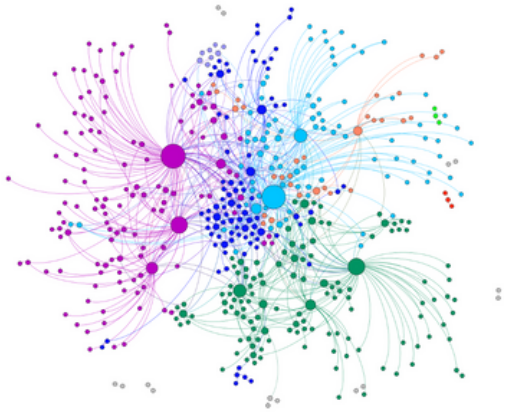
American Journal of Botany
April 2025 • Volume 112 • Number 4

# Highlighted Articles for April 2025

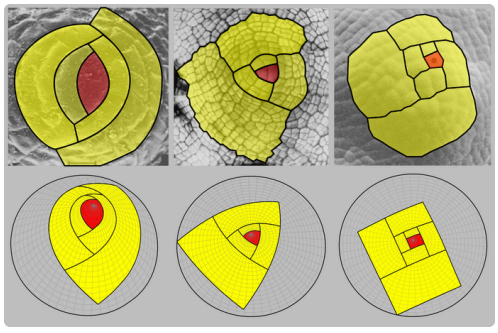
## Mistletoes and their hosts: bonds shaped by history, geography, and the environment

Mistletoes of the genus *Phoradendron* are parasitic plants that depend directly on other plant species to survive, by extracting water and nutrients from their hosts. **In this study, Tinoco-Domínguez et al. analyzed the interaction network between all *Phoradendron* species and their hosts across the Americas, revealing that most parasite-host interactions are highly specialized, with only a few being generalist.** However, mistletoes tend to parasitize host species that are evolutionarily related to each other, grow near each other, and share similar environmental conditions. Among these factors, evolutionary history emerged as the most important in explaining the observed interaction patterns. **This research helps to understand the key factors promoting and maintaining complex ecological relationships between plant parasites and their host plants.**



Eurídice Tinoco-Domínguez et al. 2025. Interaction network of *Phoradendron* and its hosts and the influence of phylogenetic, geographic, and environmental factors on the probability of interaction. *American Journal of Botany* https://doi.org/10.1002/ajb2.70025

## Cellular tangrams at the shoot apical meristem (SAM)

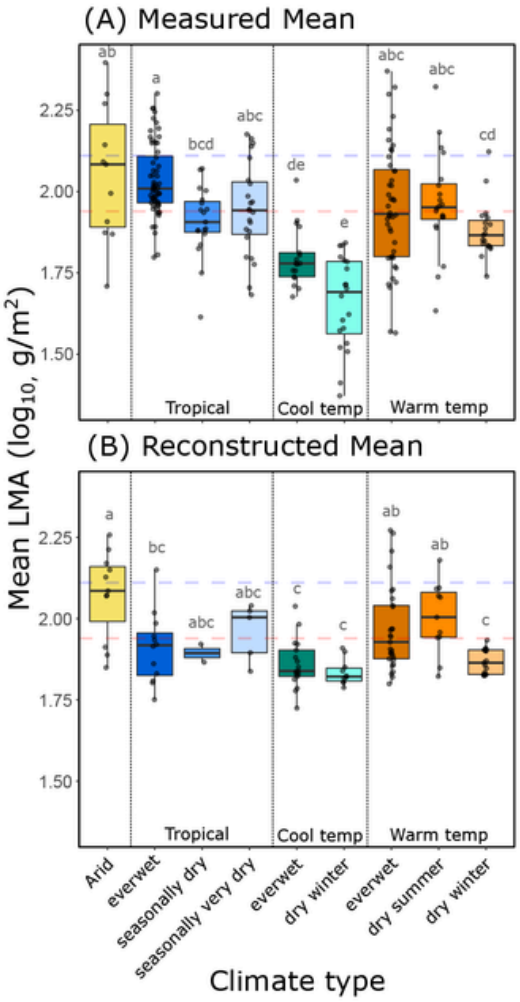


Étienne Couturier et al. 2025. The self-replicating cellular organization of shoot apical meristems. *American Journal of Botany* https://doi.org/10.1002/ajb2.70027

Apical meristems determine the primary architecture of the shoots and roots of plants. As plant-constructing engines, these organs have been at the center of developmental studies since the inception of modern plant biology. Julius Sachs noted in 1878 that the internal organization of meristems can be predicted based on two simple cell division rules: (1) the volume of the mother cell is halved during division, and (2) the new wall meets the parental wall at a right angle. **Nearly 150 years later, Couturier et al. show that the same cell division rules explain the often intricate surface segmentation of shoot apical meristems in three major groups of plants: the bryophytes, lycophytes, and ferns.** Their conclusion is supported by a meta-analysis of 205 meristem micrographs from 91 representative species as well as a geometrical model based on Sachs's division rules. Surprisingly, the distribution of the different segmentation patterns across these groups can also be predicted if Sachs's rules are supplemented with the requirement that the division plane be as short and as straight as possible. **The significance of this work resides in the observation that global order in the apical meristems of major land-plant groups emerges naturally from the local process of cell division.**

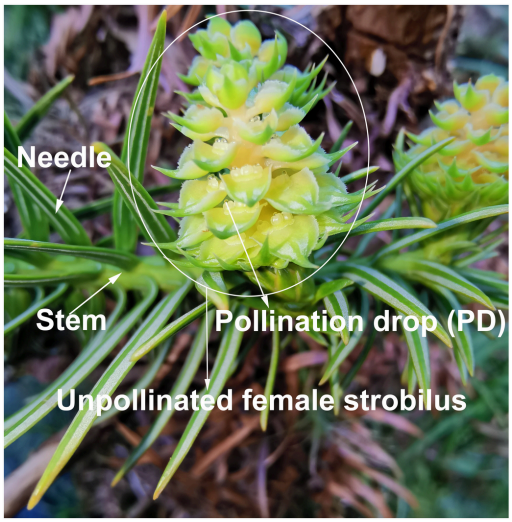
## A new global dataset provides important insight to community-scale angiosperm leaf economics and its reconstruction in the fossil record

Leaf mass per area (LMA) links leaf economic strategies, community assembly, and climate. **In a study to test leading hypotheses for the distribution of leaf economic strategies, Lowe et al. compiled data on LMA, and a morphological correlate used to reconstruct LMA from fossil leaves, the petiole metric (PM), based on in situ measurements of woody non-monocot angiosperms (WNMAs) at the community scale.** Variation in the LMA community mean agreed best with a seasonality hypothesis, in which lower temperature seasonality increases the potential payback time of annual leaf carbon investment, increasing the prevalence of evergreen WNMAs with higher LMA. The difference in LMA community variance was highest where strong abiotic gradients existed between riparian and non-riparian habitats in water-limiting climates but was lowest in cool temperate humid forests (which strongly excluded evergreen WNMAs). Climatic correlates with LMA and PM variables largely agreed, and new equations are provided for reconstructing site-scale LMA from PM of fossil leaves. **However, the authors find that paleoclimate interpretations made by matching fossil assemblage LMA distributions to those of modern sites are largely unreliable due to variability within, and overlap across, climate types.**




Alexander Lowe et al. 2024. Global patterns in community-scale leaf mass per area distributions of extant woody non-monocot angiosperms and their utility in the fossil record. *American Journal of Botany* https://doi.org/10.1002/ajb2.70019

## How long it lasts matters: Pollination drop withdrawal timing points to mate recognition in *Cunninghamia lanceolata*




**The pollination drop (PD) secreted out of the ovule in most gymnosperms functions in pollen capture, but Deng et al. demonstrate here that it may also play a role in post-pollination mate recognition in the conifer *Cunninghamia lanceolata* (Cupressaceae).** They show that the length of time that the PD remains outside the ovule before complete withdrawal depends strongly on how genetically related the pollen is to the maternal plant. They used high-resolution imaging to track PD withdrawal following pollination with self-, backcross-, and outcrossed pollen. Strikingly, PDs were withdrawn rapidly after the arrival of outcross pollen, but lingered significantly longer following self-pollination. **This suggests that the ovule can assess the genetic similarity of received pollen, and respond accordingly, which in turn implies that a previously overlooked post-pollination mechanism can shape mating outcomes in conifers.**

Houtin Yang et al. 2024. High-resolution time-course observations of pollination drop withdrawal in Chinese fir *[Cunninghamia lanceolata]* *American Journal of Botany* https://doi.org/10.1002/ajb2.70031