

AÇÕES EXTENSIONISTAS NA DIVULGAÇÃO DA XILOTECA UENF (HUENFw)

Dr. CECILIA GONÇALVES COSTA

EXTENSIONIST ACTIONS IN THE PROMOTION OF THE UENF WOOD

COLLECTION (HUENFw) Dr. CECILIA GONÇALVES COSTA

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Resumo

O registro da biodiversidade regional é fonte essencial de consulta e informação, auxiliando na identificação e elaboração de inventários de espécies e fonte de divulgação à sociedade local. Este trabalho visa divulgar o acervo científico da Xiloteca "Dra. Cecília Gonçalves Costa" e formar recursos humanos, interagindo com diferentes públicos-alvo nos municípios da região. Nosso acervo de madeiras provém de coletas realizadas na região Norte/Noroeste do Rio de Janeiro e de diversas regiões do Brasil. Nestas regiões são realizados trabalhos de campo com coletas de material botânico para o Herbário (HUENF) e Xiloteca (HUENFw), além de intercâmbios com outras instituições para a manutenção e ampliação do acervo. A HUENFw tem 614 exemplares, com a preocupação em utilizar a xiloteca como um centro de formação de pessoal para interação com a comunidade. Além de levar conhecimento científico e a importância da preservação das espécies de forma simples e clara, funcionando como um ambiente de aprendizagem e um elo entre alunos, a Universidade e a comunidade. Exposições são realizadas em escolas públicas e privadas e praças públicas. Nesse sentido, ampliamos e mantemos esse acervo botânico, gerando subsídios sobre a diversidade de árvores regionais, aumentando o conhecimento sobre a região e sua conservação.

PALAVRAS-CHAVE: coleções botânicas. madeira. Educação. feiras de ciências. feiras itinerantes.

Abstract

The regional biodiversity register is essential source of consultation and information, helping to identify and prepare species inventories and a source of dissemination to local society. This work aims to disseminate the scientific collection of wood "Dra. Cecília Gonçalves Costa" and train human resources, interacting with different target audiences in the region's municipalities. Our collection of wood comes from collections carried out in the North/Northwest region of Rio de Janeiro and from different regions of Brazil. Fieldwork is carried out in these regions with collections of botanical material for the Herbarium (HUENF) and wood collection (HUENFw), in addition to exchanges with other institutions for the maintenance and expansion of the collection. Huewe has 614 specimens, with the concern about using

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the wood collection as a personnel-training center for interaction with the community. In addition to bringing scientific knowledge and the importance of preserving species simply and clearly, working as a learning environment and a connection between students, University, and community. Exhibitions are held in public and private schools and public squares. In this sense, we expand and maintain this botanical collection, generating subsidies for the diversity of regional trees and increasing knowledge about the region and its conservation.

KEYWORDS: botanical collections. wood. education. science fairs. traveling fairs.

INTRODUCTION

Wood collections are botanical collections made of wood samples collected, cataloged, and stored according to specific techniques. These collections are of incalculable value for existing timber species' scientific and economic knowledge. In addition to gathering a large amount of data on the species, they help identify new samples and subsidize wood characterization studies, having both scientific and economic value (IPT, 2017).

The botanical collections are indispensable for studying plant biodiversity and present a precious collection of plants and information. These collections document the existence of species in a given time and space. In addition, these collections document information on the flora of preserved areas and areas that are now disturbed; they are essential in taxonomic and phylogenetic research, among others, and essential in species identification (Barbosa & Peixoto, 2003). Collections of botanically identified woods with available collection data are of great importance to meet the information needs of botanists, technologists, wood producers, and many others for whom wood is the object of research, material for analysis, and comparison (Da Cunha et al., 2015).

Wood is a naturally resistant material, a tissue product formed by woody plants with a mechanical support function. Wood or secondary xylem is used for structural and support purposes of construction. Due to its availability and physical characteristics, wood was one of humanity's first materials and became an important energy source (Dickison, 2000).

One of the practical uses of the material incorporated into the wood collection is to carry out anatomical analyses to aid taxonomic, ecological, and botanical identification studies. Identification through the anatomy of the wood is a widely used tool, especially when there is no availability of vegetative or reproductive material, as

in the cases of control and inspection operations carried out by environmental agencies in the timber trade, monitoring of management plans and controlling illegal deforestation (Da Cunha et al., 2015).

Considering that the University is formed by the pillars of teaching, research, and extension with action projects that seek to contribute to the development of society, an extensionist action is an attempt to give back from the University to the community that was invested. The wood collection is a repository of collected, preserved, and documented wood samples for scientific and educational purposes. This collection plays a crucial role in Biodiversity Conservation, Scientific Research, Education and Knowledge Dissemination, Species Identification and Classification, and Environmental Monitoring, among others. In this way, our project aims to maintain and promote the collection and its scientific contribution and bring the population knowledge about the importance of environmental preservation and botanical collections.

METHODOLOGY

The priority collection areas were four reserves and protected areas in the north of Rio de Janeiro due to the collection's demand to prioritize collections from areas with few specimens. Excursions were carried out to Mata do Carvão (Estação Ecológica Estadual de Guaxindiba) (Fig.1A), which is in the district of São Francisco do Itabapoana (21°24 'S, 41°04' W) in the north of Rio de Janeiro, Brazil. This area is the largest fragment of floodplain forest in tertiary formations, covering 3,260 hectares (Villela et al., 2006) with elevations ranging from 20 m to 200 m. The Massif of Itaoca (Morro do Rato) (Fig.1B) is also found in the northern region of the state of Rio de Janeiro (21°48' S 41°26'W), located in the municipality of Campos dos Goytacazes. It is an inselberg with approximately 900 ha that stands out in the region's landscape and is inserted in an anthropized matrix formed by extensive sugarcane fields, pastures, and quarries (Souza, 2015). The Reserva Particular do Patrimônio Natural (RPPN) Fazenda Caruara (Fig.1C) is the largest private sandbank conservation unit in the country and the only one in Rio de Janeiro that protects this type of ecosystem. This reserve was created voluntarily and maintained by Porto do Açu, with approximately 4,000 hectares. The Parque Estadual da Lagoa do Açu (Fig.1D) (North of the State) with 8,276.67 hectares, created by State Decree No. 43,522, of March 20, 2012, with

the mission of ensuring the preservation of part of one of the richest and best-preserved remnants of restinga vegetation in the State of Rio de Janeiro, as well as recovering the existing degraded areas; encourage ecotourism as a sustainable alternative for generating employment and income. In other forest remnants in Rio de Janeiro, random collections were made and taken to the Wood Collection, where they were cataloged.

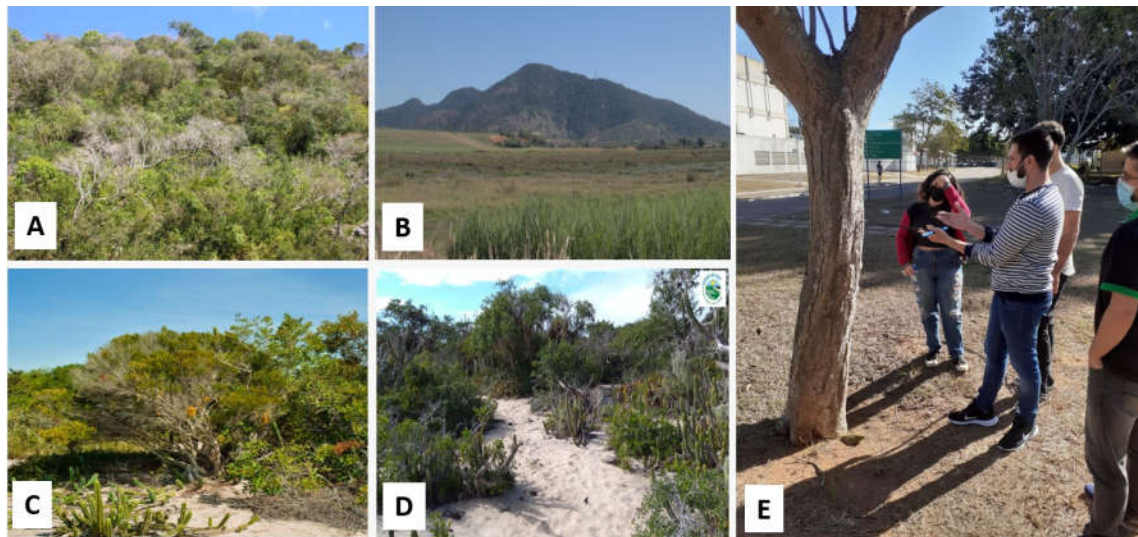


Figure 1- A: Estação Ecológica Estadual de Guaxindiba. B: Morro do Rato. C: Reserva Particular do Patrimônio Natural (RPPN) Fazenda Caruara. D: Parque Estadual da Lagoa do Açú. E: Collect with Pressler probe. Fonte: A, B e C: project archive. D: Parque Estadual da Lagoa do Açú archive.

The samples of botanical material were collected in forest remnants in the north of Rio de Janeiro, with wood extraction by non-destructive methods using a Pressler probe (Fig.1E) or motorized auger in adult individuals at 1.30 m above the ground. The species were selected using floristic and phytosociological research data from these areas (Silva & Nascimento, 2001; Rodrigues, 2004; Carvalho et al., 2006; 2013).

The target audience for human resources training courses (Fig.1E) is university scholarship holders and high school and elementary school teachers. These trainers interact with the extension project, creating a closer bond in the student-teacher relationship with nature, making them more aware of the biological reserves of the North of Rio de Janeiro. In this training course, scholarship students learn how to make

slides containing the three cutting planes to compose the laminaria for the wood collection.

In this project, an itinerant workshop (Fig.2) was created, where the subject is to unravel the wood. The target audience for this workshop is high school students, university students, and the community. The central theme proposed is the importance of biological collections, especially the wood collection. This workshop was organized in such a way as to observe wooden disks, small samples collected with a Pressler probe, slides for observation under a microscope, as well as didactic models and posters that help in understanding the work carried out in a wood collection. The workshop is taken to university events, schools, and squares whenever requested. In addition, the possibility that the workshop may be part of practical classes and even a follow-up of students from the CECIERJ Foundation of the CEDERJ Consortium in the initial years of graduation without having gone through the discipline of botany.



Figure 2 - A: Materials used in the itinerant workshop. B: Banner showing material collection and storage. C: Banner showing the three cutting planes of the wood. Source: project archive

RESULTS AND DISCUSSION

The wood collection is a collection of wood samples kept for study and research purposes. Generally, this collection is in research institutions, such as universities and natural history museums, being a valuable tool in the identification of species, in the analysis of forest diversity, in the preservation and protection of rare woods or of historical or scientific importance and in the conservation of rare or endangered specimens (Barbosa & Peixoto, 2003; Da Cunha et al., 2015). The UENF Dr. Cecilia Gonçalves Costa (HUENFw) is represented by a collection of 614 species listed and stored chiefly in plastic tubes (Fig.3A), of which 63 have blades with the three cutting planes (transverse, tangential longitudinal, and radial longitudinal) for studies anatomical data and databases for identification (Fig.3B). In addition to 16 samples on stem discs (Fig.3C).

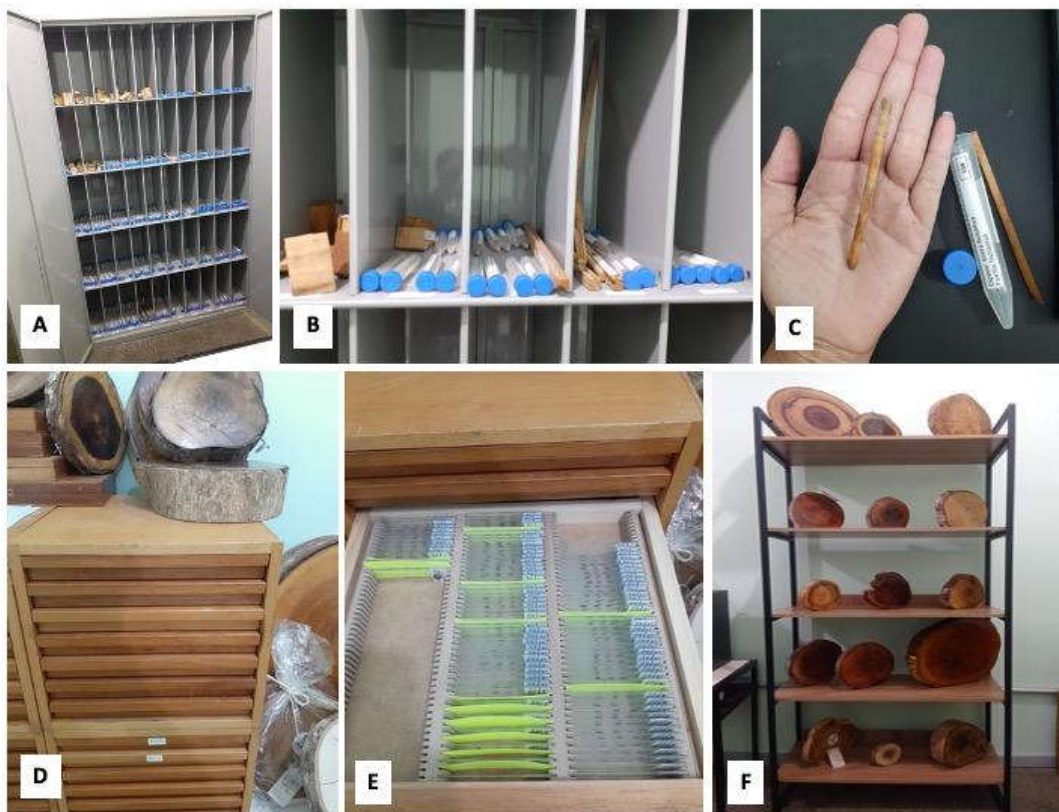


Figure 3 – A, B, and C: Cupboard with wood samples. D and E: laminaria. F: shelf with discs. Source: project archive

One of the main characteristics of tropical forests is that they harbor a rich biodiversity that, stimulated by the conditions of temperature and humidity of the

ecosystems, has lasted for millennia (Fonseca et al., 2005). The HUENFw is an important wood collection made up of specimens from the Brazilian tropical forests, helping to preserve the biodiversity of Atlantic phytogeography, mainly in the north/northwest of Rio de Janeiro and other Brazilian domains. Of the 614 species, 50% are samples collected in the North/Fluminense region, corroborating a HUENFw goal of knowing and training professionals to assist in the protection and management of wood collections as essential sources of biodiversity and forest resources in the North/Northwest of Rio de Janeiro. Dry forests, as is the case of this region, harbor less biodiversity, especially if there is a high disturbance, due to productivity limitations with a decrease in the population growth rate and trouble with an increase in the population mortality rate (Rito et al., 2017, Gonçalves et al. 2021). This fact stimulates the extension project linked to the wood collection to disseminate research with species from this region (Da Cunha et al. 2015).

Wood is a source of resources used as a raw material in many industrial sectors, such as construction, furniture, pulp, and paper. In addition, wood is also used as a source of energy in some regions of the world. However, it is essential to remember that excessive logging can lead to forest degradation and ecological imbalance, so it is necessary to maintain responsible forest management (Lima et al., 2016). Sometimes, the low use of wood is due to a lack of information about the physical, mechanical, and biological properties of the proper use of wood, as is the case of studies evaluating the effects of domestic wood collection. In some regions, the local population seems to exhibit an indiscriminate behavior in collecting firewood but a more specialized behavior in collecting wood for constructing fences. Therefore, the collection of wood for the construction of fences can affect the population structure of the most used species (Gonçalves et al., 2021). In this sense, HUENFw has been developing a way of presenting the biological collections, in this case, the C, to a broad audience, including children, young people, and adults, stimulating interest in the theme and awareness of preserving biodiversity.

Gonçalves et al. (2021) pointed out that domestic wood collection has little impact on tree community structure in a human-altered dry forest. From a theoretical point of view, specific physiological processes may allow some common species to dominate communities even with an intense wood collection. Thus, wood collection can act as selection pressure, increasing the frequency of characteristics related to

regrowth and rapid growth. Finally, from a conservationist perspective, domestic timber collection may affect some more exploited species and reduce the future availability of timber resources due to the decrease in total tree density (Gonçalves et al., 2021). Therefore, the HUENFw offers courses and workshops on the importance of wood collection as strategies to minimize the effects of domestic wood extraction must be planned. In this sense, dissemination, and training are necessary for the community and have been promoted. Regarding the collection of wood for building fences and firewood, the use of knowledge for sustainable use should be encouraged.

In addition to collection maintenance tasks, HUENFw works intensely on research carried out with wood samples to assist in studies of wood anatomy, taxonomy, plant hydraulics, and dendrochronology of species, among others. The collection has 63 botanical families (Table 1), and among these, the most representative are Bignoniaceae, Euphorbiaceae, Fabaceae, Lauraceae, Melastomataceae, Myrtaceae, and Rubiaceae (Fig. 4).

Table 1 – Botanical families represented in the HUENFw.

Total number of families collected		55 families			
Total number of samples collected		725 samples			
Family	Quant.	Family	Quant.	Family	Quant.
Achariaceae	1	Flacourtiaceae	2	Phyllanthaceae	2
Anacardiaceae	25	Guttiferae	1	Pinaceae	1
Annonaceae	11	Humiriaceae	1	Polygalaceae	6
Apocynaceae	6	Hypericaceae	1	Polygonaceae	5
Aquifoliaceae	1	Lamiaceae	1	Primulaceae	1
Araliaceae	2	Lauraceae	25	Proteaceae	1
Asteraceae	10	Lecythidaceae	7	Rubiaceae	149
Bignoniaceae	55	Lythraceae	1	Rutaceae	22
Bombacaceae	5	Malvaceae	4	Salicaceae	7
Calophyllaceae	16	Marcgraviaceae	5	Sapindaceae	18
Canabaceae	6	Melastomataceae	33	Sapotaceae	16
Cardiopteridaceae	1	Meliaceae	19	Simaroubaceae	5
Chrysobalanaceae	5	Monimiaceae	3	Solanaceae	13
Clethraceae	1	Moraceae	5	Theaceae	2
Combretaceae	1	Myristicaceae	1	Urticaceae	2
Elaeocarpaceae	7	Myrsinaceae	1	Verbenaceae	2
Erythroxylaceae	9	Myrtaceae	78	Vochysiaceae	6
Euphorbiaceae	26	Nyctaginaceae	10		
Fabaceae	80	Peraceae	1		

GRAPHIC REPRESENTATION OF COLLECTED FAMILIES

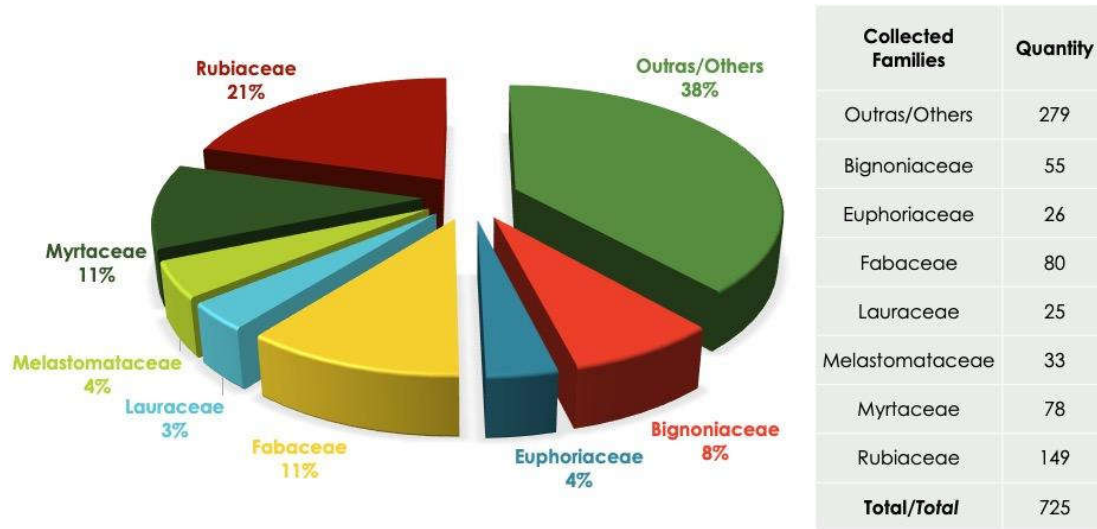


Figure 4 – Graph of the species collected from HUENFw, showing the most representative families in a total number of species Source: project archive

As mentioned, HUENFw participates in a UENF extension project (PROEX), offering workshops, courses, technical/guided visits, and exhibitions. Extension actions in biological collections aim to disseminate knowledge and value collections as resources for scientific and social development (Silveira et al., 2022). This project includes activities such as 1) Guided tours that are a great way to introduce the wood collection to the community and stimulate interest in biology and biodiversity preservation; 2) Workshops and courses to train teachers, students, environmental inspectors, farmers, and other interested parties about wood collections, their importance, and their preservation; 3) Exhibitions to present HUENFw to a broad audience, including children, young people, and adults, stimulating interest in the theme and awareness of the preservation of biodiversity; 4) Participation in fairs and events, presenting the collection, projects, and extension actions to a wide range of audiences, 4) HUENFw also establishes partnerships with schools and universities, promoting the integration of extension actions into teaching programs and stimulating the formation of future professionals in the field. 5) Participation of HUENFw in social networks, disseminating extensionist actions to a broad audience interested in the topic. Extensionist actions at HUENFw aim to bring the wood collection closer to different audiences, promoting knowledge appreciation and preserving biodiversity.

Social networks are a powerful tool for disseminating scientific content, as they allow access to a wide range of audiences and allow interaction with people interested in the topic (Torres, 2016). Due to the pandemic period, we adopted as a goal the dissemination of our actions by creating profiles on Facebook (Wood Collection UENF) and Instagram (@xilotecauenf) (Fig. 5). We successfully shared work, dissemination of results, explanatory videos on the operation of a wood collection, and field and laboratory techniques. We answered questions from followers and those interested in the subject. Our social networks carried out awareness campaigns. A mascot was created to facilitate dialogue with the civil and scientific community on scientific topics, stimulating discussion and reflection on relevant issues. Social networks allow direct interaction with the public, which is essential for answering questions and stimulating curiosity about scientific issues. Social networks also offer the possibility of participating in groups on scientific topics, allowing the exchange of information and discussion of ideas.



Figure 5: Social media. Source: project archive

With the resumption of in-person activities, our workshop offerings increased intensity throughout 2022-23. Until the beginning of this year, we had conducted approximately 49 fairs, starting from the beginning. Among these fairs, we brought the itinerant wood collection to various University events (15 in 2022-23, including events like Botany at the University of the Sociedade Botânica do Brasil). We also visited 16 elementary and secondary schools during the same period (see Fig. 6) and held sessions in public squares (nine for the general public). In addition to these activities, we organized guided tours at the wood collection headquarters, with nine visits during the same timeframe (see Fig. 7). These initiatives provided participants with the opportunity to engage with science in an interactive and accessible manner, piquing their interest and enhancing their comprehension of the significance of botanical collections, particularly those focused on wood. Moreover, these outreach activities demystify science and foster a more inclusive scientific culture. This can contribute to elevating the scientific literacy of the general population, a critical factor for making well-informed decisions and grasping the relevance of scientific issues within society (Almeida et al., 2015).



Figure 6 – Itinerant wood collection fair in different spaces, including UENF, public and private schools. Source: project archive



Figure 7 – Itinerant wood collection fair in different spaces such as schools, squares, and the wood collection headquarters. Source: project archive

There are also countless ways to make the study of Botany more stimulating, and using the wood collection can be considered a non-formal teaching space. For work with the community, it is necessary to organize, identify, and know the local flora and teach how to pass on knowledge. The training of human resources for the application of these practices should range from didactics with the target public to the competence to carry out a visual morphological analysis of the wood for the broad public, such as technicians, environmental inspectors, assistance in theses, dissertations and monographs of the area, training at a secondary and fundamental level for teachers and students, specialists and loggers, those involved in industry and commerce and interested in serving the Teaching, Research, and Extension trinomial.

FINAL CONSIDERATIONS

From a scientific, economic, and environmental preservation point of view, it is clear that the wood collection in a wood collection is an important legacy. In addition, The lack of knowledge about the plant communities and the representativeness of the species of the north/northwest region of Rio de Janeiro, such as the intense anthropic degradation of the landscapes, it is necessary to carry out ecological and conservation studies, focusing on the distribution of existing species in rocky outcrops and Mata de Tabuleiro, mainly when they occur under the domain of the threatened Atlantic Forest.

In this sense, the maintenance of the wood collection at the HUENFw becomes an essential collection for research and inspection activities.

With the increase in the dissemination of HUENFw through articles and the growing publications on social networks, we hope to expand our collection, which should lead to a rise in technical visits by researchers and students from our region and at the national level.

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REFERENCES

ABREU, K. M. P. Estrutura, florística e diversidade de fragmentos de floresta estacional semidecidual no norte - noroeste fluminense. Tese de Doutorado Universidade Estadual do Norte Fluminense Darcy Ribeiro. 209p. 2013.

ALMEIDA, C. *et al.* Centros e museus de ciência do Brasil 2015. Rio de Janeiro: Associação Brasileira de Centros e Museus de Ciência: UFRJ.FCC. Casa da Ciência Fiocruz. Museu da Vida, 2015. 312 p. ISBN: 978-85-89229-03-6. 2015.

BARBOSA, M. R.V.; PEIXOTO, A. L. Coleções botânicas brasileiras: situação atual e perspectivas. *In*: Peixoto, AL (org.). Coleções biológicas de apoio ao inventário, uso sustentável e conservação da biodiversidade. Rio de Janeiro, Instituto de Pesquisas Jardim Botânico do Rio de Janeiro. p.113-125. 2003.

CARVALHO, A. F.; NASCIMENTO, M. T.; BRAGA, J. M. A. Estrutura e composição florística do estrato arbóreo de um remanescente de Mata Atlântica submontana no município de Rio Bonito, RJ, Brasil (Mata Rio Vermelho). *Revista Árvore*, 31: 717-730. 2006.

DA CUNHA, M. *et al.*, A Diversidade de Árvores do Norte - Noroeste Fluminense: Xiloteca Uma Visão Integrada do Ensino, Pesquisa e Extensão. 2015.

DICKISON, W. C. Integrative plant anatomy. California, USA: Academy Press. 2000.

FONSECA, C. N.; LISBOA, P. L. B.; URBINATI, C. V. A Xiloteca (Coleção Walter A. Egler) do Museu Paraense Emílio Goeldi. Boletim do Museu Paraense Emílio Goeldi, Série Ciências Naturais, Belém, v. 1, n.1, p. 65-140, jan. - abr. 2005.

GONÇALVES, P. H. S; DE MEDEIROS, P. M.; ALBUQUERQUE, U. P. Effects of domestic wood collection on tree community structure in a human-dominated seasonally dry tropical forest. *Journal of Arid Environments* 193: 104554. 2021.

Instituto de Pesquisas Tecnológicas (IPT). Xiloteca Dr. Calvino Mainieri. IPT, 2017. Disponível em: http://www.ipt.br/centros_tecnologicos/CTFLORESTA/laboratorios_e_sessoes/41-xiloteca_dr_calvino_mainieri.htm. Acesso em 28 de novembro de 2022.

LIMA, A.I. N; CRUZ, C. B.; SILVA, E. L. Impactos Provocados no Meio Ambiente Pelo uso da Madeira na Construção Civil. *Revista Científica Multidisciplinar Núcleo do Conhecimento*. Edição 03. Ano 02, Vol. 01. pp 116-135, ISSN: 2448-0959. Junho de 2016.

RITO, K. F.; *et al.* Precipitation mediates the effect of human disturbance on the Brazilian Caatinga vegetation. *J. Ecol.* 105, 828–838. <https://doi.org/10.1111/1365-2745.12712>. 2017.

RODRIGUES, P. J. F. P. A vegetação da Reserva Biológica da União e efeitos de borda na mata atlântica fragmentada. Tese de mestrado em Biociências e Biotecnologia, UENF. 2004.

SILVA, G. C; NASCIMENTO, M. T. Fitossociologia de um remanescente de mata sobre tabuleiro no norte do estado do Rio de Janeiro (Mata do Carvão). *Revista Brasileira de Botânica*, 24: 51-62. 2001.

SILVEIRA, M. A. P. A.; MESSIAS, M. R.; BÍGIO, N. C. Coleções biológicas da Universidade Federal de Rondônia: o programa de visitação na socialização do conhecimento científico 2022. *Rev. CPC, São Paulo*, v.17, n.33 especial, p.295-316, jan./ago. 2022.

SOUZA, T. P. Estrutura e composição florística do estrato arbustivo-arbórea das faces Leste e Oeste de um Inselbergue da Mata Atlântica do estado do Rio de Janeiro. Dissertação (Mestrado em Biologia Vegetal) - Universidade do Estado do Rio de Janeiro, 2015.

TORRES, C. C. O uso das redes sociais na divulgação científica. *Observatório da Imprensa* edição 891. 2016.

VILLELA, D. M.; *et al.* Effect of selective logging on forest structure and cycling in seasonally dry Brazilian forest. *Journal of Biogeography*, 33: 506-516. 2006.