtained through the floristic inventory. The PCQM has been often used to sample plant communities, particularly forests (BRITO *et al.* 2007; MOREIRA *et al.* 2007; RUSCHEL *et al.* 2009). Fifty sample points were launched in stretches of Dense Montana Ombrophylous Forest, 30 points in the closed-canopy area, 10 points in the forest edge, and 10 points near one of the area drains. Thus, it was contemplated the physiognomic variations present in the study area and its surroundings, sampling the largest number of species. The points had a minimum distance of 20 meters from each other, thus ensuring that the same individual was not sampled twice. In each point, the four nearest trees were included in the sample.

The main variables collected had scientific name; commercial height (visually estimated); diameter at breast height (DBH), successional category, and dispersion syndrome. Thus, for each species were obtained: the number of individuals sampled, the number of occurrences, and basal area. The number of individuals (NI) corresponds to the number of trees of the same species sampled; The percentage over the total (200 individuals) was also calculated. The number of occurrences (NO) refers to the number of times the species occurred, considering the sample points, in this case, the percentage over the total (50 points) was also calculated. The basal area (G) is an estimator of the horizontal spatial occupation of the tree (associated with its size), and its calculation is obtained from the tree trunk diameter at 1.30 m from the ground. The basal area presented by species refers to the sum of its individuals and the percentage over the total was calculated.

For the evaluation of phytosociological parameters (MÜELLER-DOMBOIS; ELLENBERG, 1974), it was estimated the basal area (G) of the sampled area, absolute density (DA) and relative density (DR), relative frequency (FR), absolute dominance (DoA) and relative dominance (DoR) and value of importance (VI). The estimation of the ecological importance of families in the studied ecosystem was made by their relative density and dominance (MORI; BOOM, 1983) and the cover value (VC) highlighting the ecological importance of species in terms of distribution, based on density and dominance. For these analyzes, the Microsoft Excel for Windows program was used.

Results and discussion

We sampled 200 individuals, distributed in 28 families, 55 genera, and 71 tree species. The families with the highest species richness were: Myrtaceae (14 species), Fabaceae (8 species), and Lauraceae (6 species), totaling 38.4 % of the sampled species (TABLE 1). The non-pioneer species was the most representative successional category, with 54 species (~76 %), while the pioneers are represented by 17 species (~24 %) (TABLE 1). The Zoochoric dispersion syndrome is the most common with 60 species (84.5 %), while Anemochoric dispersion syndrome is represented by 11 species (15.5 %) (TABLE 1).

Table 1 – List of families and tree species found in the survey, as well as their popular name, succession category, and dispersion syndrome (Zoochoric or Anemochoric).

Family	Scientific name	Popular name	Successional Category*	Dispersion Syndrome
Annonaceae	*Duguetia lanceolata* A.St.-Hil	Araticum	P	Zoochoric
Annonaceae	*Guatteria australis* A.St.-Hil	Pindaíba	NP	Zoochoric
Annonaceae	*Rollinia sericea*	Araticum	NP	Zoochoric
Arecaceae	*Bactris setosa* Mart.	Tucum	NP	Zoochoric
Arecaceae	*Euterpe edulis* Mart.	Palmito Jussara	NP	Zoochoric
Asteraceae	*Vernonia discolor* (Spreng.) H.Rob.	Vassourão	P	Anemochoric
Bignoniaceae	*Jacaranda micrantha* Cham.	Jacarandá	NP	Anemochoric
Bignoniaceae	*Tabebuia cassinoides* (Lam.) DC.	Caixeta	P	Anemochoric
Caricaceae	*Jacaratia spinosa* (Aubl.) DC.	Fruta-de-Veado	P	Zoochoric
Chrysobalanaceae	*Licania hoehnei* Pilg.	Licania	NP	Zoochoric

(continua...)

Table 1 – Continuation.

Family	Scientific name	Popular name	Successional Category*	Dispersion Syndrome
Chrysobalanaceae	*Licania* sp.	Licania	NP	Zoochoric
Euphorbiaceae	*Alchornea glandulosa* Poepp. & Endl.	Tapiá	P	Zoochoric
Lauraceae	*Licaria armeniaca* (Nees) Kosterm.	Canela	NP	Zoochoric
Lauraceae	*Nectandra grandiflora* (Nees)	Canela-Amarela	NP	Zoochoric
Lauraceae	*Nectandra membranacea* (Sw.) Griseb.	Canela	NP	Zoochoric
Lauraceae	*Nectandra oppositifolia* Nees	Canela-Ferrugem	NP	Zoochoric
Lauraceae	*Nectandra puberula* (Schott) Nees	Canela-Branca	NP	Zoochoric
Lauraceae	*Ocotea dispersa* (Nees & Mart.) Mez	Canela-Sabão	NP	Zoochoric
Lecythidaceae	*Cariniana legalis* (Mart.) Kuntze	Jequitibá	NP	Anemochoric
Fabaceae	*Albizia hassleri* (Chodat) Burkart	farinha-seca	P	Anemochoric
Fabaceae	*Dahlstedtia pinnata* (Benth.) Malme	Timbó	NP	Anemochoric
Fabaceae	*Holocalyx balansae* Micheli	Alecrim-de-Campinas	NP	Anemochoric
Fabaceae	*Hymenaea* sp.	Jatobá	NP	Zoochoric
Fabaceae	*Inga edwalli* (Harms) T.D.Penn	Ingá	P	Zoochoric
Fabaceae	*Inga marginata* Willd	Ingá	P	Anemochoric
Fabaceae	*Piptadenia gonoacantha* (Mart.) J.F.Macbr.	Pau-jacaré	P	Anemochoric
Fabaceae	*Schizolobium parahyba* (Vell.) Blake	Guapuruvu	P	Anemochoric
Magnoliaceae	*Magnolia ovata* (A. St. -Hill) Spreng.	Pinha-D'água	NP	Zoochoric
Malvaceae	*Pseudobombax grandiflorum* (Cav.) A. Robyns	Imbiruçú	NP	Anemochoric
Meliaceae	*Guarea macrophylla* Vahl	Marinheiro	NP	Zoochoric
Meliaceae	*Trichilia silvatica*	Catiguá	NP	Zoochoric
Meliaceae	*Trichilia pallens* C. DC.	Arco-de-Peneira	NP	Zoochoric
Melastomataceae	*Miconia latecrenata* (DC.) Naudin	Pixirica	P	Zoochoric
Melastomataceae	*Miconia* sp.	Pixirica	P	Zoochoric
Melastomataceae	*Tibouchina estrellensis* (Raddi) Cogn.	Quaresmeira	P	Zoochoric
Myristicaceae	*Virola oleifera* (Schott) A. C. Smith	Ucuúba	NP	Zoochoric
Monimiaceae	*Mollinedia uleana* Perkins	Capixim	NP	Zoochoric
Moraceae	*Ficus enormis* (Miq.) Miq.	Figueira	NP	Zoochoric
Myrtaceae	*Calypthranthes grandiflora*	Murta	NP	Zoochoric
Myrtaceae	*Calyptranthes lucida* Mart. Ex DC.	Guamirim	NP	Zoochoric
Myrtaceae	*Campomanesia xanthocarpa* O. Berg	Guabiroba	NP	Zoochoric
Myrtaceae	*Eugenia cerasiflora* Miq.	Mamoneira	NP	Zoochoric
Myrtaceae	*Eugenia multicostata* D. Legrand	Araçá-Piranga	NP	Zoochoric
Myrtaceae	*Eugenia* sp. 1	Eugênia	NP	Zoochoric
Myrtaceae	*Eugenia* sp. 2	Eugênia	NP	Zoochoric
Myrtaceae	*Eugenia veriflora*	Eugênia	NP	Zoochoric

(continua...)

Table 1 – Continuation.

Family	Scientific name	Popular name	Successional Category*	Dispersion Syndrome
Myrtaceae	*Gomidesia* sp. 1	Ameixa-do-Mato	NP	Zoochoric
Myrtaceae	*Gomidesia* sp. 2	Ameixa-do-Mato	NP	Zoochoric
Myrtaceae	*Marlierea parviflora* O. Berg	-	NP	Zoochoric
Myrtaceae	*Myrcia cf. pubipetala* Miq.	Goiabão	NP	Zoochoric
Myrtaceae	*Myrcia splendens* (Sw.) DC.	Guamirim-de-folha Fina	NP	Zoochoric
Nyctaginaceae	*Guapira opposite* (Vell.) Reitz	Maria-Mole	NP	Zoochoric
Phyllanthaceae	*Hyeronima alchorneoides* Allemão	Aricurana	NP	Zoochoric
Piperaceae	*Piper miquelianum* DC.	-	NP	Zoochoric
Piperaceae	*Piper* sp.		NP	Zoochoric
Rubiaceae	*Alibertia myrciifolia* Spruce ex K. Schum	Garapatica	NP	Zoochoric
Rubiaceae	*Coussarea contracta* (Walp.) Müll. Arg.	-	NP	Zoochoric
Rubiaceae	*Psychotria mapourioides* DC	-	NP	Zoochoric
Rubiaceae	*Rudgea* sp.	-	NP	Zoochoric
Rutaceae	*Conchocarpus fontanesianus* (a. St. -Hill.) Kallunki & Pirani	-	NP	Zoochoric
Rutaceae	*Pilocarpus* sp.	Jaborandi	NP	Zoochoric
Salicaceae	*Casearia sylvestris* Sw.	Guaçatonga	P	Zoochoric
Sapindaceae	*Allophylus edulis* (A. St. -Hill., Cambess. & A. Juss.) Radlk	Chau-Chau	NP	Zoochoric
Sapindaceae	*Cupania oblongifolia* Mart.	Cuvatã	NP	Zoochoric
Sapotaceae	*Chrysophyllum inornatum* Mart.	Aguaí	NP	Zoochoric
Sapotaceae	*Ecclinusa ramiflora* Mart.	Uacá	NP	Zoochoric
Sapotaceae	*Pouteria* sp.	-	NP	Zoochoric
Solanaceae	*Solanum argenteum* Dun. Ex Poir	Solanum Prata	P	Zoochoric
Solanaceae	*Solanum pseudoquina* A. St. -Hill	Joá-de-Árvore	P	Zoochoric
Symplocaceae	*Symplocos celastrinea* Mart.		NP	Zoochoric
Urticaceae	*Urera baccifera* (L.) Gaudich	Urtiga	P	Zoochoric

*NP: Non-pioneer species. P: Pioneer species

Source: Elaborated by the authors (2020).

The main families found are very characteristic for forests in the state of São Paulo, however the richness varies according to the formation, degree of disturbance, and stratum. Joly *et al.* (2012) in a study on floristics and phytosociology in permanent plots of the Atlantic Forest also found that, in an area of dense montane forest, the families with the largest number of species were Myrtaceae, Fabaceae, Rubiaceae, and Lauraceae. Fabaceae and Lauraceae are typical of the canopy and emergent; Rubiaceae, Myrtaceae, and Melastomataceae are prominent in the understory; Euphorbiaceae and Sapindaceae participate in both strata; and Solanaceae is frequent in disturbed areas, in forest edges (MANTOVANI, 1993). According to Padgurschi *et al.* (2011), several studies show a high density of these families in the Montana Atlantic Forest (DIAS, 2005; GUILHERME *et al.*, 2004; MANTOVANI, 1993; OLIVEIRA-FILHO; FONTES, 2000; ROBIM *et al.*, 1990; TABARELLI; MANTOVANI, 1999) being, therefore, characteristics of this phytophysiognomy.

The results found greater participation of non-pioneer and zoochoric species indicate a high stage of conservation of the fragment, which is in accordance with the conservation status of the region. The largest number of non-pioneers plants to an advanced silvigenic stage, in which species characteristic of high successional stages are composing the community (OLDEMAN, 1983). The higher proportion of zoochoric indicates the participation of biotic agents in the ecological patterns of the landscape, as they act in the seed's dispersion (BUDKE *et al.*, 2005; CARVALHO *et al.*, 2010). This participation is probably also related to the conservation status of the region, which has conservation units that shelter native fauna.

Among the sampled species, *Guapira oppositte* (Vell.) Reitz showed a higher value of VI and consequently greater sociological importance, mainly due to their higher basal area and density values compared to other species. However, when analyzing the parameters of *Schizolobium parahyba* (Vell.) Blake, the third species in VI, it is noted that the superior value obtained for basal area indicates the sociological dominance of this species, even though it has a low relative density (1.5 %) and relative frequency (1.9 %) (TABLE 2).

Table 2 – Distribution of the 20 species with the highest importance in the Importance Value (VI) in the sampled area.

Species	NI*	NO*	G*	DR*	FR*	DoR*	VC*	VI*
Guapira opposite (Vell.) Reitz	20	15	0,352	10	9,5	4,94	24,4	24,43
Nectandra puberula (Schott) Nees	6	5	0,832	3	3,2	11,7	17,8	17,83
Schizolobium parahyba (Vell.) Blake	3	3	1,006	1,5	1,9	14,1	17,5	17,51
Guatteria austrails A.St.-Hil	8	3	0,741	4	1,9	10,4	16,3	16,29
Piptadenia gonoacantha (Mart) J.F.Macbr	7	5	0,496	3,5	3,2	6,95	13,6	13,61
Trichilia pallens C. DC.	11	6	0,109	5,5	3,8	1,53	10,8	10,83
Symplocos celastrinea Mart.	6	4	0,342	3	2,5	4,79	10,3	10,32
Ficus enormis (Miq.)Miq.	1	1	0,58	0,5	0,6	8,14	9,27	9,27
Eugenia sp. 2	4	4	0,311	2	2,5	4,37	8,9	8,9
Guarea macrophylla Vahl	8	5	0,09	4	3,2	1,26	8,42	8,42
Calypthrantes grandiflora	5	4	0,112	2,5	2,5	1,57	6,6	6,6
Tabebuia cassinoides (Lam.)DC.	5	5	0,041	2,5	3,2	0,58	6,24	6,24
Talauma ovata	5	3	0,07	2,5	1,9	0,98	5,37	5,38
Solanum pseudoquina A. St. -Hill	3	2	0,168	1,5	1,3	2,35	5,12	5,12
Pseudobombax grandiflorum (Cav.) A. Robyns	4	4	0,033	2	2,5	0,47	5	5
Hymenaea sp.	4	4	0,029	2	2,5	0,4	4,94	4,93
Solanum argenteum Dun. Ex Poir	4	3	0,048	2	1,9	0,67	4,57	4,57
Hyeronima alchorneoides Allemão	2	2	0,158	1	1,3	2,21	4,48	4,48
Trichila silvatica	3	3	0,072	1,5	1,9	1,01	4,41	4,41
Marlierea parviflora O. Berg	3	3	0,071	1,5	1,9	1	4,4	4,4

*NI: Number of individuals; NO: Number of occurrences; G: Basal area; DR: relative density; DoR: relative dominance; VC: Cover value; VI: value of importance.

Source: Elaborated by the authors (2020).

The importance of species is related to density, frequency, and dominance values (LAMPRECHT, 1990). High values of these three parameters represent the most important species when only the community structure is evaluated. However, species with low density, but high frequency and dominance represent dominant and isolated trees, in small numbers, but scattered with some regularity over relatively large areas. Basal area (G) may be an important indicator of the degree of the degradation of the area. Ramos *et al.* (2011) associated the low values of basal area to several anthropic factors that cause disturbances in these places. While higher values are related to a better conservation status (KURTZ; ARAÚJO, 2000; MORENO *et al.*, 2003; SZTUTMAN; RODRIGUES, 2002). According to Table 2, it is observed that the species *Schizolobium parahyba* (Vell.) Blake. was the one with the highest basal area value when compared to the others.

The relevant numerical data that may support the plant recomposition project are the number of individuals per species, the number of occurrences of the species at the sampling points (frequency), and the value of importance. Arruda and Daniel (2007) state that phytosociological studies can constitute a theoretical basis to assist in the preservation and use of flora resources, contributing to the recovery of degraded sites.

Conclusion

The results indicate a higher proportion of non-pioneer species, with *Guapira opposítte* (Vell.), presenting the highest value of importance and density, and the *Schizolobium parahyba* (Vell.) Blake with the highest values of basal area.

The survey data indicate the richness of species in the study area, serving as a basis for strategies for management and conservation of the environment. Phytosociological studies, although scarce, are important to support the analysis of preservation and the use of nature.

Comunidade arbórea em um fragmento de encosta de Mata Atlântica em São Sebastião/SP

Resumo

A expansão urbana e o crescimento das atividades econômicas associadas ao turismo, somadas às portuárias e marítimas, resultaram na ocupação das vertentes da Serra Mar, no município de São Sebastião/SP, aumentando a degradação ambiental. O objetivo do estudo foi avaliar o padrão arbóreo em um fragmento de 0,111 ha ao redor de uma clareira de 4,8 ha, localizado na Mata Atlântica na cidade de São Sebastião/SP, permitindo que o plano de revegetação inclua espécies nativas observadas na região. A análise fitossociológica foi feita utilizando o método de quadrantes centrados, por meio da amostragem de 50 pontos (30 em áreas próximas, 10 em áreas de borda e 10 próximas a uma das áreas de drenagem), havendo uma distância mínima de 20 metros entre elas. Foi ainda observado o número de indivíduos de cada espécie, bem como sua área basal (G), densidade relativa e absoluta (DR e DA) e dominância relativa e absoluta (DoA e DoR), frequência relativa (FR) e o valor de importância (VI). Os resultados indicaram uma maior proporção de espécies não pioneiras, sendo a Guapira opposítte (Vell.) com os maiores valores de importância e densidade, e a Schizolobium parahyba (Vell.) Blake com a maior área basal. Os dados analisados demonstram a riqueza de espécies na área de estudo, servindo como base para estratégias de manejo e conservação do meio ambiente. Estudos fitossociológicos, embora escassos, são importantes para subsidiar análises de preservação e de uso da natureza.

Palavras-chave: Degradação. Meio ambiete. Fitossociologia. Recomposição.

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