Ecology and evolution of plant reproduction

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
Dr. Cathy Rushworth Principal Investigator
Kallol Mozumdar PhD student
Dr. Gabbage Sandstedt Postdoc

Join us!
Current undergraduate opportunities include:
greenhouse research, organization
Upcoming opportunities: molecular genetics, field research