

PhD graduate student position, Environmental Stress Physiology

Department of Plant Sciences, University of Saskatchewan

A PhD position is now available in the field of plant environmental stress physiology within the College of Agriculture and Bioresources, Department of Plant Sciences. This PhD position is also eligible under the Dual PhD program with Iwate University (Japan), Dr. Abidur Rahman lab <http://news7a1.atm.iwate-u.ac.jp/~abidur/>. Dual Ph.D. students are expected to split their Ph.D. tenure approximately in half between University of Saskatchewan and Iwate University. For more information, please visit , <https://ugas.agr.iwate-u.ac.jp/en/dual-degree/>

Avoidance of environmental stress is an effective plant strategy particularly since our climate is becoming more extreme. The plant cuticular layer is the first barrier of defense against both abiotic as well as biotic stresses. As illustrated in our recent articles, the cuticle can effectively assist the plant in avoiding both abiotic (cold, heat, drought) and biotic (disease, insect) stresses (Forand et al., 2022; Rahman et al., 2021; Dhanyalakshmi et al., 2019). Our group has also provided a clear and direct link between specific genes such as CER3, DEWAX (involved in cuticular wax biosynthesis), increased frost avoidance/dehydration stress resistance in Arabidopsis (Rahman et al., 2021) as well as susceptibility to biotic stress in certain Arabidopsis mutants (Forand et al., 2022). Our investigation with an Arabidopsis cer3 mutant allele showed the mutant is highly sensitive in losing water from the excised shoot under dehydration stress. The mutant is also highly sensitive to freezing under subzero freezing condition and losing further of its ability to retain the wax deposition under cold-acclimation. This research examines the cuticular layer in two aspects: 1) adding another protective but temporary layer to avoid sudden frosts in potato; 2) determine if specific wax components within the cuticle can be genetically selected for, and protect against both heat and frost stress in potato and canola.

The PhD student will be paid a stipend of no less than \$30,000 CAD per year at the University of Saskatchewan for up to four years. Students are also encouraged to apply for the many scholarship opportunities available. Student development and international experience are considered important steps to successful careers. The student will have opportunities to present their work at conferences. For all who are interested in this PhD position, contact Prof. Karen Tanino, karen.tanino@usask.ca and use “PhD position, Plant Environmental Stress” in the subject line.

Deadline for application: no later than March 20, 2022 with a tentative start date of June 1, 2022.

References linked to the project:

Ashraf, Mohammad and Rahman, Abidur (2019) Plant Journal. 97: 500-516 DOI: [10.1111/tpj.14137](https://doi.org/10.1111/tpj.14137)

Dhanyalakshmi, KH et al., (2019) Leaf Cuticular Wax, a Trait for Multiple Stress Resistance in Crop Plants. In Abiotic and Biotic Stress in Plants; de Oliveira, B.A., Ed.; IntechOpen: London, UK.

Forand, Ariana et al., (2022) Plants (accepted).

Rahman, Arifa et al., (2020) Plant Cell Physiol. 61 (4): 787-802 DOI:10.1093/pcp/pcaa005

Rahman, Tawhid et al., (2021) Int. J. Mol. Sci. 22:1554. [https://doi.org/ 10.3390/ijms22041554](https://doi.org/10.3390/ijms22041554).

Rahman, Abidur (2013) Physiologia Plantarum. 147: 28-35; doi:10.1111/j.1399-3054.2012.01617.x

Shibasaki, Kyohei et al., (2009) Plant Cell. 21:3823-3838; doi: 10.1105/tpc.109.069906