American Journal of Botany

January 2024 • Volume 111 • Number 1

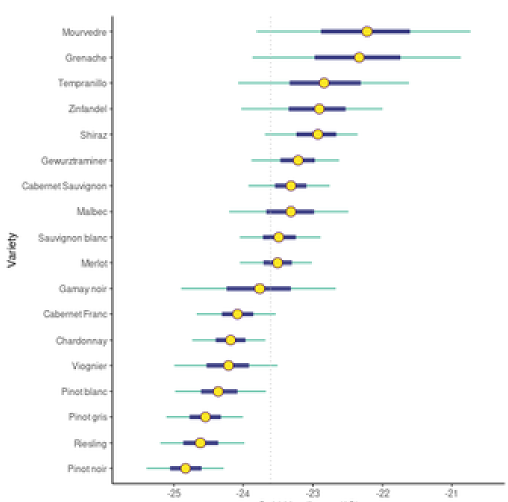
Highlighted Articles for January 2024

Beyond dispersal: Fruit wings accelerate germination

Names for specific traits that suggest a particular function can sometimes be misleading when it comes to the actual roles of those traits. For example, many species produce fruits with lateral expansions, commonly referred to as 'wings', which are thought to enhance dispersal. **However, several species with winged fruits are small statured, limiting the dispersal distances of these fruits. Do these wings serve another function?** The annual weed *Anacyclus clavatus*, a composite species found around the Mediterranean Basin, produces both winged and unwinged fruits—providing a unique opportunity to investigate alternative functions of wings. **Torices et al. hypothesized that wings could enhance germination by increasing the contact surface with water compared to that of unwinged fruits.** Their results showed that winged fruits, after they are released from their mother plants, germinate faster than unwinged fruits. They found that winged fruits absorbed water more quickly and in greater quantities than unwinged fruits. Additionally, they showed that sealing the wings to prevent water uptake delayed germination. **These findings support the idea that wings can serve functions beyond dispersal.**

Rubén Torices et al. 2024. Fruit wings accelerate germination in Anacyclus clavatus. *American Journal of Botany* https://doi.org/10.1002/ajb2.16272

Cold-range edge expansion in winegrapes depends on genotypic differences and spatial variation in the landscape

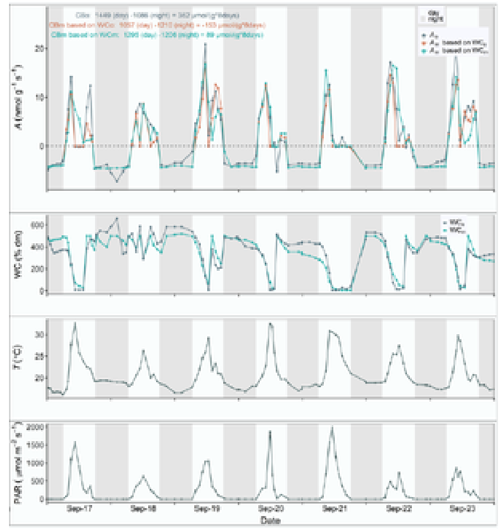


Faith A. M. Jones et al. 2024. The role of genotypic and climatic variation at the range edge: A case study in winegrapes. *American Journal of Botany* https://doi.org/10.1002/ajb2.16270

Climate change is altering how and where plants can grow, and it is possible that warmer winters may allow plants to spread into areas that were previously too cold to survive. **Jones et al. found evidence that since the 1980s, warmer winters have decreased the risk to winegrapes during cold snaps in British Columbia (BC), Canada.** The authors built a novel model that considered differences in maximum cold hardiness among various genotypes (commercial varieties), and they found that changes did not affect all winegrape varieties equally—although more cold-tolerant genotypes had a greater potential for spreading into new areas. They then combined their model results with gridded climate data for the Okanagan Valley, BC, Canada, and found that areas that are predicted to become warm enough for winegrape survival were constrained to a narrow north-south oriented strip that follows the geography of a sheltered valley. **With this research, the authors highlight the need to consider both genotypic and geographic differences when assessing range-shift potential with climate change.**

PoiCarb 1.0: A new model for estimating the carbon balance of bryophytes and lichens

Bryophytes and lichens, two large groups of organisms encompassing a wide variety of taxa, are increasingly recognized for their important functional roles in many ecosystems. Understanding the contributions of bryophytes and lichens to ecosystem dynamics requires insight into their response to ambient conditions. However, responses beyond short-term measurements have been difficult to quantify. **Nikolić et al. describe the PoiCarb 1.0 model that aims at estimating and, most importantly, understanding the drivers of long-term carbon balances of bryophytes and lichens.** The model effectively simulates diel and long-term patterns of CO2 exchange based on microclimatic data. Validation of the model by comparing modelled diel courses of net CO2 exchange to field measurements showed a strong positive correlation. **The authors present the PoiCarb model as a valuable tool to understand how microclimatic factors limit species distributions and for testing hypotheses involving different scenarios of climate-change impacts at the level of ecophysiological responses.** When combined with detailed predictions of future climate patterns, PoiCarb 1.0 could also provide guidelines for conservation efforts.



Nada Nikolić et al. 2024. Modelling the carbon balance in bryophytes and lichens: Presentation of PoiCarb 1.0, a new model for explaining distribution patterns and predicting climate-change effects.. *American Journal of Botany*
https://doi.org/10.1002/ajb2.16266