



INDUSTRY CHARTS BRIGHT FUTURE FOR WHEAT

by KIERAN BRETT

Here's a look inside the major investments being made by ACIDF and partners in winter wheat, soft white wheat and CPS wheat.

There's no doubt that wheat is an indispensable part of the agricultural economy of Alberta. While beef is associated with the province's identity, and canola is a highly valued cash crop, wheat brings in substantial farm gate revenue year after year. In 2007, in fact, Alberta grew 29% of the Canadian wheat crop, and achieved \$1.6 billion in exports from wheat alone.

Doug Walkey, Executive Director of the Alberta Crop Industry Development Fund (ACIDF), believes Alberta-grown wheat does more than it sometimes gets credit for.

“Wheat is fundamental to the success of our livestock sector,” says Walkey. “There are already large, ongoing investments in hard red spring wheat, so ACIDF and our funding partners have chosen to focus on Canada Prairie Spring, soft white and winter wheat. We see tremendous potential for farmers to grow more of these crops, and achieve a greater and more sustainable return from doing so.”

With this goal in mind, Walkey outlines several ACIDF-funded research projects around wheat, with several discussed further in this edition of Feed Grain Research Update.

Moving soft white and CPS north. ACIDF has invested \$550,000 over the next five years in soft white wheat research with Agriculture and Agri-Food Canada in Lethbridge. With further investment from the Western Grains Research Foundation (WGRF), this research program is targeting new and improved varieties of soft white wheat.

Between now and 2014, ACIDF will invest \$1.3 million with the CPS breeding program at the University of Alberta. Researchers are targeting shorter season, higher yielding CPS wheat germplasm that will meet the needs of the livestock and ethanol industries better than currently available varieties. These advances, combined with improved production practices, could support a substantial expansion of CPS acres in the province. This work is also being funded by the WGRF.

“Right now, these two wheats are mainly grown in southern Alberta,” says Walkey. “Agronomic improvements could make them more appealing to growers up into the parkland. With several marketing options available -- including livestock, ethanol and the milling market -- we think these wheats could be good choices for more Alberta farmers.”

Tougher, higher-yielding winter wheat. This is another crop that's mainly seen on the southern Prairies, but which merits a place in crop rotations farther north. ACIDF has invested \$560,000 over the next five years in research being led by Agriculture and Agri-Food Canada at Lethbridge. Higher yield, improved winter hardiness and better cold tolerance are the goals. Partners in funding and performing this research include the Crop Development Centre at the University of Saskatchewan, Bayer CropScience Canada, Ducks Unlimited, Husky Energy, WGRF and the winter cereals producer groups in Alberta, Saskatchewan and Manitoba.

Wheats that fight off midge. Wheat midge continues to cause serious yield and financial losses for growers. One promising avenue of defense is to develop varieties of wheat with built-in resistance to wheat midge. ACIDF has invested \$670,000 over four years with Agriculture and Agri-Food Canada at Swift Current to help make this happen. Partners include WGRF, Saskatchewan Agriculture Development Fund and Agriculture and Agri-Food Canada.

“It takes real partnership to move wheat forward in Western Canada,” says Walkey. “ACIDF is delighted to be working with researchers of the highest quality and with public, private and farmer-funded organizations that share our commitment to get the job done.”

NEW CLASS BRINGS NEW ENERGY TO WHEAT RESEARCH

These researchers are working to add yield, starch and agronomic performance to soft white and CPS wheats.

Sometimes, changes to Canada's grain quality assurance system are small in scope, technical in nature and of limited interest to growers. Not so with two changes ushered in at the start of the 2008-09 crop year. Effective then, the Canadian Grain Commission eliminated kernel visual distinguishability (KVD) as a registration requirement for wheat and added a new General Purpose class.

Prior to this change, plant breeders were effectively hamstrung in their search for higher yields by the need to meet KVD requirements and to address quality parameters relevant only to milling.

“Now we can breed for higher yields,” says Dean Spaner, a wheat breeder and Professor of Agricultural, Food and Nutritional Science at the University of Alberta.

To Harpinder Randhawa, wheat breeder with Agriculture and Agri-Food Canada in Lethbridge, this is especially good news for soft white spring wheat. With millers' quality parameters no longer such a factor in the General Purpose class, he notes, “new varieties can be developed for the specific needs of the end-use markets, such as biofuels and the livestock industry.”

New varieties for growers, young minds for research

Dean Spaner's wheat breeding program has become known for two distinct yet complementary achievements. On a scientific level, the program has registered many new varieties and published research of fundamental importance. On an educational level, the same work has attracted and engaged a generation of graduate students.

“We are doing training to ensure that we have some of the plant breeders of the future right here,” says Spaner. “I've been researching for ACIDF for seven years and in that time, we have brought six new plant breeders under the program. Plant breeding is a long-term proposition and having capable people is critically important for the future.”

As part of a new program now being funded by ACIDF, Spaner and his team are working with Randhawa and others to develop General Purpose wheats with higher yields, superior agronomics and disease resistance for animal feed and ethanol uses.

While ethanol might be the topic on everyone's lips, Spaner plans to ensure that the needs of the livestock industry receive the attention they deserve.

“Alberta is a significant livestock producing region,” he says. “General Purpose allows us as breeders to work with lines that would not be appropriate for food or for the Canadian Wheat Board's needs and use these to benefit hog and poultry producers. Breeders in most countries have had that option for quite some time and now we do, too.”

WORKING WINTERS, WAY SOUTH

Like Spaner, Harpinder Randhawa has new funding in place and plenty of plans to develop new wheat varieties in the General Purpose class. He's working on strains of soft white spring wheat that are higher yielding and higher in starch, with better disease resistance and agronomic performance.

In this effort, he'll be using germ plasm from several Canadian and U.S. sources, as well as international cereal resources like CIMMYT and ICARDA. To accelerate the pace of the program, Randhawa will grow crops in both Alberta and New Zealand. The plant biotechnology technique known as doubled haploid, using the tissue culture process, will allow Randhawa to produce a line of wheat in as little as six to eight months. This compares to three to four years with conventional approaches.

“Getting two crops per year, combined with using the tools of biotechnology, will allow us to speed things up,” says Randhawa. “Over the next four years, this project will help develop new breeding materials that we will be working with in the coming years as wheat breeders.”

WINTER WHEAT READY FOR ITS CLOSE-UP

With an improved breeding and agronomic package now in development, acreage could triple over the next five years.

For a busy Alberta farmer, there's a lot to like about winter wheat. Planted in the early-fall and harvested in mid-summer, the crop offers farmers the opportunity to spread out their workload relative to spring-planted, fall-harvested crops. Winter wheat is also a versatile crop, serving markets from food to feed to fuel.

So why, asks Rick Istead, don't farmers grow more of it?

“Here in Alberta, we grew about 300,000 acres of winter wheat in 2008,” says Istead, Executive Director of the Alberta Winter Wheat Producers' Commission. “When you know what the crop can do for farmers, it really begs the question: why don't we see a million acres or more?”

In Istead's view, several factors are impeding the growth of winter wheat acres. The perceived threat of winterkill tends to keep winter wheat well south: more than 70% of Alberta's crop is grown south of Highway #1. Its reputation as a lower-value crop has also proven hard to shake. Many growers would sooner plant barley, aiming for high-value malt but keeping the feed market as Plan B.

Part of the Commission's mandate is to identify barriers to the adoption and expansion of winter wheat, and work with the research community to address them. Istead's group is one member of a potential new Winter Wheat Breeding Consortium. The Alberta Crop Industry Development Fund (ACIDF) is another, and recently invested \$560,000 in the effort over the next four years.

Other groups contributing funding, research or both are the Crop Development Centre in Saskatoon, University of Manitoba, Bayer CropScience Canada, Ducks Unlimited Canada, Husky Energy, the Western Grains Research Foundation, the Saskatchewan Winter Cereals Development Commission, and Winter Cereals Manitoba.

THREE AREAS OF FOCUS

One million acres of winter wheat in Alberta? Rob Graf doesn't see why not.

“At one time, there were about 400,000 acres of winter wheat in southern Alberta alone,” says Graf, a plant breeder with Agriculture and Agri-Food Canada in Lethbridge who's leading the research effort. “I think we could see quite a large expansion in acreage quite easily over the next five years.”

Graf's research is focused on specific areas of improvement. One of his challenges is to improve the overall agronomic package. That means attributes like improved yield, winter hardiness and straw strength. He's also targeting winter wheat with earlier maturity, improved test weights and large seed size.

Another priority is to develop varieties with a range of quality types to meet end-user specifications, serving markets such as milling, livestock feed and biofuels. For example, a higher starch component would better serve the energy needs of the livestock industry.

“The milling market will continue to be important, particularly when you consider that winter wheat is the predominant type used for bread and noodles around the world,” says Graf. “The new General Purpose class will expand our ability to bring some excellent lines to market without having to be concerned with the quality requirements of milling wheat.”

Finally, as winter wheat acreage expands, improved disease and insect resistance packages will be essential. In terms of diseases, stripe rust is a particular concern, following a significant outbreak across the Prairies in 2006. Other disease and pest resistance traits that are being incorporated for the benefit of Alberta producers are resistance to common bunt, wheat streak mosaic, Fusarium head blight and wheat stem sawfly.

This new-look agronomic package is just what growers need, according to Rick Istead. With less chance of winterkill, stronger disease and insect protection and better end-use performance, today's growers could plant more acres and others farther north might look at winter wheat for the first time in a long time.

“We have three distinct markets we can serve: milling wheat, feed wheat and ethanol,” says Istead, “and there's all kinds of exciting work happening today to help us capture these opportunities.”

GROWERS PAY THE BILLS, CALL THE SHOTS

Fueled by farmers' checkoff dollars, the Western Grains Research Foundation plays a major role.

What does it take to bring superior new grain varieties to the market? Capable plant scientists, precious germ plasm and advanced technologies all contribute. Still, without funding and long-term commitment, there's only so much that researchers can do.

That's where the Western Grains Research Foundation (WGRF) comes in. This non-profit, farmer-funded organization provides both direction and dollars for wheat and barley research. As Chairman Dr. Keith Degenhardt explains, the WGRF is a source of stability in a changing environment for research funding.

“We have long-term research agreements in place,” says Degenhardt. “We have a five-year renewable agreement with Agriculture and Agri-Food Canada and a 10-year renewable agreement with the Crop Development Centre.”

Over the years, WGRF funding has contributed directly to the registration of literally dozens of

new wheat and barley varieties. In terms of hard red spring wheat, for example, the most recent CWB survey reports that the top-three varieties in Western Canada all had a helping hand from WGRF.

HE WHO WRITES THE CHEQUE MAKES THE RULES

Growing wheat and barley in Western Canada can be a tough, low-margin business. Some farmers question the wisdom of having checkoff dollars leave the farm today in exchange for uncertain research prospects down the road. To Degenhardt, this is an investment that simply must be made.

He notes that the checkoff amount – 30 cents per tonne of wheat and 50 cents for barley, and only on CWB grains – is relatively modest. When these small levies come from thousands and thousands of farmers, however, the amounts quickly become worthwhile.

“It all adds up” says Degenhardt. “The investments we are making have made a significant difference, and part of the reason is that producers now have direct involvement in what the breeders are doing. This research has allowed the producer to stay competitive on a worldwide basis.”

Degenhardt is the first to admit that not every WGRF investment pays off handsomely. Years of funding for hulless barley, for example, produced the insight that hog producers ultimately preferred to buy CPS wheats for their rations.

“At times we have been very fortunate in our results,” says Degenhardt. “At other times, less so. That’s the point, really: this is research and there are no guarantees.”

He notes it takes between eight and 10 years to develop a new variety, but for every dollar invested in variety development, farmers receive between \$4 and \$12 in return.

BRIGHT FUTURE FOR WHEAT

WGRF is partnering with ACIDF – and other funders and providers of research – to develop higher-yielding, better-performing varieties of wheat for livestock feed and other purposes. In fact, several research facilities are pursuing similar aims, an arrangement that Degenhardt has often found to be productive.

“You don’t need duplication, but there’s nothing wrong with having more than one breeder working on a certain area,” he says. “Breeders tend to have different ideas and those can sometimes pay off.”

One area where Degenhardt sees tremendous potential is in winter, soft white and CPS wheats. He’s convinced that the investments now being made by WGRF, ACIDF and others will place Alberta wheat growers in a stronger position in the future.

“We will see higher energy, lower protein wheat, with significant yield enhancements,” he says. “The crosses that will give us those improvements are being made right now, and we’re five to eight years away from new varieties. It’s an exciting time and wheat growers have lots to look forward to.”



PARTNERS IN WHEAT FEED GRAINS

ACIDF recognizes and thanks the following organizations for their expertise and dedication to improving wheat feed grains to meet the needs of growers, buyers, and consumers.

Agriculture and Agri-Food Canada
Alberta Agriculture and Rural Development
Alberta Agricultural Research Institute
Alberta Beef Producers
Alberta Cattle Feeders Association
Alberta Chicken
Alberta Livestock and Meat Agency
Alberta Milk
Animal Nutrition Association of Canada
Alberta Pork
Alberta Soft Wheat Producers Commission
Alberta Winter Wheat Producers Commission
Bayer Crop Sciences
CIMMYT
Ducks Unlimited
Husky Energy
ICARDA
Permolex Ltd
Saskatchewan Agriculture Development Fund
Saskatchewan Winter Cereals Commission
University of Alberta
University of Manitoba
University of Saskatchewan
Western Grains Research Foundation
Winter Cereals Manitoba



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This is the fifth in the series of articles that look in depth at specific solutions to feed competitiveness and will outline investments being made by private industry, farmers, research organizations, government and funding agencies in present and future feed grains research and development. Printed copies are available upon request or visit our website www.acidf.ca for others issues.