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No Longer a Best Guess: NYBG Scientists and International Researchers Produce the First Scientifically Vetted Catalog of Known Plant Species in Amazonia

In a new study published in PNAS, Researchers Document 14,003 Plant Species, Establishing an Invaluable Baseline for Further Research and Conservation Efforts



Amazonian rain forest in Yanachaga-Chemillén National Park, Peru. An international team of scientists, including four NYBG researchers, has published results of the first scientifically vetted plant list of the Amazon Basin. Photo by Fabián A. Michelangeli, Ph.D.

Bronx, NY—Representing a major advance in understanding and conserving the plant life of one of the world's greatest biodiversity hotspots, an international team of scientists—including four researchers from The New York Botanical Garden—has created the first scientifically vetted list of known plant species in the Amazon Basin.

Based on documented plant specimens held in research collections worldwide and verified by specialists in tropical plants, the team cataloged 14,003 species of seed plants in the Amazon Basin, including 6,727 species of trees. Their research is published in the latest issue of the *Proceedings of the National Academy of Sciences* (PNAS).

Until now, the number of plant species that live in the Amazon Basin has been hotly debated, with estimates ranging from the tens to the hundreds of thousands. But those numbers have been based on ecological models or unverified species lists. This study assembles comprehensive species information based on plant specimens identified by specialists.

“Over the years, the debate about the number of plant species in Amazonia has served primarily to highlight our profound ignorance of that wondrously diverse but shockingly understudied region,” said Douglas C. Daly, Ph.D., the Botanical Garden's B. A. Krukoff Curator of Amazonian Botany and Director of the Garden's Institute of Systematic Botany, who was a member of the research team. “We now have a vastly more accurate baseline for exploring and explaining Amazon plant diversity.”

Baseline data are critical for making important decisions about where to conserve land as well as for studying the processes that generate and maintain the extraordinary diversity of the Amazon rain forests.

“Without knowing precisely which species are present in these forests, understanding their evolution, ecology, and conservation is a much harder enterprise,” said Fabián A. Michelangeli, Ph.D., Curator in the Institute of Systematic Botany, who also participated in the research. “With this list, we can better understand the progress that we are making toward documenting all the plant species of this vast region, as well as their relative abundance and distribution.”

In addition to Drs. Daly and Michelangeli, the Garden's Scott A. Mori, Ph.D., Curator Emeritus, and John D. Mitchell, Honorary Curator, contributed to the research effort, which involved more than 40 scientists from the United States, South America, and Europe. Domingos Cardoso, Ph.D., of the Federal University in Salvador, Brazil, and Tiina Särkinen, Ph.D., of the Royal Botanic Garden Edinburgh in Scotland, are the lead authors of the PNAS paper.

The open-access species list was made possible by the digitization and databasing of preserved plant specimens, a collaborative network of plant scientists and research institutions, and regional initiatives. Innovative efforts such as the ongoing Flora do Brasil 2020 and the Catálogo de Plantas de Colombia, funded by their respective governments, have been foundational efforts for gathering knowledge of Amazonian plant diversity, as are local studies and the wealth of digitally available data from such sources as the Garden's William and Lynda Steere Herbarium, which holds the world's largest collection of Brazilian plant specimens.

Publication of this list should be regarded as a starting point. Many new plant species are discovered each year, both in the field and in herbarium collections, and much of the vast Amazon Basin still remains poorly or completely unexplored.

“As important as this list is, it is by no means the final word on Amazonian plant life,” Dr. Daly noted. “Rather, it is a call to mobilize resources, train and employ plant scientists, and exponentially increase the field programs that will help us move toward completion of this still sketchy mural of biodiversity.”

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The New York Botanical Garden is a museum of plants, an educational institution, and a scientific research organization. Founded in 1891, the Botanical Garden is one of the world's preeminent centers for studying plants at all levels, from the whole organism down to its DNA. Garden scientists conduct fundamental research on plants and fungi globally, as well as on the many relationships between plants and people. A National Historic Landmark, the Garden's 250-acre site is one of the greatest botanical gardens in the world and the largest in any city in the United States, distinguished by the beauty of its diverse landscape and extensive collections and gardens, as well as by the scope and excellence of its programs in horticulture, education, and plant research and conservation. Learn more: nybg.org

The New York Botanical Garden, 2900 Southern Boulevard, Bronx, New York 10458

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