

Latest Research Results



Organic oat breeding: Oat cultivars specifically developed for organic production systems in Canada.

2023

Submitted by Kirby Nilsen

Objectives:

The objective of this project was to develop milling quality oat cultivars suitable for organic production in western Canada. This was done through the identification and evaluation of oat germplasm with high levels of genetically conferred disease resistance, improved agronomic performance, and end-use quality.

Methods:

This project was a collaboration between Agriculture and Agri-Food Canada (AAFC), the University of Manitoba, and the University of Alberta. Each year the project team at AAFC Brandon generated approximately 8 new crosses, derived from parental germplasm that showed high levels of resistance to oat diseases, good agronomic performance, and exceptional grain quality profiles. Populations derived from these crosses were planted as bulks and evaluated in early generation field nurseries under organic management at the University of Manitoba, and individual plant selections were made based on agronomic traits

(lodging, plant height and maturity) and disease resistance (crown rust, stem rust, smut, barley yellow dwarf virus). Selected plants were advanced for further evaluation that included analysis of end-use quality, including milling quality (test weight, kernel weight, plumps, thins, groat percentage) and nutritional composition (beta glucan, oil, protein). Testing of advanced lines was also performed in inoculated disease nurseries (crown rust, stem rust, *Fusarium* head blight) at Morden, MB. Each year, the best performing lines were selected, advanced, and evaluated in multi-year and multi-location field trials under organic management to assess performance under a wide range of growing environments and different management conditions, including sites managed by AAFC, the University of Manitoba, and the University of Alberta. Advanced generation yield trials included the preliminary organic yield trial (PRELO), the B organic oat test (BORG), and the western Cooperative Oat Registration Test (WCORT), and were conducted at sites across western Canada.



OT8008

OT8010

Organic breeding lines under field evaluation in the Western Cooperative Oat Registration Test at Brandon, MB 2021.

Results:

The project has generated a broad germplasm base of material adapted to organic production, along with several promising candidate varieties with high levels of disease resistance, improved agronomic performance, and good milling and nutritional quality. Although no new organic varieties have been registered since 2018, the year of the registration of AAFC Kongsore developed under the Organic Science Cluster 2, elite candidate lines, namely OT8013, have been identified with potential to become new varieties in the years ahead. There is a strong chance that OT8013 could become a future variety due to its strong performance not only under organic production, but also for conventional. Our team is excited about the progress made so far, and will continue to evaluate remaining candidate lines for performance and commercial viability, including OT8013 in the years to come. Our team is committed to closely monitoring the progress of OT8013, and other candidate lines, to ensure they meet the standards for agronomic performance, disease resistance and end-use quality, and pursue commercialization if appropriate.



Kirby Nilsen presenting oat breeding research at the Annual Wheat and Oat Field Day, at Brandon Manitoba, 2022.

Conclusions:

The development of disease-resistant oat cultivars with improved agronomic performance and end-use quality is crucial for the organic oat industry in western Canada. Our previous Organic Science Cluster work has led to the release of the first two commercially available organically bred varieties: AAC Oravena and AAC Kongsore. The latter has recently become commercially available to organic producers, and offers high yields, along with a good disease resistance and quality package. The current project has made significant progress generating and selecting promising candidate varieties and germplasm. However, more development and assessment is needed to evaluate the commercial potential of breeding lines to ensure that they have merit to become future varieties. Additionally, we aim to ensure that these new varieties are accessible to producers, and that they are marketed effectively to meet the increasing demand for organic oat products in western Canada.

Activity Researchers:

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Contributing Partners:



GRAIN MILLERS



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<https://organicfederation.ca/organic-science-clusters/>