

Research targets better barley for livestock

by Kieran Brett

Funding from ACIDF, ALMA and ABC allowed these scientists to investigate how barley can make pigs healthier and deliver superior growth performance in cattle.



In any commercial relationship, loyalty and track record count for a lot. If a supplier has provided a good product at a fair price over time, you'll tend to stick with them. Even so, if someone else can provide a *better* product, wouldn't you consider it?

Alberta-grown barley, despite having a long and productive relationship with the province's livestock producers, isn't taking anything for granted. Barley growers are keen to find new and better ways for their crop to deliver even more value for those who feed it.

Over the past three years, two leading animal nutrition scientists broke new ground in understanding how barley performs as a feed ingredient and identified new avenues to improve that performance in the future. This work was supported by the Alberta Crop Industry Development Fund (ACIDF) through the \$8 million Feeding Initiative funded by Alberta Livestock and Meat Agency (ALMA) and the Alberta Barley Commission.

Cattle: opening new doors in digestion and performance

A feedlot steer eats barley as the main ingredient in its feed ration. Starch and protein from this barley fuel the animal's weight gain. What could be simpler?

In fact, as Tim McAllister, pictured above, explains, the digestive process is highly complex and many of its dynamics aren't well understood. One of these is the nature and function of bacteria in the rumen.

"The variety of bacteria capable of digesting barley varies widely," says McAllister, Principal Research Scientist, Ruminant Nutrition & Microbiology, with Agriculture and Agri-Food Canada in Lethbridge. "When we look at the rumen as an ecosystem, we don't know 80% of the bacteria, they've never been characterized. The role they play in starch digestion, how populations change under certain conditions, we don't know."

McAllister's part of this three-year project involved several studies to identify and quantify bacteria in the rumen that digest starch and protein from barley, and how different kinds of grain processing can influence this activity.

He found that many different bacteria are effective at breaking through barley's protective hull and gaining access to the digestible material in the endosperm. The difference-maker, he found, isn't the variety or plumpness or bushel weight of the barley, but how it's processed.

In McAllister's view, the long-term goal is to determine which kinds of processing will allow barley to be optimally digested, given the type of bacteria in the rumen. That would allow barley growers and buyers to build on their long-standing connection and make it more profitable in the future.

“Right now, barley is traded on factors such as bushel weight,” says McAllister. “But that doesn't consider an issue such as kernel uniformity, which could be important. We still need to work on how the chemical nature of barley responds to processing.”

Swine: barley for improved gut health



What can barley do for pork producers, beyond adding pounds to their pigs? Ruurd Zijlstra, pictured left, believes that barley can enhance gut health and thereby help producers move away from the use of low-dose antibiotics as a growth promotant.

In a series of five studies under this research project, Zijlstra laid the groundwork for his idea. His starting point was to challenge a long-held swine feeding principle.

“Barley has gotten a bad reputation as far as feeding young pigs,” says Zijlstra, a Professor and Swine Nutrition Researcher at the University of Alberta. “The thinking was that there's not enough energy value in barley relative to wheat. Our research showed that, once the diet was properly balanced for energy and amino acids, pigs hold their own with barley and may even do better.”

That extra measure of performance comes from prebiotics that are present in barley. These prebiotics help maintain the integrity of the gut wall, keeping bacteria out, and help ensure stable microbial flora. Different barley varieties naturally have differing amounts of prebiotic. This suggests to Zijlstra that barley cultivars could be developed specifically to deliver prebiotic benefits to young pigs.

“Are there things that can be done, within the genome, to give barley more of a prebiotic effect?” asks Zijlstra. “Antibiotics could be masking the effect of a low health status in pigs. The question is, how can you have a more robust health system and have diet and management work together so that antibiotics aren't needed? A prebiotic diet is a nice piece of the puzzle.”

