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PBIO Colloquium | Marijuana to Moss Discovery of Plant Endocannabinoids, April 17

Ohio University College of Arts & Sciences

PBIO Colloquium | Anomaly in Tree Growth in the Central Appalachian Mountains, April 10

April 1, 2015
Categories: Events
Tags: carbon sinkng, environmental and plant biology colloquium, environmental and plant biology events, Richard B. Thomas

The Environmental & Plant Biology Colloquium Series presents **Dr. Richard B. Thomas** to discuss “A new story from old trees: possible causes of a recent anomaly in tree growth in the Central Appalachian Mountains” on Friday, April 10, at 11:50 a.m. in Porter 104.

Dr. Richard B. Thomas

Thomas is a professor of Biology at the West Virginia University.

Abstract: Forest ecosystems play a fundamental role in the global C cycle. Consequently, state-of-the-art climate models require a mechanistic understanding of how simultaneous changes in key environmental variables affect carbon cycling in trees and forest ecosystems. Dendrochronology, in combination with measurements of stable isotopes, can be useful in disentangling the environmental complexity of historical changes in forest productivity since tree rings provide an annually defined record of response to the environment. Prior to 1970, more than a century of fossil fuel use sharply raised atmospheric levels of both CO2 and acid-rain producing sulfur dioxide. Assessing the consequences of these changes is not straightforward, however, as elevated CO2 typically aids plant growth, while acid deposition produces numerous negative impacts on plants. Richard Thomas and colleagues collected and analyzed tree rings of eastern red cedar trees in the Central Appalachian Mountains that lie in an acid rain bullseye downwind from coal-fired power plants in the Ohio River Valley. Based on changes in carbon and sulfur isotopes in the tree rings, the researchers were able to estimate how key physiological processes responded to changes in atmospheric chemistry during last century, finding that the red cedars are likely affected more by acid deposition than aided by the increased CO2. The increase in growth and the δ13C and δ34S trends in the tree ring chronology of these red cedar trees provide evidence for a distinct physiological response to changes in atmospheric SO2 emissions since ~1980 and signify the positive impacts of landmark environmental legislation to facilitate recovery of forest ecosystems from acid deposition. This study has important implications for carbon cycling in forests, showing an interaction between decreasing SO2 emissions and increasing CO2 that is not currently accounted for in biosphere-atmosphere models of climate change.