

Ancient ancestor of tulip tree line identified

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This is an artist's reconstruction of *Archaeanthus* from fossils. Credit: Courtesy David Dilcher

The modern-day tulip tree, state tree of Indiana as well as Kentucky and Tennessee, can trace its lineage back to the time of the dinosaurs, according to newly published research by an Indiana University paleobotanist and a Russian botanist.

The tulip tree, *Liriodendron tulipifera*, has been considered part of the magnolia family. But David Dilcher of Indiana University Bloomington and Mikhail S. Romanov of the N.V. Tsitsin Main Botanical Garden in Moscow show that it is closely related to fossil [plant specimens](#) from the Lower Cretaceous period.

Their findings suggest the tulip tree line diverged from magnolias more than 100 million years ago and constitutes an independent family, Liriodendraceae, with two living species: one in the Eastern United States and the other in Eastern China. The article, "Fruit structure in Magnoliaceae s.l. and *Archaeanthus* and their relationships," appears in the most recent issue of the *American Journal of Botany*.

The tulip tree, sometimes called tulip poplar or yellow poplar, is one of the largest trees of Eastern North America, sometimes reaching more than 150 feet in height. It is native from southern New England westward to Michigan and south to Louisiana and Florida.

Dilcher, an IU professor emeritus of geological sciences and biology in the College of Arts and Sciences, discovered fossil flowers and fruits resembling those of magnolias and tulip trees in 1975 in Kansas. Dilcher and Peter Crane, now the dean of the School of Forestry and Environmental Studies at Yale University, published information about the fossils and named the plant *Archaeanthus*.

But the relationship between the fossils and any living plant species remained a mystery until Dilcher met and began working with Romanov, who specializes in study of the magnolia family and its relatives. The researchers used advanced technologies of light, scanning electron and polarizing microscopy to develop a more detailed picture of the *Archaeanthus* flowers, fruits and seeds and compare them with the flowers, fruits and seeds of contemporary plants.

"We discovered features of the fruits and seeds, not previously detailed, that were more similar to those of the tulip tree line of evolution than to the magnolias," Dilcher said. "Thus the beautiful tulip tree has a lineage that extends back to the age of the dinosaurs. It has a long, independent history separate from the magnolias and should be recognized as its own flowering plant family."

While the paper provides new insight into the evolution of the tulip tree line, questions remain, Dilcher said. Scientists don't know how widespread and various the early members of the tulip tree line may have been, for example. Fossils similar to *Archaeanthus* have been found in the Southeastern United States. Were there other similar plants, and where did they develop?

Further, the fact that the tulip tree family has survived and evolved for more than 100 million years—albeit in limited and widely divergent ranges—is relevant to understanding how species have developed in the past and how they might fare in the future given changing climate and other factors.

Provided by Indiana University

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