

RAINFOR NEWS

Ecologists uncover ‘hyperdominant’ species in the Amazon

Researchers from RAINFOR have joined other scientists from around the world to generate the first basin-wide estimates of the abundance and distribution of trees in Greater Amazonia.

The research, which was published in the journal *Science*, suggests that half of the estimated 390 billion trees in Greater Amazonia belong to only 1.4% of the different species found there. The findings could aid conservation efforts and climate change research the future.

“For the first time, plant ecologists have managed to work out which species dominate Greater Amazonia. This has required a huge collaborative effort, with more than 100 researchers working in each one of the nine nations of Amazonia”, says study co-author Professor Oliver Phillips. Many other RAINFOR researchers contributed to the study which was led by Hans ter Steege, at the Naturalis Biodiversity Center in Leiden, the Netherlands.

Historically, the vast extent and difficult terrain of Greater Amazonia – which includes the Amazon Basin (spanning Brazil, Ecuador, Bolivia, Peru, Columbia, and Venezuela) and Guiana Shield (Guiana, Suriname, and French Guiana) – had restricted the study of its extraordinarily diverse tree communities to local and regional scales.

The lack of basic information about the Amazonian flora on a basin-wide scale has previously hindered Amazonian science and conservation efforts.

“In essence, this means that the largest pool of tropical carbon on Earth has been a black box for ecologists, and conservationists don't know which Amazonian tree species face the most severe threats of extinction,” says Nigel Pitman, who is the Robert O. Bass Visiting Scientist at The Field Museum in Chicago, USA, and a co-author of the study.

However, in the new study, an international team of researchers have combined data from 1,170 forestry surveys to finally answer two long-standing questions: How many trees are there in Greater Amazonia, and how many tree species occur there?

Extrapolations from this large sample suggest that Greater Amazonia harbours around 390 billion individual trees, belonging to around 16,000 species. However, half of all the trees in the region belong to just 227 of those species, say the researchers. The authors termed these species ‘hyperdominants’.

“That’s a much smaller number than anyone anticipated, and it really helps simplify our work,” says Dr Hans ter Steege.

While the study suggests that hyperdominants account for roughly half of all carbon and ecosystem services in Greater Amazonia, it also notes that almost none of them are consistently common across the region. Instead, most hyperdominants dominate a region or forest type, such as swamps or upland forests.

The study also offers insights into the rarest tree species in Greater Amazonia. According to the mathematical model used in the study, roughly 6,000 tree species in Greater Amazonia have populations of fewer than 1,000 individuals, which automatically would qualify them for inclusion in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

“The Amazon is changing fast now, and is becoming hotter than ever before in human history. So, if we can conserve enough of the forest, among these thousands of very rare species could be the winners – the ‘hyperdominants’ - of the future,” concludes Professor Phillips.