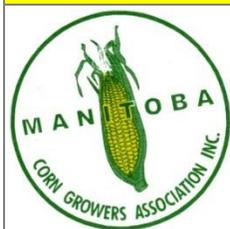


RESEARCH SUMMARY



Project Title: Manitoba Corn Initiative- Corn Physiology for Flooding Survival

Date: Feb 28, 2015

Project Start Date: April 1, 2014

Project End Date: March 31, 2018

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OBJECTIVE:

The aim of the project is to conduct preliminary studies towards the development of flooding tolerant corn plants. The project is structured into two distinct components:

- 1) Assessing the effects of altered levels of corn hemoglobins (Hbs) on flooding tolerance
- 2) Screening for flooding tolerance

SUMMARY:

1) Production of corn lines with altered levels of Hbs

During the current funding period we have verified the four DNA constructs used to over-express or down-regulate the two maize Hbs: ZmHb1 and ZmHb2. The four constructs were sent to Iowa State University where they were utilized to transform maize embryos. We have recently received 10 callus cell lines over-expressing ZmHb1, 2 lines down-regulating ZmHb1, 7 lines over-expressing ZmHb2, and 6 lines down-regulating ZmHb2. The cells are being propagated to increase their mass to 1) verify the success of transformation by genotyping the cells and measuring the presence of the respective ZmHb mRNA (it is expected that only a few of the cell lines received are successfully transformed) , and 2) regenerate plants.

2) Screening for flooding tolerance

The purpose of this research component was to assess if measurement of ZmHb expression could be used as a screening methods for flooding tolerance. The expression of ZmHbs will be measured in several genotypes (lines) after assessing their levels of flooding tolerance. We have requested almost 50 seed lines from Dr. Lana Reid (Agriculture and Agri-Food Canada). A MTA is currently being revised by the University of Manitoba; we expect to receive the seeds and start the experiment in the next few weeks.

BENEFITS TO CORN GROWERS:

Results from the project will provide information on the possible role of plant Hbs in affecting tolerance to flooding. Work performed in other species has indeed shown that altered

expression of Hbs influences flooding response. Our lab demonstrated that alfalfa plants with increased Hb expression survive flooding conditions which compromise growth of non-transformed plants. Unfortunately due to the late funding (we were only able to access funding for this project in Dec 2014), we cannot provide preliminary results demonstrating if these effects also occur in maize.

COMMUNICATION:

Due to late funding we have not been able to produce any communication in the form of conference presentations or publications.



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