URBAN FORESTRY IN MOGI GUAÇU, SÃO PAULO STATE, BRAZIL

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ABSTRACT

This study evaluated urban forestry in Mogi Guaçu, São Paulo State, Brazil, according to purchasing power. Stratified sampling was carried out in five neighborhoods, totaling 75 blocks, enabling the identification of 57 species, 20 of which are native and 37 exotics. The frequency of exotic specimens was 77.15%. The three most frequent species (57.87%) had the highest phytosanitary occurrences. Small trees presented 63.13%, medium ones 29.33% and large trees with 7.54% of frequency. Mogi Guaçu had an average Green Area Index (GAI) of 10.85 m² per inhabitant, with good potential to increase at low cost, as there are many empty spaces and the replacement of trees that presented problems must be with large trees of native forest near the city. There was no correlation between purchasing power and GAI.

Keywords: Plant health, green area index (GAI), conflicts, species diversity, ecological benefits

FLORESTA URBANA EM MOGI GUAÇU, ESTADO DE SÃO PAULO, BRASIL

RESUMO

Este estudo avaliou a arborização urbana em Mogi Guaçu, São Paulo, Brasil, de acordo com o poder aquisitivo. A amostragem estratificada foi realizada em cinco bairros, totalizando 75 blocos, possibilitando a identificação de 57 espécies, sendo 20 nativas e 37 exóticas. A frequência de espécimes exóticos foi de 77,15%. As três espécies mais frequentes (57,87%) apresentaram as maiores ocorrências fitossanitárias. Árvores pequenas apresentaram 63,13%, as médias 29,33% e as árvores grandes com 7,54% da frequência. Mogi Guaçu possuía um índice de área verde (IAV) médio de 10,85 m² por habitante, com bom potencial para aumentar a baixo custo, pois existem muitos espaços vazios e a substituição das árvores que apresentaram problemas deve ser com árvores de grande porte da floresta nativa nas proximidades da cidade. Não houve correlação entre poder aquisitivo e o IAV.

Palavras-chave: Fitossanidade, índice de área verde (IAV), conflitos, diversidade de espécies, benefícios ecológicos

INTRODUCTION

In Brazil, more than 84% of the population lives in urban centers, in the state of São Paulo, Brazil, the urban population is over 93% (IBGE, 2019). Cities are heat islands due to the low reflectivity materials used, low permeability, pollution, etc. Urban forestry can alleviate these problems by purifying the air, absorbing heavy metals, reducing the risk of flooding, absorbing noise pollution, etc. (HOLDER & GIBBES, 2017; LIVESLEY et al., 2016; McPHERSON et al., 2016; RUSSO et al., 2016; SANUSI et al., 2017; SU et al., 2016; WANG et al., 2018; YANG et al., 2019).

Trees require maintenance and pruning when they conflict with urban infrastructure, which generates some costs, however, all studies have shown that the benefits outweigh the costs at the rate of 1.52 to 6.13 per dollar invested (McPHERSON et al., 2016; WANG et al., 2018). The rate of return depends on many factors, the most important of which are the concentration of pollutants and the volume of the treetops.

The World Health Organization (WHO) recommends a minimum vegetation area of 12 m² per inhabitant for a good quality of life, and few Brazilian municipalities reach this index. In Brazil, there is no master plan for the country, states or municipalities, although the legislation obliges cities with more than 20 thousand inhabitants to have an Urban Forestry Master Plan, however the majority of city halls are not concerned with this. The objective of this work was to conduct a stratified research in five neighborhoods in the municipality of Mogi Guaçu, São Paulo State, Brazil, to study the influence of purchasing power on urban forestry; frequencies of native and exotic species and occurrence of pests and diseases depending on their origin.

MATERIAL AND METHODS

Mogi Guaçu founded in 1877, is located in the region of Campinas, in the state of São Paulo, Brazil, 22º 22'15'' S, 46º 56'16'' W, average altitude of 587 m and average annual precipitation of 1,240.50 mm. With a population of 151,888 inhabitants, spread over an area of 812,753 km², with a demographic density of 168.99 inhabitants per km² and HDI of 0.774 (IBGE, 2019).

The municipality has five industrial districts with a diversified profile, companies in the paper and cellulose, food, metallurgy and cosmetics sectors, among others. The climate is tropical in altitude with dry winter, minimum average temperature of 15.1º C and maximum of 27.9 º C. It

presents 84.7% of the population between the middle and upper classes and 15.3% in the lower class (IBGE, 2019).

Stratified sampling was carried out in five neighborhoods, Jardim Planalto Verde (high standard), with an area of 375,804.9 m², Jardim Centenário (high to medium standard), with an area of 397,338.8 m², Jardim Novo I (Medium Standard), with an area of 686,561.1 m², Jardim Ypê I (low to medium standard) with an area of 233,831.7 m², and Jardim Santa Terezinha (low standard) with an area of 261,274.5 m². Fifteen blocks were inventoried per neighborhood. Neighborhood maps were used for sampling, using AutoCad software and spreadsheets for data collection.

The data were collected by a trained person, covering the five neighborhoods, totaling 75 blocks, the four sidewalks on each block.

The identification of the species, according to the classification of Engler, was done through the personal knowledge of the team. For the species not identified in the field, the available vegetative material (leaves, flowers and fruits) was collected, photographed and taken to Embrapa Meio Ambiente in Jaguariúna, São Paulo State, Brazil, for identification with the help of botanists.

In the field research, species were identified from the common name and some qualitative parameters were analyzed, such as plant health, conflicts, height, etc.

RESULTS AND DISCUSSION

Fifteen blocks per neighborhood were evaluated, totaling 1,299 trees, 49 failures and 27 unidentified trees, 57 species, 20 natives and 37 exotics, 24 families, 22.85% native and 77.15% exotic. Three species with more than 10% of the population: *Licania tomentosa* (native) with 12.95%; *Ligustrum lucidum* (exotic) with 25.18% and *Murraya exotica* (exotic) with 19.74%, which corresponds to 57.87% of the population (Table 1). Similar results were found by other researchers in the number of species, predominance of exotic species and high frequency of few species (AVOLIO et al., 2018; BLOOD et al., 2016; MORGENROTH et al., 2016; NOWAK et al., 2016; OLIVEIRA et al., 2018; WANG et al., 2018). Worldwide, urban forestry is concentrated in some predominantly exotic species. The main reasons for this practice to occur are the low availability of seeds, the knowledge of these few traditional species, associated with the fear of taking risks with unknown species.

The two families with the highest frequencies were Oleaceae with 34.64% and Rutaceae with 20.94%; with presented the highest percentages of phytosanitary problems. The Rutaceae family presented the largest attack of pests (73.87%), pests and diseases (53.23%), pests and mechanical damage (60%). The Oleaceae family presented the greatest attacks of diseases (33.33%), mechanical damage (24%), diseases and mechanical damage (80.95%) and pests, diseases and mechanical damage with 79.49% of attacks. Although the species are exotic, the high frequency favored the highest percentages of attacks (Table 1).

The increase in species diversity increases the risk of infestation of pests and diseases due to the greater opportunity for attack, and at the same time it decreases by diluting with the largest number of species until reaching equilibrium, with 30 to 35 species of trees. From that number, the greater the diversity, the less the infestation of pests and diseases. This is because the number of trees not attacked by pests increases by the most effective dilution and by the physical and chemical masking done by non-host species (Table 1). The increase in all trophic levels makes the community more resistant to biotic and abiotic disorders (DASSOU & TIXIER, 2016; FIELD et al., 2020; GUO et al., 2019; GUYOT et al., 2015; JACTEL et al., 2019; KLAPWIJK et al., 2016).

In the evolutionary process, species select their pollinators and dispersers (symbiosis). In this way, native species are more interesting than exotic species, because they will attract the fauna associated with them, making the environment more pleasant. In the case of Mogi Guaçu, Seasonal semideciduous forest, forest formation of the atlantic forest, of the species *Astronium* spp., *Schinus* spp., *Aspidosperma* spp., *Handroanthus* sp., *Jacaranda* spp., *Cordia* spp., *Parapiptadenia rigida, Peltophorum dubia, Cedrela* spp., *Copaifera langsdorffii,* etc. present in Parque São Marcelo, belonging to the municipality of Mogi Guaçu, would be more appropriate (Table 2).

The trees were in good condition in more than 90% of the population (Table 3). There were few conflicts with the city infrastructure, the main one being with roots (17.55%), which in general can be easily corrected (Table 4, 5 and 6); 968 trees were pruned, 957 of which were incorrect (Table 7). The problem is serious because 820 trees are small, and theoretically would not need to be pruned or, at most, an orientation pruning. This problem will be corrected by training the pruning team.

Table 1. Plant health by family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Plant health								
	1	**2**	**3**	**4**	**23**	**24**	**34**	**234**	**Total**
Not identified	13	2	2	3	0	1	4	2	27
Anarcadiaceae	28	1	2	4	0	1	0	2	38
Annonaceae	1	0	0	0	0	0	0	0	1
Apocynaceae	10	1	1	0	0	0	0	0	12
Arecaceae	26	0	0	0	0	0	0	0	26
Bignoniaceae	23	6	1	4	0	0	6	1	41
Buxaceae	0	0	1	0	0	0	0	0	1
Chrysobalanaceae	146	8	6	10	4	0	2	2	178
Combretaceae	5	1	0	2	1	0	1	2	12
Euphorbiaceae	2	0	0	0	0	0	0	0	2
Fabaceae	17	0	1	2	0	0	1	0	21
Lythraceae	55	11	3	5	1	0	5	4	84
Malpighiaceae	6	0	1	0	0	0	0	0	7
Malvaceae	39	1	0	1	3	0	0	1	45
Melastomataceae	2	0	1	0	0	0	0	4	7
Moraceae	3	9	1	2	6	0	3	10	134
Myrtaceae	15	1	3	2	0	0	0	0	21
Oleaceae	87	4	14	12	14	0	102	217	450
Oxalidaceae	1	0	0	0	0	0	0	0	1
Pinaceae	2	0	0	0	0	0	0	0	2
Proteaceae	1	0	0	0	0	0	0	0	1
Rosaceae	0	1	0	0	0	0	0	0	1
Rutaceae	52	147	5	3	33	3	1	28	272
Solanaceae	2	6	0	0	0	0	0	0	8
Verbenaceae	6	0	0	0	0	0	1	0	7
Total	542	199	42	50	62	5	126	273	1,299

1 = healthy; 2 = pest attack; 3 = diseases; 4 = mechanical damage; 23 = pests and diseases; 24 = pests and mechanical damage; 34 = diseases and mechanical damage; 234 = pests, diseases and mechanical damage.

Table 2. Phenology of the plant by family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Phenology					
	1	**2**	**3**	**4**	**5**	**6**
Not identified	27	0	0	0	0	0
Anarcadiaceae	35	0	0	0	3	0
Annonaceae	0	0	0	0	0	1
Apocynaceae	4	0	0	1	7	0
Arecaceae	26	0	0	0	0	0
Bignoniaceae	26	2	0	1	9	3
Buxaceae	1	0	0	0	0	0
Chrysobalanaceae	176	0	0	0	0	2
Combretaceae	10	0	0	0	0	2
Euphorbiaceae	1	0	0	0	1	0
Fabaceae	9	0	0	1	11	0
Lythraceae	73	0	0	1	7	3
Malpighiaceae	5	0	0	0	0	2
Malvaceae	16	0	0	0	27	2
Melastomataceae	4	0	0	0	3	0
Moraceae	19	0	0	0	0	5
Myrtaceae	12	0	0	0	3	6
Oleaceae	403	0	0	2	9	36
Oxalidaceae	0	0	0	0	0	1
Pinaceae	2	0	0	0	0	0
Proteaceae	0	0	0	0	1	0
Rosaceae	1	0	0	0	0	1
Rutaceae	83	0	0	16	2	171
Solanaceae	0	0	0	0	6	2
Verbenaceae	5	0	0	0	1	1
Total	948	2	0	22	90	237

1 = leaves only; 2 = flower only; 3 = only fruit; 4 = leaf, flower and fruit; 5 = leaf and flower; 6 = leaf and fruit.

Table 3. Condition of the plant by family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Condition					
	1	**2**	**3**	**4**	**5**	**Total**
Not identified	14	10	3	0	0	27
Anarcadiaceae	29	7	2	0	0	38
Annonaceae	1	0	0	0	0	1
Apocynaceae	10	1	1	0	0	12
Arecaceae	26	0	0	0	0	26
Bignoniaceae	22	17	1	1	0	41
Buxaceae	0	1	0	0	0	1
Chrysobalanaceae	154	22	2	0	0	178
Combretaceae	6	6	0	0	0	12
Euphorbiaceae	2	0	0	0	0	2
Fabaceae	14	7	0	0	0	21
Lythraceae	56	23	4	1	0	84
Malpighiaceae	7	0	0	0	0	7
Malvaceae	35	10	0	0	0	45
Melastomataceae	1	2	4	0	0	7
Moraceae	10	20	3	1	0	34
Myrtaceae	14	6	0	1	0	21
Oleaceae	98	265	77	9	1	450
Oxalidaceae	1	0	0	0	0	1
Pinaceae	2	0	0	0	0	2
Proteaceae	1	0	0	0	0	1
Rosaceae	0	1	0	0	0	1
Rutaceae	206	51	9	6	0	272
Solanaceae	3	5	0	0	0	8
Verbenaceae	5	2	0	0	0	7
Total	717	456	106	19	1	1,299

1 = excellent; 2 = good; 3 = regular; 4 = bad; 5 = terrible.

Table 4. Conflict with wiring, light post and lighting per family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Wiring			Light post			Lighting		
	1	2	3	1	2	3	1	2	3
Not identified	4	3	20	0	0	27	0	0	27
Anarcadiaceae	4	4	30	4	0	34	1	0	37
Annonaceae	0	0	1	0	0	1	0	0	1
Apocynaceae	0	0	12	0	0	12	0	0	12
Arecaceae	0	0	26	0	0	26	0	0	26
Bignoneacea	5	3	33	4	0	36	2	1	38
Buxaceae	0	0	1	0	1	1	0	0	1
Chrysobalanaceae	15	20	143	1	0	172	0	0	178
Combretaceae	4	4	4	0	5	12	0	0	12
Euphorbiaceae	0	0	2	1	0	1	0	0	2
Fabaceae	2	1	18	0	0	21	0	0	21
Lythraceae	7	2	75	3	0	81	0	0	84
Malpighiaceae	2	0	5	0	0	7	0	0	7
Malvaceae	1	0	44	2	0	43	0	0	45
Melastomataceae	1	2	4	1	0	6	0	0	7
Moraceae	7	6	21	4	0	30	2	0	32
Myrtaceae	2	1	18	1	1	19	1	0	20
Oleaceae	76	77	297	17	12	421	1	2	447
Oxalidaceae	1	0	0	0	0	1	0	0	1
Pinaceae	0	0	2	0	0	2	0	0	2
Proteaceae	0	0	1	0	0	1	0	0	1
Rosaceae	0	0	1	0	0	1	0	0	1
Rutaceae	5	13	254	5	8	259	0	0	272
Solanaceae	0	0	8	1	0	7	0	0	8
Verbenaceae	0	0	7	0	0	7	0	0	7
Total	136	136	1,027	47	24	1,228	7	3	1,289

1 = current; 2 = potential (when the tree reaches full development), 3 = without conflict.

Table 5. Conflict with traffic signs, construction and vehicles per family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Traffic signs			Construction			Vehicles		
	1	2	3	1	2	3	1	2	3
Not identified	0	0	27	1	2	24	0	0	27
Anarcadiaceae	0	0	38	6	0	32	1	0	37
Annonaceae	0	0	1	1	0	0	1	0	0
Apocynaceae	0	0	12	0	0	12	0	0	12
Arecaceae	0	0	26	0	0	26	0	0	26
Bignoniaceae	0	0	41	5	0	36	2	0	39
Buxaceae	0	0	1	0	0	1	0	0	1
Chrysobalanaceae	0	0	178	12	12	154	4	0	174
Combretaceae	0	0	12	2	1	9	0	0	12
Euphorbiaceae	0	0	2	0	0	2	0	0	2
Fabaceae	0	0	21	1	0	20	0	0	21
Lythraceae	1	0	83	0	4	80	1	0	83
Malpighiaceae	0	0	7	0	0	7	1	0	6
Malvaceae	0	0	45	0	0	45	2	0	43
Melastomataceae	0	0	7	0	1	6	0	0	7
Moraceae	1	0	33	5	4	25	0	1	33
Myrtaceae	0	0	21	1	0	20	1	0	20
Oleaceae	2	0	248	24	18	408	12	0	438
Oxalidaceae	0	0	1	0	0	1	0	0	1
Pinaceae	0	0	2	0	0	2	0	0	2
Proteaceae	0	0	1	0	0	1	0	0	1
Rosaceae	0	0	1	0	0	1	0	0	1
Rutaceae	0	0	272	22	6	244	10	0	262
Solanaceae	0	0	8	0	0	8	0	0	8
Verbenaceae	0	0	7	0	0	7	0	0	7
Total	4	0	1,295	80	48	1,171	35	1	1,263

1 = current; 2 = potential (when the tree reaches full development), 3 = without conflict.

Table 6. Conflict with root, culvert, garage and pedestrian per family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Root 1	Root 2	Root 3	Culvert 1	Culvert 2	Culvert 3	Garage 1	Garage 2	Garage 3	Pedestrian 1	Pedestrian 2	Pedestrian 3
Not identified	4	0	23	0	0	27	4	0	23	5	0	22
Anarcadiaceae	6	0	32	0	1	37	8	1	29	9	0	29
Annonaceae	0	0	1	0	0	1	0	0	1	0	0	1
Apocynaceae	0	0	12	0	0	12	1	0	11	1	0	11
Arecaceae	0	0	26	0	0	26	2	0	24	0	0	26
Bignoneacea	7	0	34	0	0	41	2	1	38	2	0	39
Buxaceae	0	0	1	0	0	1	0	0	1	0	0	1
Chrysobalanaceae	21	1	156	0	0	178	20	8	150	5	0	173
Combretaceae	4	0	8	0	0	12	1	0	11	1	0	11
Euphorbiaceae	0	0	2	0	0	2	1	0	1	0	0	2
Fabaceae	3	0	18	0	0	21	1	0	20	2	0	19
Lythraceae	9	0	75	0	0	84	5	2	77	4	0	80
Malpighiaceae	0	0	7	0	0	7	1	1	5	1	0	6
Malvaceae	1	0	44	0	0	45	5	3	37	3	0	42
Melastomataceae	3	0	4	0	0	7	2	0	5	0	0	7
Moraceae	10	0	24	0	0	34	9	2	23	0	0	34
Myrtaceae	1	0	20	0	0	21	3	1	17	2	0	19
Oleaceae	144	0	306	1	1	448	99	6	345	21	0	429
Oxalidaceae	0	0	1	0	0	1	0	0	1	0	0	1
Pinaceae	0	0	2	0	0	2	0	0	2	0	0	2
Proteaceae	0	0	1	0	0	1	0	0	1	0	0	1
Rosaceae	0	0	1	0	0	1	0	0	1	0	0	1
Rutaceae	15	0	257	0	0	272	47	4	221	43	1	228
Solanaceae	0	0	8	0	0	8	0	0	8	0	0	8
Verbenaceae	0	0	7	0	0	7	1	0	6	0	0	7
Total	228	1	1,070	1	2	1,296	212	29	1,058	99	1	1,199

1 = current; 2 = potential (when the tree reaches full development), 3 = without conflict.

Table 7. Pruning, size and origin of the plant by family in Mogi Guaçu, São Paulo State, Brazil from 02/02/14 to 11/30/2014.

Family	Pruning			Size			Origin	
	1	2	3	1	2	3	1	2
Not identified	0	19	8	15	8	4	0	0
Anarcadiaceae	1	22	15	12	21	5	32	6
Annonaceae	0	0	1	0	0	1	0	1
Apocynaceae	0	2	10	11	1	0	1	11
Arecaceae	0	0	26	20	5	1	0	10
Bignoniaceae	0	21	20	24	9	8	24	17
Buxaceae	0	1	0	1	0	0	0	1
Chrysobalanaceae	3	115	60	119	51	8	178	0
Combretaceae	0	10	2	2	3	7	12	0
Euphorbiaceae	0	0	2	1	1	0	0	2
Fabaceae	2	6	13	10	5	6	6	15
Lythraceae	2	52	30	66	16	2	0	84
Malpighiaceae	0	3	4	6	1	0	1	6
Malvaceae	0	18	26	42	3	0	2	43
Melastomataceae	0	6	1	4	2	1	7	0
Moraceae	0	29	5	18	10	6	0	34
Myrtaceae	0	7	14	18	3	0	16	5
Oleaceae	6	422	22	196	207	47	0	450
Oxalidaceae	0	0	1	0	0	1	0	1
Pinaceae	0	0	2	1	0	1	0	2
Proteaceae	0	0	1	1	0	0	0	1
Rosaceae	0	1	0	0	1	0	0	1
Rutaceae	2	215	55	238	34	0	0	272
Solanaceae	0	1	7	8	0	0	8	0
Verbenaceae	0	7	0	7	0	0	0	7
Total	16	957	325	820	381	98	287	969

Pruning: 1 = correct pruning; 2 = incorrect; 3 = not pruned. Size: 1 = small (tree height up to 6 m and canopy diameter up to 3 m); 2 = medium (tree height from 6.1 to 9 m and canopy diameter up to 7 m); 3 = large (tree over 10 m tall and canopy over 10 m in diameter); Origin: 1 = native; 2 = exotic.

More than 63% of the trees are small (Table 7). The benefits of urban trees are in the crowns, where together with the photosynthesis process, toxic gases, heavy metals and dust are absorbed, and oxygen and water are eliminated. Noise absorption is also proportional to the canopy volume, therefore, the larger the tree and, consequently, the canopy, the greater the benefits for the population (COUTTS et al., 2015; LIVESLEY et al., 2016; MARTINI et al., 2017; McPHERSON et al., 2016; MONTEIRO et al., 2019; RUSSO et al., 2016; SANUSI et al., 2017; WANG et al., 2018). Thus, on the sidewalks without wiring, large trees should be planted. A small tree generates US $ 44.00 per year of return for each dollar invested, while a large tree generates US $ 140.00 per year (WANG et al., 2018).

The green area index per inhabitant [(GAI) (m² inhabitant $^{-1}$)] was calculated based on the area of the canopy of the trees according to their height, 3 m² of canopy for low trees, 7 m² for medium height trees and 10 m² for tall trees were stipulated. The weighted harmonic mean was used to determine the green areas of the neighborhoods, and the population demographic density was considered homogeneous, that is, 168.99 inhabitants per km² (Table 8).

Three neighborhoods had a GAI above that recommended by the World Health Organization (12 m² per inhabitants), and the general average was slightly below that recommended (10.85 m²) and is not related to purchasing power population, unlike most cities where, the greater the purchasing power, the higher the GAI (BERTINI et al., 2016; LI et al., 2015; MARTINI et al., 2017; MORGENROTH et al., 2016; ORDÓÑEZ et al., 2019; SANUSI et al., 2017; SONG et al., 2016; STEENBERG et al., 2019; XIAO &McPHERSON, 2016; YANG et al., 2019).

Typically, the wealthiest neighborhoods have larger green areas and less population density, which allows the planting of trees within the property (MONTEIRO et al., 2019), while in the poorer neighborhoods, in addition to the higher population density, the areas are more waterproof. Possible explanations for why this did not occur in Mogi Guaçu are the low distinction between social classes, 84.7% of the population are middle to upper class and 15.3% from low class, and the homogenization of demographic density.

Table 8. Green area index [(GAI) (m² inhabitant-¹)] in the different neighborhoods of Mogi Guaçu, São Paulo State, Brazil.

Parameters	Neighborhood				
	P.V.	S.T.	J.N.I	J.Y.I	J.C.
In total blocks	33	24	31	29	30
Number of courts assessed	15	15	15	15	15
Neighborhood area (m^2)	744,700	811,500	981,600	422,400	872,400
Area evaluated (m^2)	375,804.9	262,274.5	686,561.1	233,831.7	397,338.8
Green coverage assessed area (%)	50.46	32.32	69.94	55.36	45.55
Green neighborhood area (m^2)	1,797.46	2,701.11	2,210.47	3,217.12	2,392.97
Inhabitant in the neighborhood *	222.92	208.24	172.16	400.07	193.71
GAI (m^2 inhabitant-¹)	8.06	12.97	12.84	8.04	12.35

PV = Jardim Planalto Verde (high purchasing power); ST = Jardim Santa Terezinha (medium to high purchasing power); JNI = Jardim Novo 1 (average purchasing power); JYI = Jardim Ipê 1 (medium to low purchasing power); JC = Jardim Centenário (low purchasing power). * = Regardless of the area and considering homogeneous distribution in the city (168.99 inhabitants km^{-2}). GAI (m^2 inhabitant^{-1}).

CONCLUSION

All neighborhoods evaluated in Mogi Guaçu showed low species diversity and high percentage of exotic species.

The larger the canopy area, the greater the environmental benefits; therefore, whenever possible, large trees should be planted. Species diversification is also related to the quality of urban forestry and, the greater the diversity, the lower the risk of attack by pests and diseases.

We recommend diversifying with large species from the Seasonal Semidicidual Forest and training the tree pruning team in Mogi Guaçu.

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