



## Improving barley and triticale feed

**Project Code:** FDE.04.13  
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### Project Title:

Germplasm and variety development of barley and triticale for animal feed with a focus on feed quality, yield and disease resistance of both grain and annual forage production

### Researchers:

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**Background** Continued improvements in the yield and nutritional quality of barley grain and annual forages are essential to maintain a competitive cattle feeding sector in Canada. The Field Crop Development Centre (FCDC) in Lacombe is Canada's only crop breeding program dedicated to and making a deliberate effort to improve feed and annual forage crops. Other programs do produce feed and forage annual varieties but they are often just new varieties that have failed to meet requirements for other sources (e.g. beer or bread). FCDC is the only place making a concerted effort to improve the nutritional value for livestock through barley and triticale variety development.

### Objectives

1. To develop varieties of barley (grain and forage) and triticale (forage) with improved nutritional quality, yields, yield stability, disease resistance, and water use efficiency, and
2. To expand the germplasm resources available to ensure that future varietal development continues into the future.

### What they did

This research team had unique access to international genetic resources and scientific expertise. They applied traditional selection and molecular marker technology to select for improved yields, digestibility (evaluated using NIRS technology), efficiencies of nitrogen and water use of barley (focusing on both grain and forage) and triticale (focused on forage). All potential breeding lines were also screened for disease resistance (smuts, rusts, fusarium, etc.) in multiple locations to ensure a robust disease resistance package for all varieties. They utilize a winter field in California and growth rooms in Lacombe that sped up variety selection cycles by adding one or two growing seasons during the winter. Access to international germplasm ensured that new varieties could be selected that have resistance to diseases that affect barley in other parts of the world, which may arrive in Canada in the future. Beef Cluster funding was directed towards the disease nursery activities being conducted through AAFC Brandon. In an effort to reduce the number of years it takes to compete pre-registration variety testing, this project increased the size of the breeding program allowing plant breeders to make more crosses between lines and evaluate more lines at the same time, which reduced time from initial crosses to registration trials to 4-6 years instead of 7-10.

### What they found:

During the duration of this project, 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 TRI3066 (two row dual purpose, registered), SR15507 (six row forage, registered), and TRI14617 (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), TRI16629 (two-row malting, sold by SeedNet), TRI17629 (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 6th 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.

### What it means:

FCDC is Canada's only barley breeding facility that focuses on feed and forage barley variety development. Plant breeding is a long-term process. This project continued to build on past research to produce new varieties as well as new crosses that will go on to form the basis of tomorrow's future varieties.

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