

DEVELOPMENT OF IMPROVED WINTER WHEAT CULTIVARS FOR WESTERN CANADA

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Funding Partners: Canadian Agricultural Partnership Program, Alberta Wheat Commission, Western Grains Research Foundation, Saskatchewan Winter Cereals Development Commission, Manitoba Crop Alliance

Research Period: 2018-2023

Summary

The Agriculture and Agri-Food Canada (AAFC) Lethbridge Research and Development Centre has a long history of developing superior winter wheat cultivars (primarily Canada Western Red Winter) that enhance competitiveness and reduce business risk for the Canadian wheat value chain. This five year project funding (2018/19 to 2022/23) proposes to: A) continue plant breeding activities coordinated from AAFC LRDC for the development of winter wheat cultivars for all agro-ecological areas of western Canada, and B) expand activities to evaluate winter durum potential in western Canada and establish targeted breeding objectives. To achieve these goals, a well-established, multidisciplinary, pan-Canadian AAFC research team supplemented with key collaborations with personnel at universities and elsewhere will be engaged.

The major component of this project is to continue the development of improved, field-ready winter wheat cultivars of the CWRW wheat class for western Canada by simultaneously targeting higher grain yield and improved lodging resistance while providing a range in acceptable maturity and plant height, maintaining or improving tolerance to abiotic stresses (particularly cold), improved and more durable resistance to diseases (particularly stem rust, leaf rust, stripe rust, Fusarium head blight, and common bunt) and insects (wheat curl mite, wheat stem sawfly), enhanced nutrient and water use efficiency, and end-use quality characteristics that reflect customer demand.

The generation of basic knowledge on winter durum adaptation and end-use quality in western Canada is a new endeavor. Preliminary studies in southern Alberta have shown potential from the perspectives of high grain yield and avoidance of Fusarium head blight (FHB) infection. In basic terms, the main breeding challenges will be to improve winter survival to that of winter wheat, selection for genetic resistance to important diseases, and ensuring grain quality is sufficient to meet export market demands. This project, which compliments a winter durum breeding effort funded through the Alberta Agriculture Funding Consortium (AFC), will focus on expanding the agronomic evaluation of international cultivars and AAFC breeding lines to areas outside of southern Alberta. Trait specific focus will be placed on cold tolerance, disease resistance (Fusarium head blight, stripe rust, stem rust, leaf rust, common bunt) under naturally infected and inoculated conditions, and detailed end-use quality analysis. The results from this

project will provide vital information on which to base future breeding objectives and may result in the development of field ready cultivars.

Objective

For 2023, register 3 or more CWRW wheat cultivars with 18% higher grain yield than Radiant/CDC Buteo that exhibit good winter survival, short to moderate height, strong straw, high test weight and resistance to the major disease/insect threats specific to each production area including stem rust, leaf rust, stripe rust, fusarium head blight, common bunt, wheat curl mite and wheat stem sawfly.