

## Oldest Trees Are Growing Faster, Storing More Carbon as They Age

Jan. 15, 2014 — In a finding that overturns the conventional view that large old trees are unproductive, scientists have determined that for most species, the biggest trees increase their growth rates and sequester more carbon as they age.

In a letter published today in the journal *Nature*, an international research group reports that 97 percent of 403 tropical and temperate species grow more quickly the older they get. The study was led by Nate L. Stephenson of the U.S. Geological Survey Western Ecological Research Center. Three Oregon State University researchers are co-authors: Mark Harmon and Rob Pabst of the College of Forestry and Duncan Thomas of the College of Agricultural Sciences.

The researchers reviewed records from studies on six continents. Their conclusions are based on repeated measurements of 673,046 individual trees, some going back more than 80 years.

This study would not have been possible, Harmon said, without long-term records of individual tree growth. "It was remarkable how we were able to examine this question on a global level, thanks to the sustained efforts of many programs and individuals."

Extraordinary growth of some species, such as Australian mountain ash -- also known as eucalyptus -- (*Eucalyptus regnans*), and the coast redwood (*Sequoia sempervirens*) is not limited to a few species, the researchers said. "Rather, rapid growth in giant trees is the global norm and can exceed 600 kg (1,300 pounds) per year in the largest individuals," they wrote.

"In human terms, it is as if our growth just keeps accelerating after adolescence, instead of slowing down," said Stephenson. "By that measure, humans could weigh half a ton by middle age, and well over a ton at retirement."

The report includes studies from the Pacific Northwest. Harmon and his colleagues worked in forest plots -- some created as early as the 1930s -- at the H.J. Andrews Experimental Forest east of Eugene and Mount Rainier National Park. Researchers measured growth in Douglas-fir, western hemlock, Sitka spruce, western red cedar and silver fir. The National Science Foundation and the Pacific Northwest Research Station of the USDA Forest Service provided funding.

Under the auspices of the Smithsonian Institution's Center for Tropical Forest Science, Thomas and



*Mature trees. In a finding that overturns the conventional view that large old trees are unproductive, scientists have determined that for most species, the biggest trees increase their growth rates and sequester more carbon as they age. (Credit: Copyright Michele Hogan)*

colleagues in Africa established a 123-acre forest research site in Cameroon in 1996. They measured growth in about 495 tree species.

"CTFS does very important work facilitating collaboration between forest ecologists worldwide and therefore enabling us to gain a better insight into the growth of trees and forests," Thomas said. "This model for collaboration was the basis of the *Nature* study."

While the finding applies to individual trees, it may not hold true for stands of trees, the authors cautioned. As they age, some trees in a stand will die, resulting in fewer individuals in a given area over time.

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### Journal Reference:

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