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Highlighted Articles for February 2023

Flowers that self-shade reduce heat stress and pollen limitation

As temperatures rise, plants are facing increased heat stress that can disrupt reproductive function. Self-shading by petals may allow plants to mitigate the negative effects of heat stress on plant fitness. **Karban et al. found that the vertically oriented petals of some species shade their pistils and reduce temperatures by 3-8 degrees Celsius.** The authors hypothesized that this shading and lower temperature might increase reproductive success. They found that when flowers of the giant California tree poppy (*Romneya coulteri*) were wired to be permanently open or permanently closed, they produced fewer seeds compared to unencumbered flowers with petals that shaded reproductive structures. Enhanced pollination of shaded flowers was likely responsible for some of this effect, as the addition of pollen to the wired flowers increased seed production. **These results suggest that shaded flowers are cooler and may be more attractive to pollinators.**

Richard Karban et al. 2023. Flowers that self-shade reduce heat stress and pollen limitation. *American Journal of Botany* https://doi.org/10.1002/ajb2.16109

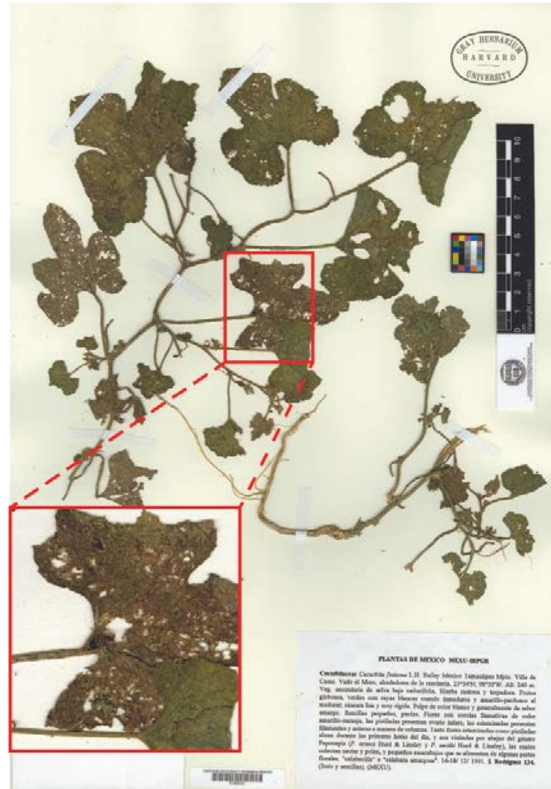
Identification with molecular markers provides a better understanding of growth in juvenile and mature dioecious trees

Qing He et al. 2023. Effects of tree sex, maturity, local abiotic, and biotic neighborhoods on the growth of a subtropical dioecious tree species *Diospyros morrisiana*. *American Journal of Botany* https://doi.org/10.1002/ajb2.16124

Many important tropical forest and crop trees (such as papaya, nutmeg, and Sharon fruit) are dioecious: i.e., they have two separate sexes. However, male and female trees are difficult to tell apart until they mature and produce different flowers. **He et al. utilized recent advances in genetic techniques to determine the sex of both juvenile and mature trees of *Diospyros morrisiana* (a species related to Sharon fruit) in a subtropical forest plot in China.** Using a sex-specific molecular marker, the authors found more female than male juvenile trees, but more male trees in flower than female trees. When the growth of each tree was examined over a 5-year period, the authors discovered that juvenile trees grew faster than mature trees and that male trees grew faster than female trees. **This new information suggests that tree sex and life stage can have strong effects on growth and demonstrates that sex-specific molecular markers in conjunction with ecological data can be used to enhance long-term studies of tropical forests.**

Old leaves, new findings: Evolutionary trends of pumpkins, beetles, and bacteria

An ongoing challenge in studying evolutionary patterns of plants and their insect herbivores is gathering historical information across a wide range of geographic regions. In a study that demonstrates the rich resource that herbarium specimens can provide to examine plant-insect interactions, **Jenny et al. investigated the interactions between *Cucurbita*—a genus of plants that includes pumpkins, squash, and gourds, and *Acalymma*—a group of leaf beetles that have evolved to feed on these plants.** The authors examined a collection of 13 *Cucurbita* species from the Harvard University Herbaria for evidence of beetle damage. The specimens spanned nearly two centuries and had been collected from across North, Central, and South America. **The authors find that changes in habitats from dry to wet climates and human-mediated agricultural spread may have influenced the level of herbivory pressure the plants faced from the beetles.**



Laura A. Jenny et al. 2023. Herbarium specimens reveal herbivory patterns across the genus *Cucurbita*. *American Journal of Botany*. https://doi.org/10.1002/ajb2.16126

Experimental warming disrupts a boreal lichen symbiosis

Abigail R. Meyer et al. 2023. Climate warming causes photobiont degradation and carbon starvation in a boreal climate sentinel lichen. *American Journal of Botany* https://doi.org/10.1002/ajb2.16114

Lichens play a prominent role in forested ecosystems. Despite their importance, little is known about how they will be impacted by future climate-change scenarios. **To better understand how warming and increased CO2 levels might affect lichen symbioses, Meyer et al. explored the causes of mass loss and death in an iconic boreal lichen, *Evernia mesomorpha,* when exposed to experimental warming.** They observed that the strong negative impact of warming was driven by functional loss of the algal component of the lichen symbiosis ("bleaching"), which was likely due to decreased activity times and increased respiration rates. No effects of increased CO2 levels were observed. Like the shifting dynamics seen in coral symbioses, the authors also looked for compositional changes in algal communities associated with warming, and found that community structure changed with increased temperatures. **While *E. mesomporpha* appears to be quite sensitive to warming, the shifts in algal communities offer a glimmer of hope for acclimation potential in these iconic symbioses.**