



# FEED GRAIN CROPS AND LIVESTOCK TOGETHER UPDATE 2009



Issue 6

## FARMERS, FEEDERS JOIN FORCES TO MOVE BARLEY FORWARD

by KIERAN BRETT

**Barley growers and cattle producers are putting their money where their future is, teaming up to fund research of vital importance.**

Historically, the relationship between barley growers and barley-buying cattle producers has sometimes been antagonistic. It's not hard to see why. When barley prices are relatively low, growers suffer but feeders benefit. When prices are higher, growers might prosper while feeders struggle to make a buck.

Today, there are signs of a new spirit in that relationship, and there might be no better evidence than the new grower-feeder cooperation around barley research. The Alberta Beef Producers (ABP), the Alberta Barley Commission (ABC) and the Alberta Crop Industry Development Fund (ACIDF) are together investing \$6.25 million over the next five years to develop barley varieties better suited to the needs of Alberta's livestock feeding industry. Also on the drawing board are calibrations to accurately estimate the feeding value of a barley sample, using Near Infrared Reflectance Spectroscopy or NIRS.

In funding this research from producer checkoff dollars -- \$1.5 million from ABP and \$1.25 million from ABC -- growers and feeders of barley are joining forces with a common goal: reduce dependence on U.S.-grown corn.

### Alberta barley vs. U.S. corn

As Stuart Thiessen explains, many feedlot operators use U.S. corn as an unsustainable though sometimes unavoidable necessity. They'd rather buy grain closer to home and avoid the costs, hassles and uncertainties of cross-border trade, assuming that quality and price are comparable.

"The reality is that Western Canadian feedlots will not survive on U.S. corn," says Thiessen, who owns and runs a 30,000-head feedlot outside Strathmore. "You truck the corn here, you truck to meat back there, it just doesn't make sense. Long term, if we have to bring in corn, we're done."

Today, many U.S. corn growers are capable of growing 200 bushels per acre. Fueled by the steady returns made possible with a hybrid crop, U.S. seed corn companies are investing aggressively to create even higher yields. They talk confidently about a 300-bushel average corn yield within 10 to 15 years.

By comparison, Thiessen sees Canadian barley yields stagnating. In this environment, he believes that investing in higher-yielding, better-performing barley is a matter of necessity for both beef producers and barley growers.

"We have established a good feedback loop around breeding," says Thiessen. "As beef producers, we want more energy produced per acre of barley that cattle can use. So we decided that the best bang for our buck was to invest in barley research."

## **A shared commitment to progress**

Mike Leslie, CEO of the Alberta Barley Commission, notes that the province's producers are supporting the search for better barley through an increased checkoff. In 2009, growers endorsed an increase to \$1 per tonne, adding an estimated \$500,000 per year in new investment funding for 2010.

Even at a time of tight operating margins, producers clearly recognize what's at stake. While long-prevailing standards have favored plumpness and high test weights, there's a new yardstick on the way. NIRS technology will provide fast, precise and inexpensive evidence of the feeding quality of barley for sale. This should ensure buyers can more easily purchase quality, while sellers can more easily capture value.

“To be competitive, you have to produce pounds of meat,” says Leslie. “Barley needs to be a feed grain that is economical for cattle, hogs and chicken. Our research is intended to ensure the maximum number of pounds of meat per acre of barley, to make us competitive. That's why this collaboration that exists between the feed industry and the grain sector is so important to the future.”

## **BETTER BARLEY, AND NEW WAYS TO KNOW IT**

**With funding from ACIDF, beef producers and barley growers, this extensive research project is aiming to improve digestible energy and other traits.**

Alberta is known as a livestock-producing region, with world-class and world-scale production of cattle, hogs and poultry.

According to the Alberta Barley Commission, up to 80% of the barley grown in Alberta is fed to livestock, fuelling an industry whose revenue is counted in the billions of dollars. Alberta barley is also exported globally, feeding livestock such as cattle, hogs and in Saudi Arabia, even camels.

While barley occupies a singular place in the agricultural economy of Alberta, this crop hasn't always garnered the research support it arguably merits.

That is changing. A five-year, \$6.25 million investment by the Alberta Beef Producers, Alberta Barley Commission and ACIDF will fund the development of new and improved feed varieties of barley for beef cattle, swine and poultry. This work will build on the knowledge gained over the last few years in developing Near Infrared Reflectance Spectroscopy calibrations for barley for these species.

If the challenge is big, then so are the resources needed to tackle it. The effort is being led by Alberta Agriculture and Rural Development (ARD), with other team members including the Crop Development Centre at the University of Saskatchewan and Agriculture and Agri-Food Canada in Lethbridge, Swift Current and Brandon. This project will work with existing barley germplasm and introduce new germplasm from international cereal breeding resources from CIMMYT in Mexico and ICARDA in Syria.

## **All varieties not created equal**

To the naked eye, one truckload of barley seems pretty much the same as the next. As long as the barley is plump and has a reasonable test weight, it's seen as good to go. But as Patricia Juskiw explains, NIRS has the potential to tell a different story.

“We are doing feeding trials with ruminants, swine and poultry, to produce NIRS calibrations for barley,” says Juskiw, barley breeder with ARD in Lacombe. “As we develop calibrations for barley for these species, we can look at barley and see the variations among different cultivars. If there is a genetic basis for these differences, we could start improving these traits.”

Armed with the knowledge that NIRS provides, researchers will be better able to improve the digestible energy of barley to suit the specific needs of cattle, pigs and poultry. That could unlock a future in which feed barley isn't just a fallback for unsuccessful malt production, but a market in its own right.

“It will help us when the quality parameters for different livestock species are better defined and better understood,” says Juskiw. “We have to start thinking in new ways about feed quality, because it is different for weaner pigs and poultry than it is for sows and cattle.”

### **A long-term effort**

The reason why stable funding is necessary is that results take time. Germplasm currently available to researchers will go a long way to producing more digestible energy in barley. New material from ICARDA and CIMMYT could allow future varieties to also exhibit good drought tolerance and disease resistance.

Maltsters and livestock producers have long competed for high-quality Alberta barley, with livestock producers generally choosing from barley not selected for higher-priced malt. In Juskiw's view, the needs of these two markets needn't be at odds. Improving malt varieties is another way of improving barley as feed.

“We have for years selected for malt quality,” she says. “Using NIRS as a measurement tool, we can determine what will be good for malt. I'm excited by the fact that the traits you want in malt barley are very close to what you want for a ruminant.”

*An important component of this project is plant breeding work relating to triticale, which will be discussed fully in an upcoming edition of ACIDF Feed Grain Research Update dedicated to triticale.*

## **LESS FERTILIZER, SAME YIELD**

Crop nutrition guidelines assume that nitrogen is cheap. It isn't. Funded by ACIDE, this project is seeking ways to cut nitrogen use without losing yield.

How much nitrogen do you need to grow a profitable crop? For farmers worldwide, that's the \$40 billion question.

According to Allen Good, Professor at the University of Alberta's Department of Biological Sciences, \$40 billion is the amount spent globally on nitrogen fertilizers in a typical year. The trouble is, less than half of the nitrogen applied is absorbed by the crop. The rest degrades in the soil or is leached away, causing significant and often permanent environmental damage. The act of applying nitrogen fertilizer is also associated with the release of harmful greenhouse gases.

Researchers believe there's a better way. With \$1.6 million in funding from ACIDE, Good and barley breeder Patricia Juskiw are developing barley varieties that use nitrogen more efficiently.

“The project is looking at strategies that can be used to reduce the rate of application of nitrogen while maintaining yield equivalence,” says Good. “If we can use less nitrogen but grow the same

amount of barley, that saves farmers money and it helps the environment.”

### **Some are sippers, others are guzzlers**

For decades, the financial and environmental cost of nitrogen fertilizer didn't keep anyone up at night. Today, it's different. Farmers and society have begun to more fully scrutinize these factors, and include them in an accounting of the true cost of growing crops.

According to Juskiw, many barley varieties grown in Western Canada are quite efficient at using nitrogen. Others are less so.

“Especially among some of our newer varieties, they are very efficient,” Juskiw says, “and can yield well under conditions of low nitrogen. At one time, nitrogen was so cheap, people didn't really look at the impact of it on costs. One could ask, have we been selecting for varieties that need 100 pounds of nitrogen to grow well? We haven't defined or explored what some of our varieties might do under much lower nitrogen.”

Over the next few years, Juskiw will study how well current varieties use nitrogen, and how the germplasm at hand could improve this performance. Longer term, she'll work with gene constructs developed by Good, including fresh genetics from international sources. The goal is to understand more fully how barley uses nitrogen, with a view to using less.

### **How low can you go?**

How is it that two barley varieties – which might seem visually identical – can use nitrogen with widely varying efficiency? Like much else in plant science, the answer lies at the molecular level.

Good is working with scientists in the U.S. and Australia who have mapped the genome of barley, isolating the genes believed responsible for nitrogen use efficiency. In the coming years, he will develop these genes into a construct that Juskiw could eventually deploy for plant breeding purposes. Similar research has already been done in rice and canola.

In time, new barley cultivars could potentially grow well on just a fraction of the nitrogen typically applied today. This is highly conceptual work with a lengthy time frame and potentially, an immense payoff for farmers, society and the environment.

Says Good: “Given today's increasing fertilizer cost, and our understanding of its environmental impact, we might be able to use less without sacrificing yield. There's a large amount of work to be done, and we are collaborating with researchers who have some very interesting genetics.”

### **A roadmap for feed barley in Alberta**

This long-time grower and policy leader sees reason for optimism, provided industry players continue to work in an integrated fashion.

Of the 17,000 Alberta farmers who grow barley, very few have experienced the industry from as many perspectives as Doug Robertson.

With years of service to producer groups – including three terms as Chairman of the Alberta Barley Commission, until 2008 – the Carstairs-area farmer knows the agronomics, policy and politics of the crop inside-out.



What does the future hold for feed barley and barley growers in the province? Robertson finds himself, for the most part, optimistic. Despite some stubborn challenges, he sees positive trends as well. Feed Grain Research Update asked Robertson for his candid views on how the industry can chart a successful future.

### **Grower and feeder are in this together**

If barley is expensive, it will drive the livestock industries out of business, or over the border to buy corn. Cheap barley, in Robertson's view, will cause growers to choose better-paying crops.

“The critical thing is, you have to be able to economically feed livestock,” he says. “There is no way we can have one sector riding on the back of the other sector. If a bushel of barley costs \$1.50 or \$1.75, it's not going to work because farmers won't grow it.”

At the same time, livestock producers are unlikely to pay more than they need to. Robertson believes the answer is for science and agronomy to deliver more feeding value per bushel to the buyer, and reward the grower for providing that added value.

### **Focus on variety improvement and innovation**

Robertson points to low-phytate barley for hog feed as an example of science solving a problem for the crop, its growers and its buyers. He urges funders and performers of research to roll up their sleeves and deliver more innovation.

“A lot of the varieties today are basically malt varieties,” says Robertson, “and they are not necessarily what the livestock industry wants. They want more starch. In terms of yield, maybe we should look at hybrid varieties. If we can get 140- to 150-bushel barley through hybrids, you can afford to take a little less per bushel, because you're getting more bushels per acre.”

The more scientists and processors work on barley, the more potentially valuable components they find. Robertson advocates continued focus on areas such as fractionation of barley. Fractionation could strip out valuable components but still leave a viable livestock feeding product.

### **Above all, work together**

Like any long-time grower, Robertson has been through many periods when either barley growers or livestock producers enjoyed profitable years at the other's expense. He'd sooner see a steady environment where both sides can make a reasonable dollar while managing risk. Research holds the promise of contributing to this vision, provided each link in the chain gives a little to gain a lot.

“We need to think system-wide: from grain, to livestock, to customer,” says Robertson.

“I think there is a great future in tailoring barley to what the buyers want. It is great to see the Alberta Beef Producers contribute dollars to barley research. It shows their commitment to the industry, and that they want to make sure Alberta barley is there for the future.”



## PARTNERS IN THE BARLEY OF TOMORROW

**ACIDF** recognizes and thanks the following organizations for their expertise and dedication to improving Alberta barley, to more fully meet the changing needs of barley growers, livestock producers and domestic and worldwide customers.

Agriculture and Agri-Food Canada  
Alberta Agriculture and Rural Development  
Alberta Agricultural Research Institute  
Alberta Barley Commission  
Alberta Beef Producers  
Alberta Livestock Industry Development Fund Limited  
Alberta Pork  
CIMMYT  
ICARDA  
Crop Development Centre, University of Saskatchewan  
University of Alberta

**ACIDF**  
ALBERTA CROP INDUSTRY DEVELOPMENT FUND

*This is the sixth 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](http://www.acidf.ca) for others issues.*

Copyright © 2009

