

Funded PhD position available at Idaho State University in plant ecology and genomics!

We are looking for a PhD student and future collaborator to join our team on a recently-funded project investigating the ecological impacts of ploidy and genome size variation in the iconic foundational species, big sagebrush (*Artemisia tridentata*). This student will be involved in a large and collaborative network of transdisciplinary scientists and stakeholders across Idaho as part of the NSF/Idaho EPSCoR GEM3 project (see idahogem3.org for more information on this state-wide initiative). The PhD student will be co-advised by Dr. Josh Grinath (<https://jbgrinath.wordpress.com/>) and Dr. Kathryn Turner (kathryngturner.com) in the Department of Biological Sciences at Idaho State University (isu.edu/biology). The student will be supported on a research assistantship for two full years (tuition is waived, and there is guaranteed summer funding and no TAing during that time). After that, the student will transition to a teaching assistantship or other funding support. This work represents 1-2 chapters of the student's dissertation; the student will develop additional, perhaps related, projects for the rest of their dissertation work.



The project:

Ploidy level and genome size are genetic traits that greatly influence the performance of phenotypes in ecological communities. In particular, organismal demands for nitrogen (N) and phosphorus (P) are expected to increase with genome size because genetic architecture requires larger amounts of these resources than other biomolecules. As N and P have limited availability in most natural systems, these demands translate into stronger limitation in the performance of polyploids vs. diploid relatives. In plants, restrictions on polyploid performance may be even more severe for species that are co-limited by both N and P supply. Co-limitation occurs when plant access to one resource is impeded by the lack of another resource, and performance only improves greatly when multiple resources are simultaneously available. In addition, water availability can affect plant access to N and P, and co-limitation may occur among all three of these resources. Though resource co-limitation is common for plants, it is currently unclear how ploidy level and genome size affect the strength of co-limitation and plant competitive ability across various resource environments. Moreover, it is unclear how these resource relationships affect the spatial distribution of individuals within and across populations. In this project, we will study the effects of ploidy level, genome size, and resource availability (N, P, and water) on the performance of big sagebrush (*Artemisia tridentata s.l.*). Focusing on the establishment life-history phase, we will use greenhouse and field experiments to evaluate how these factors affect sagebrush resource requirements, co-limitation, competitive ability, and spatial patterning.

To apply:

If interested, please contact Dr. Grinath (grinjosh@isu.edu) and Dr. Turner (turnkat2@isu.edu) as soon as possible. For more information on applying, please see the Department of Biological Sciences at ISU (isu.edu/biology/degree-programs). Ideally, this position would begin August 2021.