UC SANTA BARBARA

THE Current

January 7, 1998
Gail Gallessich

Scientists Estimate the Age of Trees in the Amazon

Using the newest, most powerful technology available, scientists in California and Brazil have dated tropical trees harvested in Brazil, finding that the oldest trees were well over 1,000 years old, substantially older than maximum ages previously predicted by most researchers.

The findings, published in Nature, are based on a radiocarbon dating technique that uses very small samples, allowing scientists to obtain wood from the core of a tree at its base. "We analyzed the oldest wood, laid down when the tree was a sapling, which provides the best possible estimate of the tree's age," said Jeff Chambers, a graduate student at the University of California, Santa Barbara, and lead author of the paper.

Determining the age of trees typically involves counting annual growth rings. However, since tropical trees don't have such annual growth rings, there has been no easy way to determine their ages.

For the joint Brazilian-American research project, 20 large "emergent" trees harvested near Manaus in the central Amazon were tested. Mil Madeirera, the the logging company that harvested the trees, is actively working toward developing sustainable forestry practices, according to the researchers. Emergent trees are the giants that stick up from the main forest canopy.

The age of the trees has a number of implications. "In a breeding population of trees with ages ranging from decades to millennia, unique genes that might be lost with the passing of generations are maintained in the long-lived individuals," said Chambers. "Thousand-year-old trees can reproduce with trees that are many generations younger and prevent the loss of genetic diversity. Also, the oldest individuals may harbor genetic traits like fast growth rates or resistance to pests that would be useful for selective breeding programs."

Knowing the age of different species at harvestable size will allow foresters to develop sustainable harvest practices.

The age of the trees also sheds new light on global climate models. Since atmospheric carbon dioxide concentrations are strongly influenced by carbon intake and release in tropical rain forests, the estimated residence time for carbon in wood in tropical evergreen forests is a key variable in these climate models. This new research indicates that carbon cycling through tropical forests is slower than the amount predicted by current global climate models.Further, the existence of millenium-old trees implies that some forests have remained intact through a number of extreme El Niño events, according to Chambers.

Despite widespread deforestation in the tropics, some 85 percent of Amazon forests remain essentially intact.

"These vast old growth forests provide a unique opportunity for nations of the Amazon to unify the efforts of ecologists, foresters, and managers toward developing sustainable land-use practices," he explained.The Nature article, "Ancient Trees in Amazonia," was co-authored by Joshua Schimel, associate professor of Ecology, Evolution and Marine Biology at the University of California, Santa Barbara, and Niro Higochi, a scientist with Brazil's Instituto Nacional de Pequisas da Amazonia.

The radiocarbon dating was performed at Lawrence Livermore National Laboratory's Center for Accelerator Mass Spectrometry, using their facility's accelerator mass spectrometer, a new device considered to be more accurate than standard radiocarbon dating technology.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.