

Highlighted Articles for November 2023

How do understory herbs in North American temperate deciduous forests respond to historical climate fluctuations?



Chenxi Wang et al. 2023. Molecular phylogeography and historical demography of a widespread herbaceous species from eastern North America, *Podophyllum peltatum*. *American Journal of Botany* <https://doi.org/10.1002/ajb2.16254>

Mayapple (*Podophyllum peltatum*) is one of the most common understory herbs in the eastern North American (ENA) temperate deciduous forests. **Using plastid and nuclear DNA, Wang et al. identified an Appalachian Mountains discontinuity (which means the populations are different on both sides) and a Mississippi River discontinuity in mayapple.** They indicated that the intraspecific divergence is dated to pre-Quaternary period, and the eastern populations have higher level of genetic diversity. They suggested mayapple might persist in multiple refugia (including the central Appalachian) during the Quaternary glacial period, and postglacial expansions (especially westward) are likely responsible for its present genetic structure. **This study provides an example of how pre-Quaternary events and Quaternary glacial-interglacial cycles could jointly affect species' phylogeographic pattern, and an additional line of evidence supporting the existence of northern refugia and their important role in the postglacial recolonization of ENA temperate taxa.**

Five in one: Hidden diversity in the national tree of Brazil

Pau Brasil is an iconic and endangered species of the Brazilian Atlantic Forest that presents broad morphological and ecological variation across its range. It is unclear if there are distinct morphological groups, each with their own separate history, or if the species is simply responding to a wide spectrum of ecological stimuli. **Rees et al. use herbarium material and genetic analyses to ask if morphological variation matches geographic and genetic patterns.** They found that the species is composed of five distinct genetic clusters that are geographically structured. They also show that cultivated trees mainly come from a narrow genetic stock from Northern Brazil. **These results shed light on the natural history of this culturally important species and provide evidence for conservation programs aimed at preserving the overall genetic diversity of the tree that gave its name to the country of Brazil.**



Mathew Rees et al. 2023. Phylogenomic and morphological data reveal hidden patterns of diversity in the national tree of Brazil, *Paubrasilia echinata*. *American Journal of Botany*, <https://doi.org/10.1002/ajb2.16241>

Phylogenomic time tree of bryophytes uncovers hidden diversity and spikes of diversification in the last 150 million years

Mosses, liverworts, and hornworts are known collectively as bryophytes, a lineage of about 20,000 extant species. **Bryophytes occur in virtually all regions of the globe and make significant contributions to ecosystem function through processes like carbon fixation and regulating water flow.** The evolutionary history of bryophytes spans nearly 500 million years beginning with the earliest land plants, but the details of their history were uncertain. **In this study, Bechteler et al. provide the most comprehensive phylogenomic analysis of bryophytes to date.** The GoFlag consortium analyzed an extensive, novel set of genetic markers in a wide range of species, revealing new hypotheses for the relationships among the major lineages. Bryophytes steadily diversified over the last 400 million years, punctuated by bursts of rapid diversification in the last 150 million years. **These results provide a new framework for studying the role of bryophytes in the face of global climate change, past and present.**



Julia Bechteler et al. 2023. Comprehensive phylogenomic time tree of bryophytes reveals deep relationships and uncovers gene incongruences in the last 500 million years of diversification. *American Journal of Botany* <https://doi.org/10.1002/ajb2.16249>