RUSH WORTH LAB

Ecology and evolution of plant reproduction

College of Science
UtahStateUniversity

Why plant reproduction?

Organisms and their populations have many different ways of exchanging genes, which is extremely important for population health and longevity. *We study the wildflower* Boechera*, which has an especially wide array of reproductive strategies, each of which influences fitness, ecology, and evolution.* They also have a few research benefits, listed below!

Asexuality

Plantlets, stolons, apomixis, oh my!
Lowest genetic variation
Can start new populations alone

Self-fertilization

Can pollinate before flowers open
Reduced genetic variation
Can start new populations alone

Outcrossing

Showy, scented flowers
High genetic variation
Range limited by mates

Hybridization

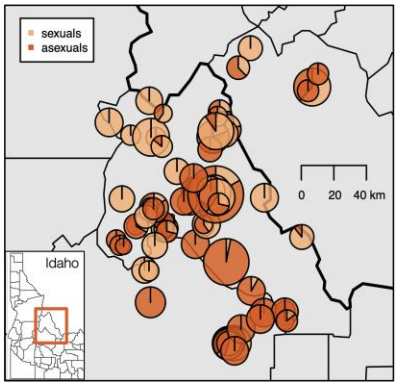
Unexpected trait combinations
High genetic variation
May be ecologically novel

Why plants?

- easy to cross
- can be grown and planted in large experiments
- sessile (stay where you put them)
- have small genomes for guilt-free extraction

Self-fertilizing plants are ideal for studying inbreeding & shifts in gene flow

Ecological drivers of reproductive shifts

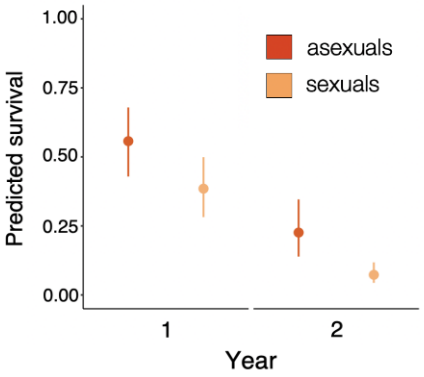


Asexual and sexual lineages are ecologically differentiated.

Asexuality is associated with:

- Greater precipitation variation
- Greater variation in temperature
- Human-caused disturbance
- Flat topography

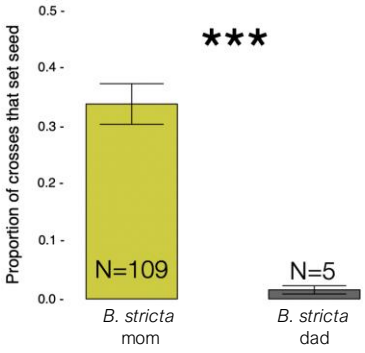
Fitness impacts of reproduction



Asexual lineages have higher over-winter survival than sexuals.

This is in spite of experiencing significantly higher insect herbivory!

Impacts of mating system on speciation



Boechera stricta and *B. retrofracta* hybridize in the wild and hybrids transition to asexual reproduction. Crosses only work if *B. stricta* is mom.

If *B. stricta* is more highly self-fertilizing, this is consistent with multiple evolutionary predictions!

Team

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Principal Investigator

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Postdoc

Join us!

Current undergraduate opportunities include: greenhouse research, organization

Upcoming opportunities: molecular genetics, field research