

Undergraduate Research Symposium May 18, 2018 Mary Gates Hall

Online Proceedings

POSTER SESSION 2

MGH 206, Easel 166

1:00 PM to 2:30 PM

phyB-Mediated Resource Recycling in *Brassica Rapa*

Lauren Houston, Senior, Biology (General)

Mentor: Andrej Arsovski, Biology

Mentor: Jennifer Nemhauser, Biology

Plants recycle resources from dying organs to feed the development of new ones. For example, chloroplast degradation in senescing leaves is a major source of nitrogen for seeds. Darkness or shade can induce leaf senescence and chloroplast degradation, but if light returns soon enough, new chloroplasts are made and the leaf remains photosynthetically active. Phytochrome B (PHYB) is a protein that serves a key role in resource allocation throughout the plant. phyB null mutants of the model crop species *Brassica rapa* (Br) exhibit low chloroplast count, poor seed production, and a reduced increased growth response to high CO₂, as compared to wild type. We will investigate the underlying cause of these phenotypes by comparing the transcriptomic response of chloroplast-biogenesis and nitrogen-assimilation-related genes in wild-type and BrphyB null mutants before and during dark-induced senescence, as well as after recovery. Establishing a deeper understanding of the scope of PHYB's role in resource recycling will help us isolate appropriate targets for engineering more drought-resistant and nutrient efficient crops.

species are needed to feed people directly and to feed livestock. How crop species respond to predicted climate change compounds the complexity of this challenge. Phytochrome B (phyB) is a photoreceptor that affects the plant's ability to respond to changing resource availability. Plants with a reduced phyB function make less seeds, whether measured in the model plant, *Arabidopsis thaliana*, or in the crop, *Brassica rapa*. The reason for this seed yield phenotype is unknown. Characterizing reproductive structures in *Brassica rapa* from before fertilization through the production of viable seeds to identify the role phyB plays in seed production will give insight in this process. Doing this may ultimately lead to the identification of potential targets for engineering higher yielding oil seed varieties.

POSTER SESSION 4

MGH 241, Easel 134

4:00 PM to 6:00 PM

The Connection Between Phytochrome B and Gynoecium Development in *Brassica rapa*

Joseph Edward (Joey) Zemke, Junior, Biology (Molecular, Cellular & Developmental)

Mentor: Jennifer Nemhauser, Biology

Mentor: Andrej Arsovski, Biology

Global climate change and population growth pose a significant risk to global food security. Estimates suggest that animal products alone, such as animal feed, must increase by 60-70% by 2050 to keep up with population growth. Crop