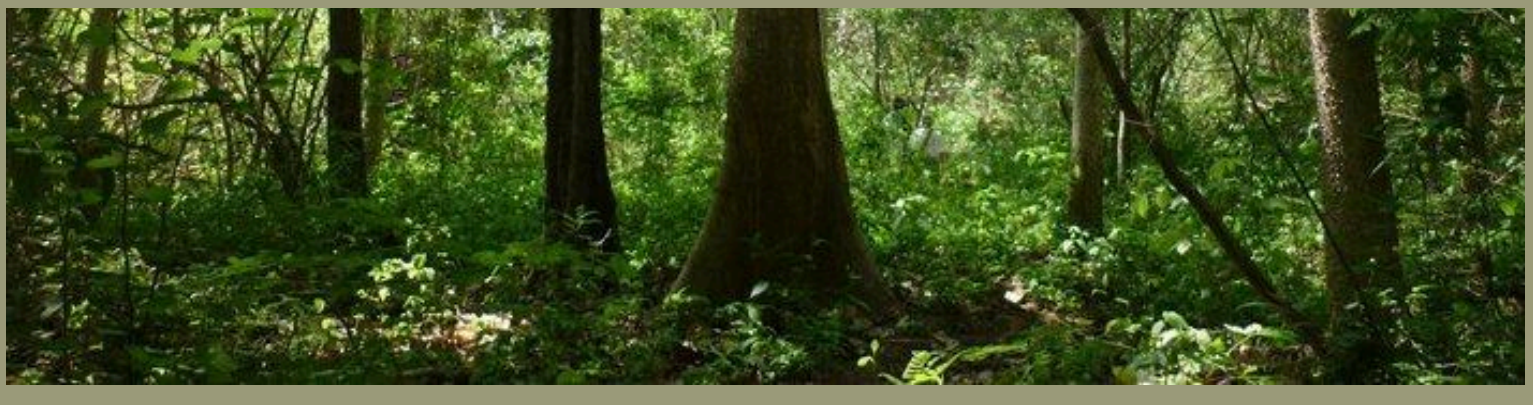
Synthesis of Tree Biodiversity in Tropical America with Plot Inventories



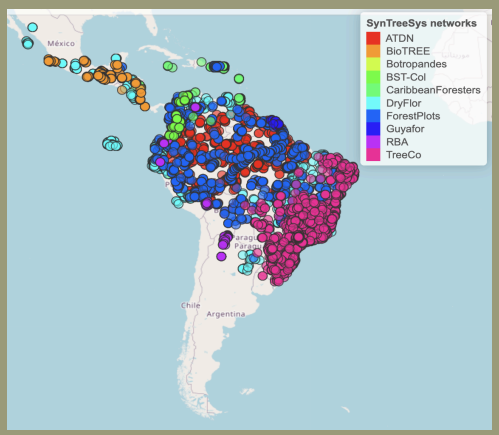
SynTreeSys compiles the available plot-based knowledge of tree biodiversity across Tropical America to address fundamental ecological and biogeographical questions. Thanks to your invaluable contribution, we are conducting a novel and unparalleled compilation of vegetation inventories from multiple networks, to bring a step change to our understanding of tree biodiversity in Latin America.

The project's primary objectives are: (1) assessing patterns and drivers of tree diversity and dominance, (2) mapping hotspots of exceptional tree species turnover, and (3) evaluating the IUCN conservation status of tropical tree species in America.

Funded by the Center for the Synthesis and Analysis of Biodiversity since 2022, the project has been developed through four in-person workshops, and additional three online meetings, where participants worked together on specific workflows needed to achieve the objectives outlined above:s: 1 - Database harmonization; 2 - Patterns of tree diversity; 3 - Drivers of tree diversity; and 4 - Tree vulnerability to climate change scenarios (as part of the original work on conservation of neotropical biodiversity).

A first and critical step for SynTreeSys is the Data Sharing Agreement that serves as a foundational document outlining the principles and guidelines governing the exchange and use of data within the project. This document provides a publication and data sharing policy agreed by all networks involved, ensuring transparency and appropriate recognition of all intellectual, financial and professional contributions.

Interactive plot map here



10 networks ~10000 plots ~50000 morphospecies and ~950 collaborators

4th SynTreeSys workshop, December 2023 Villa de Leyva and Bogotá (Colombia)

Hosted by the Instituto Alexander von Humboldt, this latest meeting in Latin America held immense importance in enhancing connections and communication among Latin American researchers, and policymakers, as well as leading to critical progress in the main goals of the project, so this first newsletter will showcase these advances.

Workshop 1 (May 2022): Participants worked towards a common data structure, mandatory metadata, and assessed how to resolve issues related to the database structure.

Workshop 2 (November 2022): Participants defined the SynTreeSys data sharing agreement, and discussed hypotheses, predictions, and data analysis for the project publication plan.

Virtual meeting (April 2023): Participants shared progress and difficulties on data request and acquisition, and in the implementation of the cross-network data harmonisation.

Workshop 3 (June 2023): Participants finalised the taxonomic standardisation in the dataset, through collaboration with the World Flora Online (WFO), and eliminated duplicated plots across plot networks. They also discussed the structure of the scientific papers and associated data. They agreed to include a science communication piece, focused on lessons learnt from the collaborative process.

Database harmonisation

An improved version of the SynTreeSys database was released, including the lookup tables and CheckTON, a process involving the verification of plot duplicates and data quality and format.

Lookup tables are: i)Vegetation types and biome classification based on the IUCN-ecosystem functional groups; ii) Disturbance
Including five categories: 1: low, 2: low-to-mid, 3:mid, 4: mid-to-high and 5: high and two for successional stage: M: Mature and S: Secondary; Taxonomic table: 13,327 accepted species in SynTreeSys dataset after World Flora Online (WFO) backbone check.

Conservation Assessments

With the support of the National Authority for Plants Conservation, participants identified side projects for Colombia, such as to use the THREAT pipeline (developed for the Mata Atlantica tree flora) for the Orinoquia and Colombian dry forest flora, with the goal to move from plot inventory data to conservation management plans within the Colombian conservation plant strategy.

The assessment of the IUCN conservation status of tropical tree species in Latin America will be conducted by Guilherme Grittz, PhD student at the University of Sao Paulo, supervised by Renato Lima.

PUBLICATION GOALS

Tree Diversity:
Mapping tree diversity across different biomes and examining general patterns of species richness and distribution.

Alpha Diversity:
Distinguishing the influence of climate and biogeography in patterns of species richness.

Tree Vulnerability:
Niche modelling species to assess the most important drivers of tree species' abundances and model their spatial distribution in future scenarios.

Perspective:
Lessons from the process: summary of highlights from the collaboration - efforts, data gathering, cleaning, and governance. This paper could inform/inspire others and be an example of the processes that worked and did not work aiming at healthy, long-term scientific collaboration.

Taxonomy:
Exploring issues associated with species taxonomy in vegetation inventory data, and proposing ways in which vegetation plot data can contribute to improve large-scale taxonomic assessments.

Virtual meeting (September 2023): Participants discussed next steps towards further funding, and extended collaboration with researchers from Costa Rica and Mexico.

Workshop 4 in Colombia (December 2023) Summary here →

Santuario de Fauna y Flora Iguaque Boyacá-Colombia

Next workshop:

Montpellier, June 10-14, 2024

SynTreeSys Conferences Participation

26th IUFRO World Congress, Stockholm - June 23-29, 2024

XX International Botanical Congress, Madrid - July 21-27, 2024

SynTreeSys Community

Discussions focused on strategies and engagement programs to enhance communication among all SynTreeSys contributors.

We will use a set of communication tools that include webinar seminars for manuscript content updates, and newsletters as communication updates from workshops and events.

Science-Policy

Discussions addressed the following topics:

1 Challenges in developing concrete opportunities to advise decision-making

2 How to develop strong, long-term trusting relationships between data owners and users beyond academia

3 Opportunities to use the compiled data to inform management within tropical forests

We held a Public Policy Meeting in Bogota hosted by IAvH, which: emphasised transitioning from tree species distribution records to abundance data.

Key components included attention to Key Biodiversity Areas, climate change adaptation policies, and conservation plans of tree species prioritized.

The final proposal is a comprehensive policy brief, co-led by the Instituto Humboldt, to streamline the outcomes and conclusions of SynTreeSys.

Satellite projects

Further collaboration and third third-party requests are considered when there is no overlap with ongoing deliverables. In summary, the lead of any new project needs to share a half-page document with the group members (networks' points of contact, so they can communicate directly with all the contributors team - meaning everyone has a chance to be informed, comment and decide if they would like to contribute to the new study.

First Satellite project presented:

Tree Hyperdominance: SUCCESS AND VULNERABILITY OF SOUTH AMERICA'S TROPICAL FORESTS by Viviana Ceccarelli, PhD Student at the University of Leeds, supervised by Oliver Phillips and Tim Baker.

Future of SynTreeSys-funding:

Discussions on securing funding for future initiatives, exploring possibilities for continued support, and contemplating more ambitious projects beyond the current publication plan.

- To organise additional meetings and conferences
- To develop new projects (via new grant proposals) stemming from SynTreeSys
- To recruit students and postdocs (as part of new grant proposals or specific postdoc fellowship calls)

We started discussions with other synthesis centers (sDiv, FAPESP) to submit proposals for SynTreeSys 2.0. It would be great to strengthen the network in Latin America, maybe via the direct involvement of local institutions.