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Articles

Roadside urban forests in Jaú, São Paulo: composition, diversity, and management practices

Floresta urbana viária em Jaú/SP: florística, diversidade e manejo da arborização

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ABSTRACT

Promoting sustainable development and enhancing urban resilience to climate change are urgent global priorities. Among the strategies to achieve these goals, expanding and improving urban green spaces and tree cover play a critical role. Assessing the current state of urban tree cover is therefore essential to guide actions that optimize the ecosystem services provided by urban vegetation. This study aimed to quantify and characterize tree cover along public sidewalks in the central region of Jaú, São Paulo. A comprehensive tree census was conducted, evaluating indicators such as total number of trees, tree density, floristic composition and diversity, species origin, tree and trunk height, and tree pit dimensions. The findings were unsatisfactory across all indicators: the number of sidewalk trees was insufficient, density and diversity were low, exotic species predominated, pruning was excessive, and most tree pits had permeable areas smaller than the recommended minimum. These results underscore the pressing need for a municipal policy on urban forestry to regulate species selection, planting practices, and tree management, thereby fostering a more resilient and sustainable urban environment.

Keywords: Urban forestry; Sidewalk trees; Phytosociology; Dendrometry

RESUMO

Promover o desenvolvimento sustentável e a resiliência urbana, face às mudanças climáticas, é uma necessidade premente. É preciso, entre outras estratégias, incrementar a resiliência das cidades. Para tanto, uma das estratégias é criar, ampliar, recuperar, conectar e melhorar as áreas verdes e a arborização. Nesse sentido, avaliar a arborização urbana é fundamental para propor e estabelecer ações que otimizem os serviços ecossistêmicos prestados pelas árvores urbanas. Para quantificar e qualificar a arborização urbana dos passeios públicos em Jaú, São Paulo, foi realizado um censo arbóreo na região central da cidade. A arborização foi avaliada a partir dos seguintes indicadores: total de árvores e densidade arbórea; diversidade arbórea e composição florística, origem das espécies, altura das árvores e dos fustes e dimensões dos canteiros. Os resultados encontrados foram insatisfatórios para todos os indicadores analisados, ou seja, o número de árvores nas calçadas é insuficiente, a densidade e a diversidade são baixas, as espécies exóticas são predominantes, a quantidade de podas é excessiva e maioria dos canteiros tem área permeável inferior ao mínimo recomendado. Os resultados indicam a necessidade de uma política pública municipal de arborização urbana para regulamentar os procedimentos de escolha das espécies, plantio e manejo das árvores.

Palavras-chave: Silvicultura urbana; Arborização; Fitossociologia; Dendrometria

1 INTRODUCTION

Urban forests comprise all tree vegetation and associated plant formations within and surrounding urban areas, ranging from small towns to large metropolitan regions. They include trees located along streets and sidewalks, on median strips, and within parks, squares, gardens, residential yards, parking areas, and cemeteries, as well as wooded spaces in suburban and peri-urban zones. In addition, urban forests encompass conservation units, protected areas, and remnants of natural or planted ecosystems that contribute to the ecological structure and environmental quality of cities (Biondi, 2015).

Urban forests directly benefit the environment, including the regulation of microclimate, mitigation of noise and air pollution, control of the water cycle, biodiversity conservation, and the delivery of essential ecosystem services (Ferreira; Duarte, 2019). In the context of ongoing climate change, these forests play a vital role in protecting urban communities from extreme weather events such as floods and droughts, thereby contributing to climate adaptation and urban resilience (WEF, 2011; ANA, 2023).

To achieve these functions, urban planning must be redefined to recognize roadside tree planting and green areas as integral components of Nature-based Solutions (NbS). When properly designed and managed, urban vegetation can replicate key hydrological and ecological processes, supporting adaptive management grounded in natural systems (Cohen-Shacham et al., 2016; UNESCO, 2018). Processes such as rainfall interception and soil water infiltration within watersheds are fundamental to this approach, positioning urban forests as essential elements of resilient and sustainable urban landscapes (Muñoz-Villers et al., 2013).

To maximize the ecological, hydrological, climatic, and social functions of urban roadside forests, trees must be arranged at an appropriate density and exhibit adequate floristic diversity. Trees must be in good overall condition to promote effective canopy cover. In addition, soil permeability must be ensured on public sidewalks and tree beds (Rezende et al., 2020).

Urban forests in public parks should increase social benefits and contribute to greater resilience in cities by restoring ecosystem services related to gene flow in native flora and fauna species and hydrological regulation, both through the interception of precipitation by tree canopies and through water infiltration into the soil via tree beds and permeable pavements (Silva et al., 2019).

The management of urban forests encompasses a complex set of activities that must account for interactions with urban infrastructure—often characterized by high costs and potential conflicts—as well as coordination among public and private stakeholders. This complexity is particularly evident in the management of roadside tree planting, where spatial, technical, and institutional challenges frequently intersect (Basso; Corrêa, 2014; Martini, Biondi; Batista, 2019).

The success of sidewalk trees depends on effectively integrating the planting process into broader urban planning and public management strategies. Selecting suitable species for each specific context, using appropriately sized seedlings, ensuring adequate planter dimensions, and properly managing trunk and crown development are crucial measures for maximizing the positive impacts of urban trees on microclimate regulation, hydrological balance, ecological integrity, and social well-being (Lima et al., 2020).

In this context, the present study aimed to analyze the results of a tree census conducted in the central region of Jaú, São Paulo. The census involved the enumeration, geolocation, identification, characterization, and documentation of all trees within this area. Based on specific indicators, the study sought to assess and discuss the current condition of roadside tree planting in the city.

2 MATERIALS AND METHODS

A census-type tree inventory, in which all trees in an area are identified, characterized, and mapped, was conducted in the central region of the city of Jaú, São Paulo, in an area called "Landscape Unit No. 01 - UDP 01." The UDP 01 measures 1,729,621 m^2 (172.96 ha). There are 137 blocks and 20 squares/green areas (Figure 1).

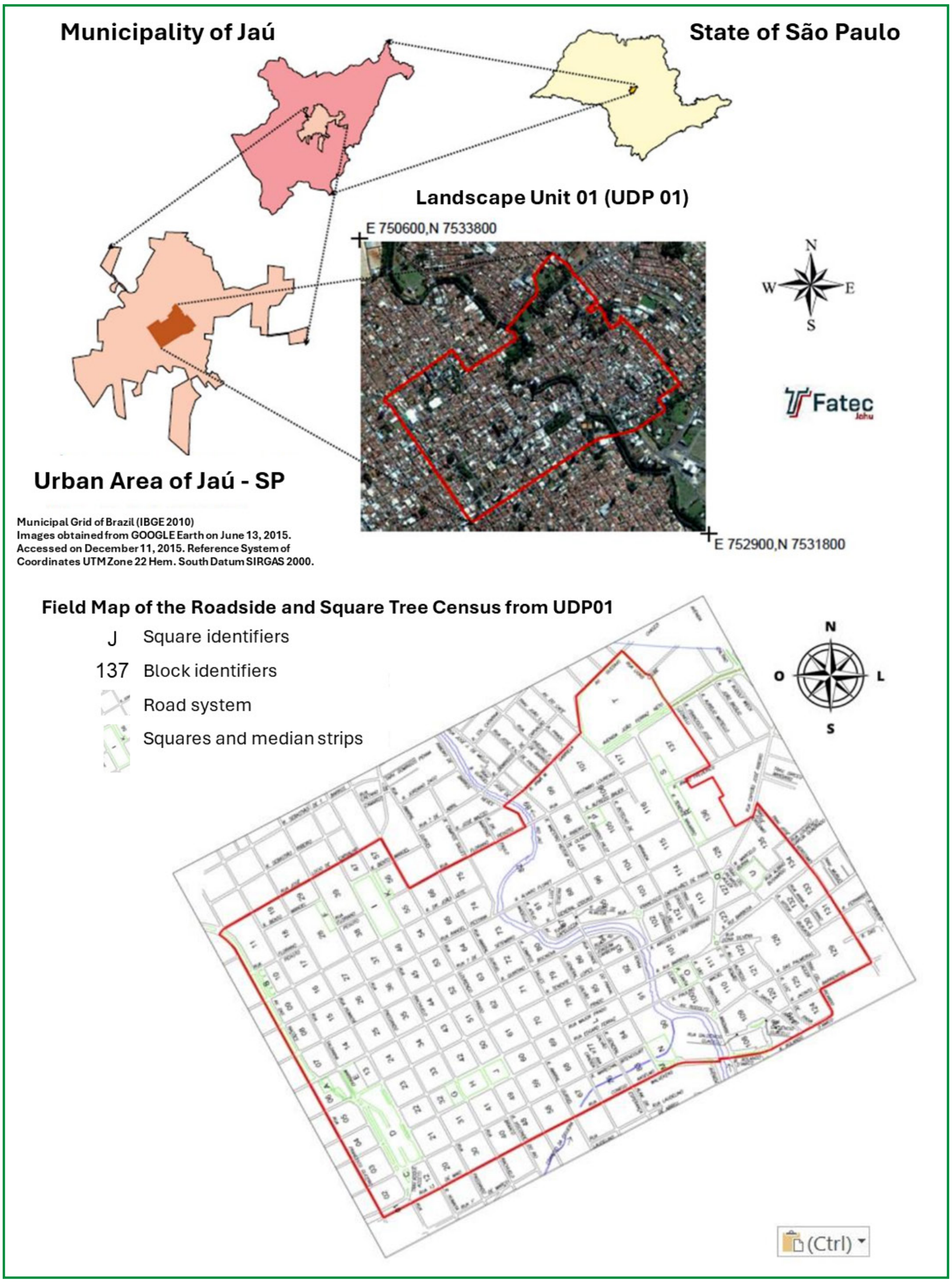
Data collection was carried out using a field spreadsheet adapted from Silva Filho et al. (2002) to develop a geospatial database of tree cover along public roads and within green areas of the study site. The surveyed area, corresponding to UDP 01, comprises 137 blocks totaling 54,485 linear meters of public sidewalks and encompasses 3,977 properties.

All individuals planted on the sidewalks of UDP 01 were identified. Trees located in urban squares and parks were not included in this study, nor were trees in fragments of native vegetation.

Species identification was performed through consultation of relevant literature and, when necessary, with botanical experts. The spelling and taxonomic validity of species names were verified using the Reflora Database – Virtual Herbarium of the Rio de Janeiro Botanical Garden (REFLORA - VIRTUAL HERBARIUM, 2024).

To determine the origin and occurrence of the species—classified as regional native, Brazilian native, or exotic—the List of Brazilian Flora Species (Cardoso-Leite et al., 2019) and the List of Species Indicated for Ecological Restoration for Various Regions of the State of São Paulo (Barbosa, 2017) were consulted. Based on these classifications, the proportions of individuals belonging to regional native species (NR), native species from other regions of Brazil (NB), and exotic species (E) were calculated.

Figure 1 – Location of Jaú/SP and Landscape Unit No. 01 – UDP 01



Source: Authors (2024)

Subsequently, the following parameters were calculated:

Relative density (*DRi*):

$$DRi = \frac{ni}{N} x\ 100\% \quad (1)$$

and

Shannon Wiener species diversity index (*H'*):

$$H' = -\sum \left(\frac{ni}{N}\right) \times \ln\left(\frac{ni}{N}\right) \quad (2)$$

where: *ni* is the number of individuals of a given species; N is the total number of individuals sampled.

The results obtained from the Tree Census in UDP 01 were analyzed based on the following indicators: total number of trees and tree density, species diversity and floristic composition, species origin, tree height, trunk height, and bed dimensions. The reference or ideal values adopted for each indicator in this study are presented in Table 1.

Table 1 – Ideal indicators and indices used for roadside tree planting

Indicator	Ideal situation
Number of trees	3,977 trees* (1 tree per property)
Tree density	73 trees/km of sidewalk (1 tree/13.7 m of sidewalk; 13.7 m = average lot frontage)
Floristic composition	RICHNESS: High Shannon Diversity Index - H' > 4 UNIFORMITY: Density of individuals per species No species with relative density (DRi) > 15%
Origin of species	At least 50% of the number of species and 50% of the number of individuals of native species of regional occurrence.
Tree trunks	100% of trees with trunk diameter > 1.80 m**
Tree height	100% of adult trees with a height ≥ 6 m***
Size of tree beds	100% of beds with permeable area > 1 m²****

Source: Authors (2024)

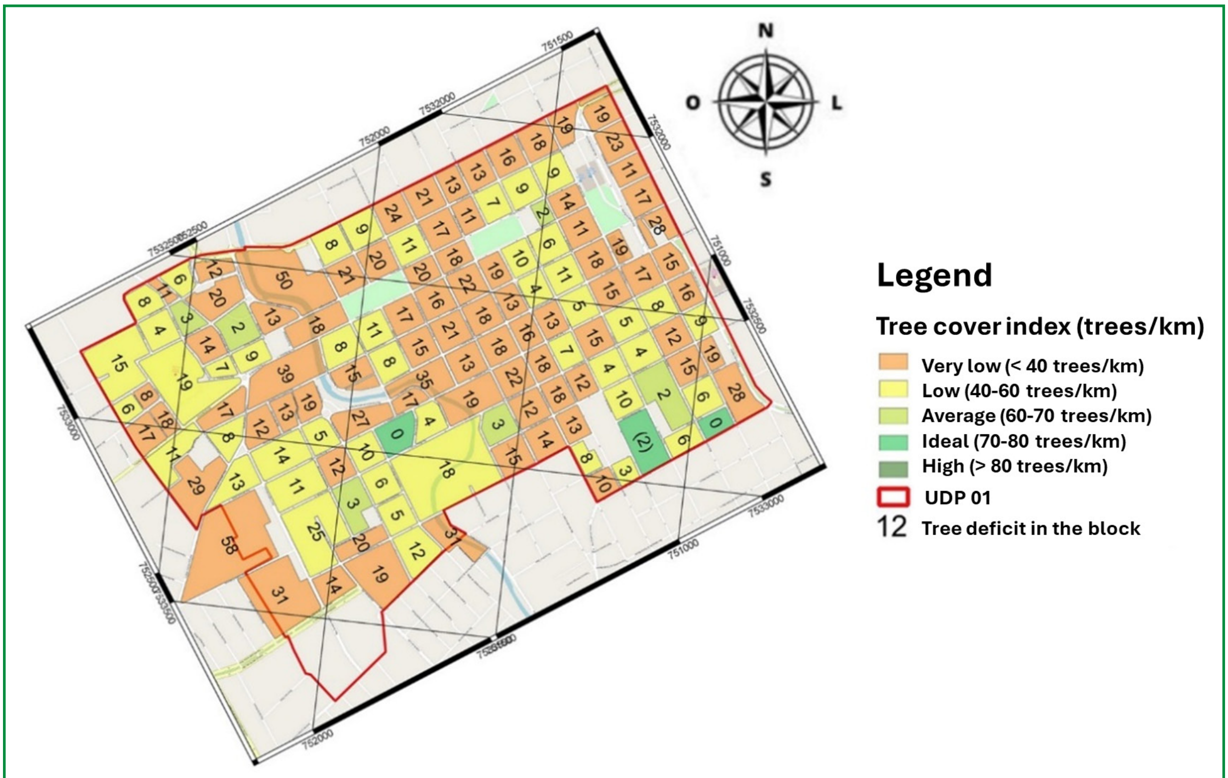
In where: * For the assessment of tree coverage in UDP 01, the ideal number of trees was estimated as one tree per property or building, corresponding to a total of 3,977 trees; ** According to the Municipal Code of Urban Arborization of Jaú (Municipal Law No. 3,830/2003), sidewalk trees must be pruned to a single trunk (stem) up to a minimum height of 1.80 m; *** Height of small tree species; *** According to the Municipal Code for Urban Tree Planting of Jaú (Municipal Law No. 3,830/2003), tree planting beds must have a minimum area of 1.0 m².

3 RESULTS AND DISCUSSIONS

A total of 1,870 trees were recorded in UDP 01, revealing a deficit of 2,107 trees in relation to the ideal number. This reference value is based on Municipal Law No. 5,249/2019, which establishes the requirement to plant one tree in front of each new building as a condition for obtaining the *Habite-se* (occupancy permit) in Jaú/SP (Jaú, 2019).

Tree density in UDP 01 was 34 trees per kilometer of sidewalk, representing less than half of the ideal density of 73 trees/km. Among the 137 blocks surveyed, only three reached densities between 70 and 80 trees/km (Figure 2). In comparison, Aoki et al. (2023), in a study on urban tree planting in cities of Mato Grosso do Sul, found densities ranging from 49 to 106 trees/km of sidewalk. Figure 2 also illustrates the number of additional trees required in each block to achieve the ideal density.

Figure 2 – Tree cover index and tree deficit per block in Landscape Unit No. 01 - UDP 01, Jaú/SP



Source: Authors (2024)

Table 2 presents the values of the indicators obtained in this study in comparison with the corresponding ideal indices.

Table 2 – Current condition of roadside tree planting in Landscape Unit No. 01 (UDP 01), Jaú/SP, in relation to the proposed ideal condition

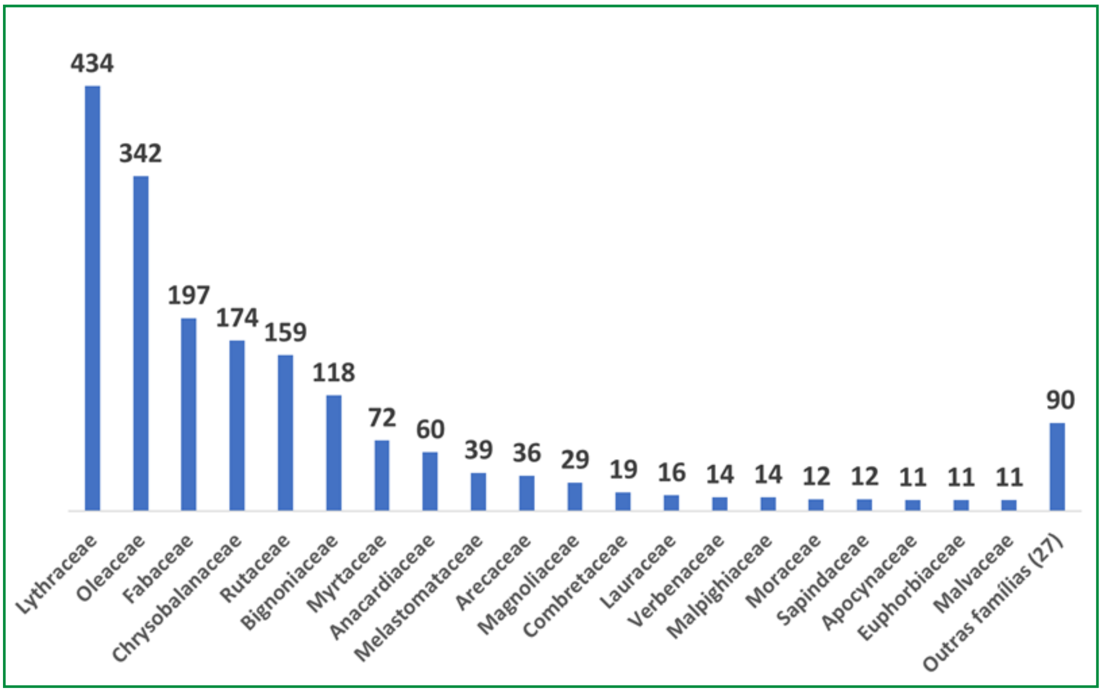
Indicator	Ideal situation	Real situation
Number of trees	3,977 trees	1,870 trees
Tree density	73 trees/km of sidewalk	34 trees/km of sidewalk
Floristic composition	Shannon Diversity Index (*H'*) > 4 No species with *DRi* > 15%	Shannon Diversity Index (*H'*) = 3.12 Resedás: *DRi* = 22.6% Alfeneiros: *DRi* = 18.2%
Origin of species	At least 50% of the number of species and 50% of the number of individuals of regional species	64% of individuals from 73 exotic species; 22% from 30 species native to Brazil; 14% from 17 species found regionally.
Tree trunk	100% of trees with trunks > 1.80 m.	18% of trees with trunks $\geq$ 1.80 m.
Tree height	100% of adult trees with a height > 6 m.	83.2% of the tree population of adult and sub-adult individuals; 72% of trees with a height < 6 m; 961 trees with signs of drastic and poorly executed pruning.
Size of tree beds	100% of beds with permeable area > 1 m²	11% of tree beds with permeable area > 1 m²

Source: Authors (2024)

A total of 118 species belonging to 48 botanical families were identified in UDP 01. The families recorded, listed in decreasing order according to the number of tree individuals, were: Lythraceae, Oleaceae, Fabaceae, Chrysobalanaceae, Rutaceae, Bignoniaceae, Myrtaceae, Anacardiaceae, Melastomataceae, Arecaceae, Magnoliaceae, Combretaceae, Lauraceae, Malpighiaceae, Verbenaceae, Moraceae, Sapindaceae, Apocynaceae, Euphorbiaceae, Malvaceae, Platanaceae, Polygonaceae, Punicaceae, Asparagaceae, Solanaceae, Lamiaceae, Pinaceae, Bixaceae, Podocarpaceae, Compositae, Elaeocarpaceae, Nyctaginaceae, Proteaceae, Rubiaceae, Annonaceae, Boraginaceae, Cactaceae, Caricaceae, Cupressaceae, Monimiaceae, Salicaceae, Scrophulariaceae, Tiliaceae, Araliaceae, Araucariaceae, Berberidaceae, Plumbaginaceae, and Rosaceae (Figure 3).

Table 3 presents the 35 species with ten or more individuals occurring along the sidewalks of UDP 01. The remaining 95 species were represented by fewer than ten individuals each.

Figure 3 – Total number of trees by botanical family (families with at least 10 identified tree individuals) in Landscape Unit No. 01 (UDP 01), Jaú/SP



Source: Authors (2024)

The Shannon–Wiener diversity index obtained for UDP 01 was 3.12 (Table 3). Similarly, Silva et al. (2020) reported an H’ value of 3.19 for the tree cover along public roads in Analândia. These comparable results likely reflect the unplanned and irregular distribution of species on public streets, largely resulting from tree planting carried out by residents without coordinated planning.

Cardoso-Leite et al. (2019) conducted a census of roadside trees in the urban area of Sorocaba, recording 51,908 trees distributed among 203 species, 130 genera, and 47 families. Of these, 41.78% of individuals and 42.36% of species were native to Brazil. The Shannon–Wiener diversity index (H’) for Sorocaba was 3.73, with no evidence of species dominance. These results indicate a well-planned and diversified urban tree population.

In terms of species density, the exotic species resedá and alfeneiro showed relative densities (DRi) of 22.6% and 18.2%, respectively (Table 3).

Table 3 – Most common tree species found in roadside plantings in UDP 01, Jaú, São Paulo

Scientific name	Family	Common name	Qde	Dr %[1]	Pi[2]	LN[3]	(Pi*LN)[4]
Lagerstroemia indica L.	Lythraceae	Resedá	423	22.6%	0.2262	-1,4863	-0.3362
Ligustrum lucidum W.T.Aiton	Oleaceae	Alfeneiro	341	18.2%	0.1824	-1,7018	-0.3103
Moquilea tomentosa Benth.	Chrysobalanaceae	Oiti	174	9.3%	0.0930	-2,3746	-0.2210
Murraya paniculata (L.) Jack	Rutaceae	Murta-de-cheiro	126	6.7%	0.0674	-2,6974	-0.1818
Handroanthus chrysotrichus (Mart. ex DC.) Mattos	Bignoniaceae	Ipê Amarelo do Cerrado	68	3.6%	0.0364	-3,3142	-0.1205
Cenostigma pluviosum (DC.) Gagnon & G.P.Lewis	Fabaceae	Sibipiruna	61	3.3%	0.0326	-3,4228	-0.1117
Schinus molle L.	Anacardiaceae	Aroeira-salsa	45	2.4%	0.0241	-3,7270	-0.0897
Holocalyx balansae Micheli	Fabaceae	Alecrim de campinas	41	2.2%	0.0219	-3,8201	-0.0838
Pleroma granulosum (Desr.) D. Don	Melastomataceae	Quaresmeira	39	2.1%	0.0209	-3,8701	-0.0807
Tabebuia roseoalba (Ridl.) Sandwith	Bignoniaceae	Ipê branco	35	1.9%	0.0187	-3,9783	-0.0745
Magnolia champaca (L.) Baill. ex Pierre	Magnoliaceae	Magnolia amarela	29	1.6%	0.0155	-4,1664	-0.0646
Callistemon viminalis (Sol. ex Gaertn.) G.Don	Myrtaceae	Escova-de-garrafa	23	1.2%	0.0123	-4,3982	-0.0541
Eugenia uniflora L.	Myrtaceae	Pitangueira	23	1.2%	0.0123	-4,3982	-0.0541
Dictyoloma vandellianum A.Juss.	Rutaceae	Tingui	22	1.2%	0.0118	-4,4427	-0.0523
Bauhinia forficata Link	Fabaceae	Pata-de-vaca	21	1.1%	0.0112	-4,4892	-0.0504
Terminalia catappa L.	Combretaceae	Sete Copas	19	1.0%	0.0102	-4,5893	-0.0466
Psidium guajava L.	Myrtaceae	Goiabeira	17	0.9%	0.0091	-4,7005	-0.0427
Handroanthus impetiginosus (Mart. ex DC.) Mattos	Bignoniaceae	Ipê roxo	16	0.9%	0.0086	-4,7611	-0.0407
Cassia fistula L.	Fabaceae	Cassia imperial	15	0.8%	0.0080	-4,8256	-0.0387
Duranta erecta L.	Verbenaceae	Pingo de ouro	14	0.7%	0.0075	-4,8946	-0.0366
Nectandra megapotamica (Spreng.) Mez	Lauraceae	Canelinha	13	0.7%	0.0070	-4,9687	-0.0345
Caesalpinia pulcherrima (L.) Sw.	Fabaceae	Flamboyant-mirim	13	0.7%	0.0070	-4,9687	-0.0345
Tipuana tipu (Benth.) Kuntze	Fabaceae	Tipuana	10	0.5%	0.0053	-5,2311	-0.0280
Other species	35 families	95 species	282	15.1%	0.1508		-0.9320
TOTAL	48 families	118 species	1870	100.0%	1.0000	- ∑ =	-3.1200

Source: Authors (2024)

In where: [1] Dri - Relative density: ratio in % between the number of individuals of the species divided by the total number of individuals; [2] ni/N: number of individuals of a given species / total number of individuals sampled; [3] Ln: Natural logarithm of ni/Ni*Ln; [4] (ni/Ni)*Ln = H': Shannon-Wiener species diversity index.

Bacelar et al. (2020), studying the afforestation of the city of Monte Alegre/PA, estimated that 72% of the tree species found are not native to the region and 50% are exotic, meaning they do not occur in Brazil. The authors attribute this fact to the absence of standards, planning, and a lack of specialized techniques and technicians in afforestation, coupled with a lack of information and research on the conservation of local native flora and its potential uses. As a strategy to solve this problem, the Ministry of the Environment created the Cidade + Verdes (Greener Cities) Program, which has as one of its guidelines to prioritize the use of native species in urban afforestation, in addition to promoting the creation, recovery, expansion, and proper management of urban green areas (BRAZIL, 2021).

Regarding diameter at breast height (DBH), 898 trees (48.0%) had DBH values ranging from 0.20 m to 1.08 m, while 564 trees (30.2%) had DBH between 0.10 m and 0.19 m. Altogether, this indicates that 78.2% of the tree population (1,462 individuals) consists of adult and young sub-adult trees.

Regarding tree height in UDP 01, Jaú/SP, 72% of individuals measured less than 6.0 m at the time of the inventory. In total, 961 trees (51.4%) showed evidence of drastic or poorly executed pruning and crown reduction. When analyzing height in relation to DBH, it becomes evident that excessive pruning practices have been commonly applied.

Morais et al. (2024), in a study on roadside trees in Botelhos, Minas Gerais, concluded that the predominance of trees with heights up to 6.0 m is likely related to conflicts with overhead power lines.

Vieira et al. (2024), studying roadside tree planting in Serra do Mel, Rio Grande do Norte, observed that many trees had undergone drastic pruning, even in areas without conflicts with power lines. It is an inappropriate but common practice. Pruning poorly executed repeatedly, irreversibly damages the canopy structure, weakens the tree, accelerates wood decay, and reduces its lifespan.

Only 18% of the trees in UDP 01 had trunks exceeding 1.80 m in height. Low trunks increase conflicts with urban mobility. According to the Municipal Code of Urban Arborization of Jaú (JAÚ, 2003), sidewalk trees must be pruned to form a single trunk with a minimum height of 1.80 m.

Another important aspect concerns the size of the tree beds. Although 90% of the public sidewalks in UDP 01 are wider than 2.0 m and therefore suitable for tree planting—allowing adequate permeable space for proper tree growth—only 11% of the tree beds had an area greater than 1.0 m^2. It is worth noting that, according to SVMA (2015), the recommended area for tree beds on public sidewalks is 2.0 m^2.

4 CONCLUSIONS

Adequate tree density and a biodiverse, well-balanced floristic composition of urban sidewalk forests—prioritizing regional species—are essential for maximizing the positive impacts of street tree planting on local climate regulation, hydrology, ecology, and social well-being.

In addition, factors such as species size and canopy architecture, adequate trunk diameter, and appropriate bed dimensions—designed to increase permeable surface areas in cities-should be considered in the planning, management, and maintenance of urban tree planting.

In the case presented, there is a clear need to develop a municipal public policy for urban tree planting along public sidewalks to regulate the selection of species, planting practices, and tree management procedures. Equally important is the education and training of public and private agents, as well as raising public awareness about proper management practices and the ecological and social importance of urban trees.

It is essential and urgent to establish an action plan with clear objectives and measurable targets to improve the indicators evaluated. Such a plan would enable the trees along public sidewalks to develop into a cohesive urban forest capable of enhancing the city’s sustainability and resilience while maximizing ecological, hydrological, climatic, and social benefits.

REFERENCES

ALVES, L. P.; COSTA, J. A. S.; COSTA, C. B. N. Arborização urbana dominada por espécies exóticas em um país megadiverso: falta de planejamento ou desconhecimento? **Revista Brasileira de Geografia Física.** v.16, n.03, p.1304-1375. 2023.

AGÊNCIA NACIONAL DE ÁGUAS E SANEAMENTO BÁSICO - ANA. **Conjuntura dos recursos hídricos no Brasil 2022: informe anual.** Brasília: ANA, 2023.

AOKI, C.; SOUZA, A. S.; POTT, A.; ALVES, F. M.; GUARALDO, E. Arborização urbana em Mato Grosso do Sul: síntese do conhecimento. **Revista de Gestão Ambiental e Sustentabilidade**, v.12, n. 1, p. 1-36, e23442. 2023. https://doi.org/10.5585/geas.v12i1.23442

BACELAR, W. J. L.; PARRY, M. M.; HERRERA, R. C.; FRANÇA, I. F.; PARRY, S. M. Diagnóstico qualiquantitativo da arborização urbana da cidade de Monte Alegre, Pará, Brasil. **Ciência Florestal**, Santa Maria, v. 30, n. 4, p. 1019–1031, 2020. DOI: 10.5902/1980509838182. Available at: https://periodicos.ufsm.br/cienciaflorestal/article/view/38182. Accessed on: 27 Sept. 2024.

BARBOSA, L. M. et al**. Lista de espécies indicadas para restauração ecológica para diversas regiões do Estado de São Paulo**. São Paulo: Instituto de Botânica, 2017. 344p.

BASSO, J. M.; CORRÊA, R. S. Arborização urbana e Qualificação da Paisagem. **Paisagem e Ambiente: Ensaios**, São Paulo, v.34, p. 129 – 148, 2014. DOI: https://doi.org/10.11606/issn.2359-5361.v0i34p129-148. Accessed on: 20fev2024

BIONDI, D. **Floresta Urbana**. Curitiba: A Autora, 2015.

BRASIL. MINISTÉRIO DO MEIO AMBIENTE. **Programa Cidades + Verdes**. 2021. Available at: https://www.gov.br/mma/ptbr/assuntos/agendaambientalurbana/cidadesmaisverdes. Accessed on: 17 June 2023.

CARDOSO-LEITE, E.; de FARIA, L. C.; CAPELO, F. F. M.; TONELLO, K. C.; CASTELLO, A. C. D. Composição florística da arborização urbana de Sorocaba/SP, Brasil. **Revista da Sociedade Brasileira de Arborização Urbana**, Piracicaba, v.9, n.1, p.133-150, 2014. DOI: http://dx.doi.org/10.5380/revsbau.v9i1.66599. Accessed on 29 mai. 2024.

COHEN-SHACHAM, E; WALTERS, G.; JANZEN, C. MAGINNIS, S. **Nature-based solutions to address global societal challenges.** IUCN. 97p.2016.

FERREIRA, L. S.; DUARTE, D. H. S. Exploring the relationship between urban form, land surface, temperature and vegetation indeces in a subtropical megacity. **Urban Climate**, v.27, p.105-23, 2019.

LIMA, G. V. B. A.; PEREIRA, M. M.; RIBEIRO JUNIOR, C. R.; DE AZEVEDO, L. E. C.; ARAÚJO, I. R. S. O direito à cidade arborizada: A arborização urbana como indicador da segregação socioeconômica em Belém do Pará. **Revista da Sociedade Brasileira de Arborização Urbana**, Curitiba, v.15, n.1, p. 79-96, 2020. DOI: http://dx.doi.org/10.5380/revsbau.v15i1.69694. Accessed on 27 mai. 2024.

MARTINI, A.; BIONDI, D.; BATISTA, A. C.; SILVA FILHO, D. F. da. Análise Microclimática das diferentes tipologias de Floresta Urbana de Curitiba. **Floresta**, Curitiba, v. 47, n. 2, p. 137 – 144, 2017. DOI: 10.5380/rf.v47i2.49518. Accessed on 20 mar. 2024.

MORAIS, S. M. F.; PEREIRA, A. A.; OLIVEIRA, U. F. Inventário Florestal Urbano do município de Botelhos, MG. **Ciência Florestal**, Santa Maria, v. 34, n. 1, e71628, p. 1-27, 2024. DOI 10.5902/1980509871628. Available at: https://doi.org/10.5902/1980509871628. Accessed on: 19 Aug. 2024.

PINHEIRO, R. T.; MOURA, D. R.; MARCELINO, D. G. Densidade arbórea e sombreamento nas áreas verdes das quadras residenciais de Palmas, Tocantins. **Ciência Florestal**, Santa Maria, v. 33, n. 2, e71225, p. 1-20, 2023. DOI 10.5902/1980509871225. Disponível em: https://doi.org/10.5902/1980509871225. Accessed on: 24 set. 2024.

PREFEITURA MUNICIPAL DE JAÚ. **Lei Ordinária nº. 3.830, de 09 de dezembro de 2003.** Disciplina a arborização no município de Jaú e dá outras providências e dá outras providências.

PREFEITURA MUNICIPAL DE JAÚ. **Lei Ordinária nº. 5.249, de 28 de agosto de 2019.** Dispõe sobre a obrigatoriedade de plantio de árvore defronte a cada nova edificação neste Município e dá outras providências. Available at: https://www.jau.sp.gov.br/uploads/downloads/compilado-atos-normativos-legislacoes-ambientais.pdf. Accessed on: 18 June 2024.

REFLORA - HERBÁRIO VIRTUAL. Available at: https://reflora.jbrj.gov.br/reflora/herbarioVirtual/. Accessed on: 18 May 2024.

REZENDE, J. H.; ARONI, L. R.; RODRIGUES, V. L.. Avaliação e Classificação de Praças com o uso de Veículos Aéreos Não Tripulados (VANT). **Revista Brasileira de Arborização Urbana**, v. 15, p. 75-89, 2020. DOI: http://dx.doi.org/10.5380/revsbau.v15i2.72430

SALES, M. P.; MOURA, G. J. B.; OLIVEIRA, A. A. A.; PIBER, R. S, Cidades verdes: uma análise do Plano Diretor de Arborização Urbana do município de Salvador (BA). **Revista Monografias Ambientais [online]**, n. 20. 2021. Disponível: https://doi.org/10.5902/2236130862962. Acesso: 27 ago. 2023.

SANTAMOUR JÚNIOR, F. S. **Trees for urban planting: diversity unifomuty, and common sense.** Agriculture Research Service, Washington: U.S. National Arboretum, 2002.

SECRETARIA DO VERDE E DO MEIO AMBIENTE - SVMA. **Manual técnico de arborização**. 3ed. São Paulo: Prefeitura de São Paulo, 2015.

SILVA FILHO, D. F. da; PIZETTA, P. U. C.; ALMEIDA, J. B. S. A. de; PIVETTA, K. F. L.; FERRAUDO, A. S. Banco de dados relacional para cadastro, avaliação e manejo da arborização em vias públicas. **Revista Árvore**, Viçosa, MG, v. 26, n. 5, p. 629-642, 2002.

SILVA, G. T. G. da; CABELLO, N. B.; BARBOSA, P. H. G.; BELINAZI, L. de L.; SILVA, J. M. S. da; CAPELO, F. F. M. Composição Florística da Arborização Urbana de Analândia/SP, Brasil. **Revista da Sociedade Brasileira de Arborização**, Curitiba, v.15, n.1, p. 79-96, 2020. DOI: DOI: http://dx.doi.org/10.5380/revsbau.v15i1.68083. Accessed on: 27abr2024.

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION – UNESCO. **The United Nations World Water Development Report 2018: Nature-Based Solutions for Water.** Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. 170p. 2018.

VIEIRA, M. D.; OLIVEIRA, L. E. M. de; SOUZA NETO, L. T. de; SOUZA, D. N. do N. . Diagnóstico da arborização urbana da Vila Brasília, Serra do Mel, RN, Brasil. **Terr@ Plural**, [S. l.], v. 18, p. 1-16, 2024. DOI: 10.5212/TerraPlural.v.18.22189.005. Available at: https://revistas.uepg.br/index.php/tp/article/view/22189. Accessed on: 19 June 2024.

WIESEL, P. G.; DRESCH, E.; SANTANA, E. R. R.; LOBO, E. A. Urban afforestation and its ecosystem balance contribution: a bibliometric review. **Management of Environmental Quality: An International Journal [online]**, n. 323. 2021. Available at: 10.1108/MEQ-07-2020-0156. Accessed on: 07 Feb. 2024.

WORLD ECONOMIC FORUM - WEF. Water Security: **The Water-Food-Energy-Climate Nexus.** Island Press: Washington. 2011.

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