

Public Abstract

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One of the major consequences of forecasted future climate change is the redistribution of plant life due to corresponding species migrations and extinctions. This has caused many scientists to look at the history of vegetation migrations to help understand future vegetation and biodiversity patterns. Our knowledge of past species range changes has been largely gained by interpretations of the fossil pollen record.

The current method used in palynology to identify past species range limits is that pollen must reach a certain percentage of total pollen found at a site before its actual presence can be inferred. This study will utilize a modified method. It will look for accumulation and temporal patterns of pollen deposition rather than percentages of a specie's pollen, thus eliminating false positives resulting from far-travelled pollen and false negatives due to such things as small pollen-producing populations or small catchment areas. Utilizing this method in conjunction with a genetic study done by McLachlan, Clark, and Manos (2005), the study will look for refugia and refine the paleorange limits of the temperate deciduous species *Fagus grandifolia* during the retreat of the Laurentide Ice Sheet from North America.

A reanalysis of pollen data indicates consistent patterns of more northerly refugial locations and different migration routes for American Beech (*Fagus grandifolia*) than currently accepted. Patterns of pollen deposition, in conjunction with DNA data, reveal a likely refuge in southern Missouri, and suggest pockets of American Beech may also have mixed with boreal forest elements along the Appalachian Plateau, closer to the ice sheet margin than typically shown in previous reconstructions of its range.