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## Amazon's Carbon Sink Under Threat

By Phil Berardelli  
*ScienceNOW* Daily News  
5 March 2009

Researchers monitoring the long-term health of the Amazon tropical rainforest have made a startling discovery. A severe drought in 2005 not only restricted the rainforest's ability to absorb carbon dioxide from the atmosphere but also, in some cases, killed off so many trees that it made areas net CO<sub>2</sub> emitters. The findings, to be reported in tomorrow's issue of *Science*, suggest that not even rainforests can be considered fail-safe when it comes to sequestering greenhouse gases.

When the world's tropical rainforests are growing, they can absorb a huge amount of CO<sub>2</sub> from the atmosphere--on the order of 1.8 billion metric tons annually, or nearly one-fifth of global emissions from fossil-fuel combustion. But when trees are not healthy, they don't use nearly as much CO<sub>2</sub>, and in some cases they can even be a net emitter.

RAINFOR, a team of scientists from 13 nations, has been tracking forest health in the Amazon for the past 25 years by surveying 136 plots scattered across 44 sites in the region. When the drought struck in 2005, the researchers raced across the Amazon Basin to assess the potential damage. They managed to remeasure 55 of the plots that year. Before the drought, trees on 76% of those plots had been sequestering about 0.5 tons of carbon per year per hectare, while the remainder were growing less rapidly and therefore packing away less carbon. During the drought, however, only 51% continued to sequester carbon, while the rest lost carbon--as much as 6 tons per year per hectare--the result of rot and digestion by soil microbes.

"We found the Amazon surprisingly sensitive to drought," says ecologist and lead author Oliver Phillips of the University of Leeds in the U.K. The 2005 event "was strong enough to switch the forest from being a long-term absorber of CO<sub>2</sub> ... to being a temporary source of CO<sub>2</sub>." Because some climate models point to increased incidences of drought in the Amazon Basin this century, he adds, the loss of tropical rainforests as a carbon sink could cause CO<sub>2</sub> levels to rise even faster.

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**Stressed to death.** This leaf is from a young tree dying from the 2005 severe drought in the Amazon Basin.

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Ronald Neilson, a bioclimatologist with the U.S. Department of Agriculture's Forest Service in Corvallis, Oregon, says the study shows that drought in the rainforest "can have a very significant impact on the planetary carbon balance." But he points out that because droughts tend to produce fewer cloudy days, increased sunlight may encourage growth even in dry weather.

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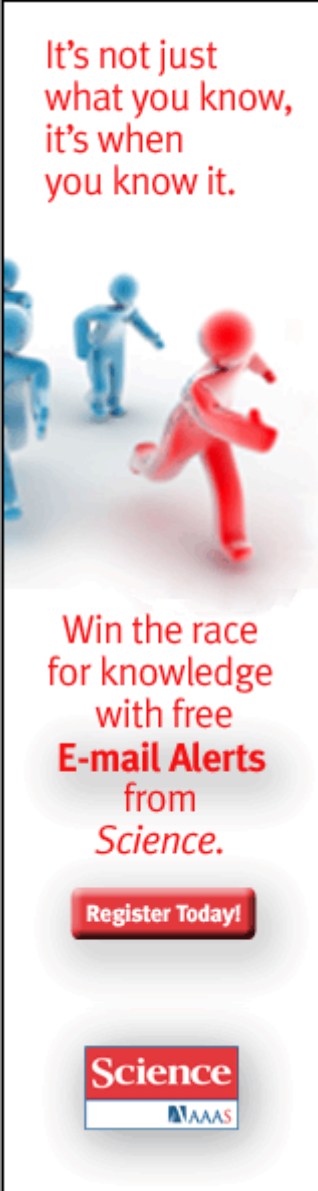
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