



Breeding cultivars of barley and triticale with improved feed quality and yield.

BREEDING FOR HIGHER FEED YIELDS

PROJECT NO.: 0005.018

RESEARCH INSTITUTION: Alberta Agriculture and Rural Development Field Crop Development Center

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Background: According to the 2006 Competitiveness Study, corn yields in the U.S. increased from 90 bushels per acre in 1980 to 150 in 2005. In Canada, average barley yields increased from 45 to 55 bu/acre in the same time period. This difference is partly because corn can convert sunlight to plant matter more efficiently than crops like barley, wheat and rye, and partly because of climate and other production differences. However, part of the difference is also related to the fact that industry in the U.S. has invested a lot more resources in plant breeding than we have in Canada.

These researchers are working with partners across Canada to develop new varieties of barley and triticale that can resist a variety of plant diseases, use water more efficiently, and produce higher yields of grain and silage in a range of environments. Working with international partners in Syria and Mexico will allow access to new genetics, and shuttling seed between the northern and southern hemispheres will allow more varieties to be tested in each calendar year. They are also working closely with beef cattle nutritionists to develop improved ways of evaluating the feed quality (nutrient content, rate of fermentation, and digestibility) of the silage and grain varieties produced. This project will continue for at least seven years.

Objectives: The objectives of this study are to:

1. Develop feed grain and silage varieties of barley and triticale with improved yields and feed value for livestock, and
2. Investigate new genetic resources that will lead to continued improvements in feed yield, quality and crop production efficiency

Implications of the Research: Developing new feed barley and triticale varieties with better yields, disease resistance, and feeding quality is essential to improving the competitive position of the Western Canadian beef industry.

UPDATE: Seven new barley varieties with superior yield and quality have been approved for registration. From those, the ones being commercialized are AB Cattlelac (six-row feed and forage, sold by Alliance Seeds), AB Advantage (six-row feed and forage, sold by SeCan), Lowe (two row malt, with Fusarium resistance, sold by SeCan). The others still available for commercialization are TR13606 (two row dual purpose, registered), SR15507 (six row forage, registered), and TR14617 (two row malt, registered).

After the formal completion of this project, the program continued to release varieties that were created during its duration. In February 2019, the FCDC had a record number of varieties approved for registration, with four triticale and four barley varieties approved. The varieties that are soon going to be in the market are SR17515 (six-row feed and forage, sold by SeCan), TR16629 (two-row malting, sold by SeedNet), TR17639 (two-row feed, sold by Canterra Seeds). The variety SR17519

(six-row, feed and forage with improved NUE) was approved for registration and is in the process of being contracted by a seed company.

For triticale, progress has been achieved in yield and other characteristics, leading to four new varieties (two winter and two spring) that were proposed for release at the PGDC meeting in February 2018. Approved for registration were WT0010 (winter triticale, sold by SeedNet), T256 (spring triticale, sold by Solick Seeds), T257 (spring triticale, registered and available for commercialization). The winter triticale WT0009 had preliminary registration in 2018 and got full registration in February 2019, together with WT0011, and were commercialized by Corn Brothers Farm and SeCan respectively. The spring triticale T267 and T270 were also approved for registration in 2019, with the first being commercialized by SeCan.

In 2019, the two-row program achieved 1st, 2nd and 5th place in the ranking for yield at the Co-Op trial network in where all breeding programs in western Canada test their varieties. Besides the increase in yield, the varieties created with the support of this project also have improved disease resistance, including resistance to fusarium head blight. The disease nurseries also helped to provide data around mycotoxins that can be used in future development of resistant varieties.

Previously it took 5 years to reach the Western Co-Op Trial variety testing, in which new varieties have to be tested for 2 more years before varieties are approved for registration and subsequent marketing by commercial seed sellers. Due to efficiencies in this project, researchers were able to reduce that time by 20-40%, taking only 3-4 years to reach the Western Co-Op Trials.



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