Breeding and biotechnology game-changers in durum

New durum varieties from this program

AAC Frontier CWAD
- Canada's first ever ergot-resistant durum variety
- Intermediate FHB resistance
- High yield and grain protein (similar to AAC Schrader)
- Shorter plant height and good straw strength
- Low grain cadmium concentration
- High falling number

AAC Brigham CWAD
- Midge-tolerant
- High yield
- Strong straw strength
- Short height
- Greater resistance to FHB
- High yellow pigment
- Low cadmium concentration

AAC Burton CWAD
- High yield
- Enhanced lodging resistance
- Improved drought and heat tolerance
- Short height
- Strong resistance to FHB (MS*, close to intermediate level)
- Low cadmium concentration

DT2035 durum germplasm
- Intermediate FHB resistance (similar to AAC Schrader)
- High yield and grain protein
- Short height and strong straw strength
- Low grain cadmium concentration

By Noelle Chorney
FREELANCE WRITER

TO STAY COMPETITIVE and increase return on investment for farmers in one of Canada's top seeded crops, the durum wheat market requires tireless work on improving cultivars.

A collaborative research project, which integrates traditional breeding with a suite of genomic and molecular technologies, is funded through the Canadian National Wheat Cluster*, and Agriculture and Agri-Food Canada (AAFC) Swift Current and partners across the Prairies are making great strides.

"We are combining multiple desirable traits, including climate-resilience traits, by integrating traditional breeding with several advanced tools and upstream genomic research that allow us to stack many traits efficiently and accurately," said Ruan.

The changing growing environment adds another layer of complexity to the traits breeders need to consider.

"Breeders already work on yield, quality and major disease resistance, but climate change has increased the urgency and the number of traits that must be combined within each new variety," Ruan said.

"Instead of focusing on one or two issues at a time, we now need to stack multiple stress-tolerance traits together including heat and drought tolerance and water-use efficiency."

The collaborative combination of multiple genetic, genomic, and molecular tools has become available just in time. The research team has a long list of technologies to work with, with each tool helping to make the process more efficient.

"From large scale phenotyping to doubled-haploid technology, to marker-assisted and genomic selection, from advanced imaging to strategic parental selection, we can now more efficiently combine yield, quality, disease and insect resistance, and climate adaptive traits within elite durum wheat varieties," said Ruan.

This multi-faceted approach has already led to impressive genetic gains in durum breeding. In 2024 and 2025, the team registered three new durum wheat varieties and a durum germplasm that will lead to new varieties (see sidebar for details). The research team is also using off-season nurseries to speed up plant selection for the next growing season.

In the short term, growers benefit from newly registered varieties that will reduce downgrades, cut cleaning costs and protect grain value. Growers will no longer have to compromise between yield and disease resistance in durum wheat, they can have the best of both worlds.

According to Ruan, trait stacking will continue to advance, which will allow for more desirable traits. But in the medium-to-longer terms, growers can expect a steady pipeline of varieties that offer better yield stability under drought, heat and disease pressure, which means fewer bad years and more consistent profit margins.

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