# Barley Water Stress Management Trial

**Project duration –** 2018

## Objectives

The purpose of this project was to evaluate the tolerance and recovery of two-row barley cultivars to prolonged excess moisture environment, with the intention of identifying a barley variety with improved tolerance and recovery in waterlogging conditions. The response of yield to waterlogging under field conditions was evaluated at PESAI site in Arborg, MB in 2018 on a set of contrasting two-row barley cultivars to waterlogging stress.

## Collaborators

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## Results

ANOVA analysis showed that cultivar, treatment, and their interaction all significantly influenced grain yield, with the lowest value in control and the highest in the irrigated treatment for all the cultivars. Similarly, lodging was lower in the control than in the irrigated treatment. The plant height was significantly affected by cultivar and treatment, while the days to heading were significantly affected only by cultivar.

Contrary to what was expected, the data indicated that grain yield was significantly higher in plots with irrigated treatment than in the control for all the cultivars. Furthermore, plant height increased significantly in the irrigated treatment.

## Project Findings

Despite of unexpected results, we can take some learning from 2018 (drier year) in order to improve the 2019 experiment. To do so, some steps are recommended to take, such as to modify the application of the treatment by increasing the amount of water and/or frequency of irrigation in order to induce considerable stress symptoms (around 70% leaf symptom yellowing) in the susceptible cultivars. Probably flooding plots continuously for few days will be a more realistic approach in a drier year.

## Materials and Methods

Twelve two-row barley cultivars were evaluated for waterlogging tolerance in field conditions at Prairies East Sustainable Agriculture Initiative (PESAI) site in Arborg, MB in 2018. The experimental design used was a Randomized Complete Block Design with three replications and different randomization in irrigated and non-irrigated trials. The trial was seeded on May 16 and harvested on Aug 23. At the time of seeding, 75 lbs/acre of nitrogen and 25 lbs/acre of phosphorous were applied. On June 8, 0.8L/acre of Curtail herbicide was sprayed to control broadleaf weeds.

Waterlogging-tolerant cultivar Deder2 and waterlogging-sensitive cultivar Franklin were used as checks. The excess moisture treatment was imposed by applying a total of 14.5 inches of irrigation starting June 14 and ending on July 27.

Some of the traits evaluated included days to heading, days to maturity, plant height at maturity, lodging, and grain yield. Heading date was determined when 50% of the heads in each plot had fully emerged, maturity date was determined when 50% of the heads in each plot were ripe, and lodging was evaluated in a scale of 1-5 (1=fully erect, 5=fully flat).