

Case Western Reserve University biologists suspect lightning fires help preserve oak forests

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Oak forests may be approaching extinction, but lightning fires may play a vital role in their regeneration, according to Case Western Reserve University biologists.

Paul Drewa, assistant professor in Case's biology department, and graduate student Sheryl Petersen, suspect that these kinds of fires may provide a natural mechanism to deter encroachment of shade tolerant hardwoods, especially red maples that are crowding out oaks and other plants on the ground floors of numerous forests throughout the eastern United States.

For an article in the Journal of the Torrey Botanical Society, the researchers examined regional weather patterns to see if environmental conditions exist for the occurrence of lightning fires in Appalachian forests of Adams and Pike Counties in southern Ohio.

"The likelihood of lightning fires increases through the summer when the frequency of lightning strikes reaches its greatest peak in late August, coinciding with dry environmental conditions," said Drewa.

Drewa and Petersen also found that from 1993 to 2005, 29 lightning fires were reported in Ohio's fire protection areas, with 70 percent of those occurring during the summer.

"Human alterations to the natural fire regime, especially decades of fire suppression, have changed oak-dominated ecosystems in southern Ohio and throughout the eastern US," reported Petersen. "As a result, there is a preponderance of shade tolerant hardwoods that are preventing oaks and other native species from regenerating."

The oak canopies of remaining forest fragments are deceptive, according to the researchers, who found that oaks are not thriving well beyond the seedling stage, with few developing into older life history stages, including juveniles, saplings, and poles.

"Eventually this means the demise of oak trees and other less shade tolerant plant species in future years," said Drewa.

While red maples and other shade tolerant species may experience delayed recovery after summer fires, oaks in particular have been shown to experience less damage because their roots are more expansive and provide greater storage and greater seasonal stability of carbohydrate reserves.

To save the oak forests, Drewa and Petersen are advocating studies that include summer fires as experimental treatments. They caution against fires in other seasons that might foster proliferation of plants other than oaks and other less shade tolerant species.

Source: Case Western Reserve University

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