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## **Crop Adaptation Genomics - Use of Genomic Tools for Crop Improvements in Temperate Climates**

<b>Status</b>	Current
<b>Competition</b>	III
<b>Sector</b>	Agriculture
<b>Genome Centre</b>	Genome Prairie & Genome Alberta
<b>Project Leader</b>	Brian Fowler

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### **Project Description**

Canada has long been one of the world's leading grain producers, despite its relatively short growing season. Harsh winters and cool summers can lead to devastating crop losses. A key to maintaining and improving Canada's competitive position lies in crop improvement, a field of research that increasingly uses genomic approaches to identify genetic factors involved in the climatic adaptation of particular crops.

Dr. D. B. Fowler, a researcher on crop development at the University of Saskatchewan, is principal investigator of Use of Genomic Tools for Crop Improvements in Temperate Climates.

The project will focus on three economically important crops - wheat, barley and rye. Drawing on extensive genetic data and tools within the wheat and barley species and close relatives, the research team will seek to better understand the low-temperature responses of these crops. Rye is the most low-temperature tolerant winter cereal and provides a natural candidate for gene identification, characterization and exploitation.

The team expects to improve our understanding of the genetic mechanisms underlying low-temperature responses opening the way to more effective crop development for a wide range of species.. The immediate goal of the project is to learn from the low-temperature adaptation of hardy species like rye in order to reduce the production risks of more commercially important crops like wheat and barley.

Research findings will be broadly disseminated, which in turn will give rise to technology transfer opportunities. Benefits are anticipated in several different areas. For example, robust crops better able to withstand low temperatures will lead to development of more sustainable and environmentally friendly production systems. It will take less herbicides and energy to grow crops that are more cold resistant. Crop moisture will be utilized more efficiently and productivity will be improved as well.