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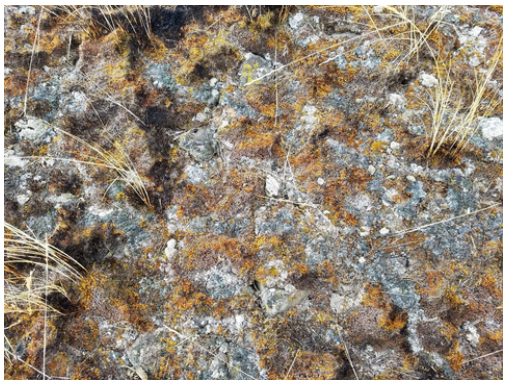
Highlighted Articles for December 2023

Long-term biocrust responses to wildfires in Washington, USA

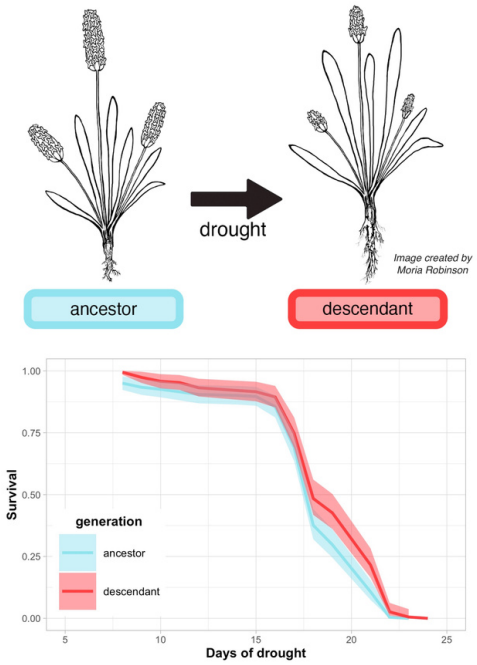


Heather T. Root et al. 2023. Long-term biocrust responses to wildfires in Washington, USA. *American Journal of Botany* https://doi.org/10.1002/ajb2.16261

Dryland ecosystems in the western US are affected by invasive species, wildfires, livestock grazing, and climate change in ways that are difficult to distinguish. Biocrust communities support substantial biodiversity and contribute to many ecosystem functions, such as stabilization against erosion and nutrient cycling. **Root et al. studied the effect of wildfire on biocrust and plant communities in an area of Washington, USA that had not been grazed by livestock since 1987 and was previously sampled for biocrusts in 1999.** Between 1999 and 2020, exotic annual grass cover increased in all plots (both burned and unburned) and unburned plots only by 16% and 18%, bunchgrass cover decreased by 21% and 25%, and biocrust cover decreased by almost 9% and 10%, respectively. Biocrust community changes were more strongly related to increasing exotic annual grasses than to wildfires. **The authors suggest that decreases in bunchgrass increased exotic annual grass, which reduced biocrust cover.** The minimal influence of wildfire on exotic annual grass and biocrusts suggests that apparent negative impacts of wildfire at other sites may be due to exacerbation by livestock grazing or other surface disturbance.

Herbarium collections reveal rapid adaptation to drought

Global change is challenging organisms in unprecedented ways. **The southwestern United States is experiencing a millennial-scale megadrought that has already lasted for two decades, and it is unknown whether natural populations will be able to evolve quickly enough to keep pace with such abrupt and dramatic environmental changes. Christie et al. used a novel "resurrection" approach, germinating dormant seeds from museum specimens that were collected prior to the onset of severe drought, together with seeds from the same populations that had experienced 10–15 years of severe drought.** The authors found that modern-day populations of the annual plant Plantago patagonica (Woolly Plantain) had rapidly evolved different allocation strategies characterized by increased investment in roots and leaves, and decreased investment in reproduction. Contemporary genotypes survived experimental drought for longer than historical genotypes, suggesting that differences in allocation (and potentially other unmeasured traits) have conferred higher survival under the increasingly arid conditions in the southwestern United States. **Overall, this work shows that some populations may be able to evolve rapidly in response to climate change, although there may be limits to the rate and degree of adaptation.**



Kyle Christie et al. 2023. Resurrected seeds from herbarium specimens reveal rapid evolution of drought resistance in a selfing annual. *American Journal of Botany* https://doi.org/10.1002/ajb2.16265