

Ecological Genetics, Genomics, and Plant Evolution

Mentors: Ava Garrison (PhD Student) & [Dr. Jeff Connor](#) (KBS-IBIO Faculty)

Research Description:

Our lab studies the mechanisms by which natural selection on plants produces adaptation (sometimes rapid) to a variable environment, as well as possible genetic and ecological constraints on this adaptation. We measure the strength of selection and use this together with molecular genetic and genomic approaches to predict evolutionary change and identify the genetic mechanism underlying adaptation and constraint. During their summer research with us, the student will have the opportunity to choose their preferred area of focus from our current research and will be expected to contribute to the project design.

One avenue of our current research is stamen evolution in the mustard family (Brassicaceae). We have investigated mechanisms of adaptation in anther exertion in wild radish (*Raphanus raphanistrum*) using genotyping by sequencing approaches. We are also studying evolutionary trait loss in the model system *Arabidopsis thaliana*, a tetradynamous plant (meaning a plant with 6-stamens, and only 4 of them are elongated), which appears to be in the process of short stamen loss. Another aspect of our research is weed and crop evolution in wild radish, one of the world's worst weeds. We are investigating the traits associated with weediness and specifically the ability to adapt to agricultural fields, as well as the evolution the two major groups of crop radish (*Raphanus sativus*), the red European radish and the large white Asian daikon. We integrate field, greenhouse, and lab work to investigate these questions.

Other Information:

The research apprenticeship will take place at MSU's W.K. Kellogg Biological Station for 11 weeks in the summer of 2017. The student's project will likely involve a combination field, greenhouse, and lab work. The project may include long periods of time either outside or in the greenhouse. We look forward to mentoring an undergraduate student this summer. Feel free to email with questions (garri115@msu.edu).