Improving Heat and Drought resistance in Canola (*Brassica napus*) Through Regulating Diacylglycerol Acyltransferase (DGAT1) Activity

Canola's value to the Canadian economy is approximately $27 billion, with $9 billion of canola grown in Alberta. High summer temperatures and drought are threats to canola production in the Canadian Prairies, as they can severely decrease yield and seed quality. It is important to develop new canola cultivars that are better adapted to Alberta's changing climate conditions. An enzyme called "DGAT1" could increase canola's tolerance to drought and heat. This project aims to generate and evaluate canola lines with distinct modifications of DGAT1 under heat and drought stress and to identify genes related to stress tolerance. The outcomes will advance the creation of canola cultivars with higher resistance to drought and heat and with high yield and oil quality.

heat & drought resistance
DGAT1 gene

FUNDING DETAILS

RECIPIENT:
University of Alberta

PARTNERS:
Agriculture and Agri-Food Canada
&
Alberta Canola Producers Commission

TOTAL BUDGET:
$416,750

AI FUNDING:
$47,000

PROJECT DATES:
March 2020 – February 2023

PROJECT TRL:
Start: 2
End: 4

APPLICATION

Canola lines generated in this project, and the results about gene function in heat and drought resistance and seed quality, can be used in canola breeding to improve canola stress response, as well as to maintain and increase seed yield and quality. This innovative knowledge will be valuable for both public and private canola breeders and will be freely available under material transfer and intellectual property agreements.

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PROJECT GOALS

- Evaluate canola lines with distinct modifications of DGAT1 under heat and drought stress.
- Identify genes involved in the control of heat and drought resistance.
- Collaborate with canola breeders to develop molecular markers for these stress resistance genes through application of traditional breeding and modern genomics tools.

BENEFITS TO ALBERTA

- Knowledge regarding the function of DGAT1 in canola with respect to plant development and seed quality under heat and drought conditions.
- The canola lines, genes and knowledge generated in this proposed project could lead to the development of valuable stress-tolerant canola cultivars through molecular-assisted canola breeding approaches.
- The results will benefit public and private canola breeders for use of these genes and canola lines, and canola producers in Alberta through the provision of resistant cultivars.
- In the long term, the successful completion of this project will also help improve canola production efficiency and improve the national and global competitiveness of Alberta's canola industry.

8 Publications   **4 Students Trained**   **1 Project Job**   **2 Future Jobs**   **1 New Product/Service**

CURRENT STATUS

June 2020

The proposed lab work has been initiated. A PhD student will join the lab to continue the work from September 2020.