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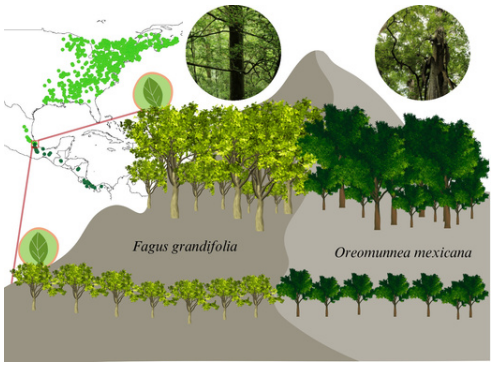
Highlighted Articles for May 2024

Variations in leaf trait response to climate change and their relationship with the ecological niche structure

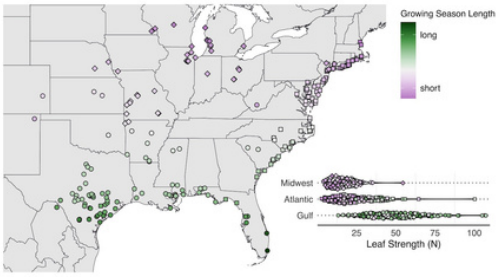


Miriam Reyes-Ortiz et al. 2024. Leaf functional traits and ecological niche of *Fagus grandifolia* and *Oreomunnea mexicana* in natural forests and plantings as a proxy of climate change. *American Journal of Botany* https://doi.org/10.1002/ajb2.16322

Tropical montane cloud forests are particularly vulnerable to higher temperatures due to climate and land-use changes. The natural forests of *Fagus grandifolia* and *Oreomunnea mexicana*, two tree species thriving in Mexico's upper montane cloud forests, were studied to determine how these species respond to environmental shifts. **Using plantings at lower elevations as a proxy for expected future climate conditions, Reyes-Ortiz et al. analyzed leaf traits (area, specific leaf area, thickness, and toughness) in both natural forests and plantings and analyzed the intricate relationships between traits and niche structure of each species.** The findings revealed patterns in leaf characteristics at different elevations, suggesting how these trees may fare in future climate scenarios. **The authors highlight that exploring leaf variation within the ecological niche of the species provides insight into the adaptive strategies of these endangered species with restricted distribution in the face of climate change.**

Leaf morphology and season length determine leaf tensile resistance in a perennial grass

Leaf tensile resistance is the ability of a leaf to withstand pulling forces such as wind and herbivory and is primarily determined by leaf morphology. It is important in such ecological processes as leaf longevity, herbivore resistance, and plant growth rates. Although several studies have identified the drivers of variation in leaf tensile resistance across species, it is unclear if the same factors are important within a single species. **To address this significant knowledge gap, Durant et al. used quantitative genetic approaches and structural equation modeling to understand how leaf morphology and seasonality affect leaf strength and toughness in *Panicum virgatum* (switchgrass).** The authors found that leaf tensile resistance was highly heritable and differed significantly among three geographically separated subpopulations of *P. virgatum*. Leaf tensile resistance was also strongly associated with leaf thickness, leaf dry mass per area, and growing season length. **The high heritability of leaf tensile resistance and its relationship to growing season length suggests that *P. virgatum* can adapt to longer growing seasons caused by climate change.**



P. Camilla Durant et al. 2024.Genetically correlated leaf tensile and morphological traits are driven by growing season length in a widespread perennial grass. https://doi.org/10.1002/ajb2.16349

Local habitat factors and spatial connectivity do not affect urban seed predation

Over the past centuries, urban landscapes have been expanding globally. This urbanization alters local habitats and reduces their connectivity, leading to significant changes in species interactions. Although several studies have reported a significant impact of urbanization on plant-insect interactions, the effects of urbanization on seed predation remain mostly unexplored. **To understand the local and spatial factors driving seed predation within urban landscapes, Gaytán et al. examined the relative effects of local habitat variables (sunlight exposure and leaf litter) and spatial connectivity on the predation of oak acorns.** Seed predation rates varied annually but they were not influenced by variations in local habitat factors or spatial connectivity. Despite previous studies demonstrating the impacts of various urbanization-related factors on a range of organisms, this research establishes the baseline expectation that urban seed predators are not affected by differences in sunlight exposure, leaf litter, and spatial connectivity. **This study suggests that the influence of local and spatial factors on insects within an urban context may depend on the insect species guild and has broader implications for urban planning and management.**

Álvaro Gaytán et al. 2024. The effect of local habitat and spatial connectivity on urban seed predation. *American Journal of Botany* https://doi.org/10.1002/ajb2.16333

Five circumboreal peat moss species have similar patterns of genetic structure that could reflect common ecological drivers of evolution during the Pleistocene.

Karn Imwattana et al. 2024. Parallel patterns of genetic diversity and structure in circumboreal species of the *Sphagnum capillifolium* complex. *American Journal of Botany* https://doi.org/10.1002/ajb2.16348

The ecologically important genus *Sphagnum* (peat moss) is one of the largest genera of mosses, with several species having broad geographic ranges covering almost all of the northern hemisphere (some with circumboreal distributions). **Using genome-scale data of over 380 samples, Imwattana et al. showed that five circumboreal *Sphagnum* species have strikingly similar patterns of genetic structure.** Within each species, plants in eastern North America and Europe are consistently resolved in the same genetic cluster, which differs from plants in the pacific northwest and Beringia. **The results support the hypothesis that *Sphagnum* species with circumboreal distributions survived in multiple glacial refugia during the last glacial maximum, and that long distance dispersal out of refugia, population bottlenecks, and adaptations to conditions unique to each refugium could have contributed to current genetic structure.** The data also show that Alaska appears to be a hotspot for genetic and species diversity of *Sphagnum*.