

Deployment of tepary bean genetics to improve stress tolerance in common bean

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$128,066.50	Completed	June 2013 – December 2017	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF); Alberta Pulse Growers Commission; Western Grains Research Foundation	\$313,473.50

Project Description

To identify and transfer stress tolerance related genes from tepary bean to common bean, leading to the development of common bean varieties with improved abiotic stress tolerance.

Outcome

Our preliminary screening of wild tepary accessions for tolerance to sub-zero temperatures demonstrated that the wild tepary bean accession, W6 15578 is a potential donor of tolerance to cold. We hypothesized that there is possibility of selecting for germplasm tolerant to sub-zero temperatures by screening for drought hence the population was evaluated under sub-zero (Saskatoon) and water stress (Puerto Rico) conditions. A few lines were found to be superior to the common bean parent under both stress conditions. A map of the tepary bean genome was developed and compared to that of common bean genome. Agronomic evaluation of introgression lines in Saskatoon was carried out and a subset of selected introgression lines selected to be grown in three locations. Results suggest that the introgression line C-11-2 is a stable and a better performer than the common bean checks across locations. Based on yield, days to maturity and cold tolerance, two promising entries (C-11-2 and B-11-3) were used in further backcrosses with promising Saskatchewan-adapted tepary bean lines and pinto beans. These backcrosses and the introgression lines could be used to improve abiotic stress tolerance in common bean.

Research Objective

OBJECTIVE 1

To identify and transfer stress tolerance related genes from tepary bean to common bean, leading to the development of common bean varieties with improved abiotic stress tolerance.