

Separation technology enhances grain quality and value

by Kieran Brett



ACIDF is one of four organizations that funded the purchase and operation of a grain quality improvement system for the Canadian Feed Research Centre. It can potentially make a huge difference to farmers' economic returns.

Sometimes a small deficit in product quality creates a steep reduction in the product's economic value. Just ask a prairie crop producer. Under Canada's system of grading wheat, barley, durum and other crops, even a tiny amount of undesirable material can reduce the value of a crop by 25%, 50% or more. Talk about a fiscal cliff.



On a conceptual level, there ought to be a better way. If you simply removed the offending material, the higher economic value of what's left would presumably justify the effort.

Until recently, however, the grain industry has lacked a proven, efficient method of doing so.

At the Canadian Feed Research Centre at the



University of Saskatchewan, Tom Scott, left is working on what could be a breakthrough in grain quality enhancement. By operating a Bomill seed processor with Near InfraRed Spectroscopy (NIRS) technology, Scott is studying how to remove defective or damaged individual kernels from a grain sample. This would dramatically enhance the grade and value of the rest of the grain.

“We have never before been able to look within an individual sample to see how individual kernels contribute to the final grade,” says Scott, U of S's Research Chair in Feed Processing Technology. “With the Bomill and NIRS, we now have the capacity to sort individual kernels on a chemical basis rather than visually.”

The Centre's Swedish-made, \$370,000 Bomill machine was first leased and later purchased with funding from the Alberta Crop Industry Development Fund

(ACIDF), Canadian International Grains Institute (CIGI), the Saskatchewan Ministry of Agriculture and Western Economic Development Canada.

Transforming the value of grain

The Bomill is capable of processing three tonnes of grain per hour – roughly 30,000 seeds per second – analyzing each seed for quality parameters set by the operator. It can then separate the sample according to which seeds meet or do not meet this specification.

Since getting the keys to the Bomill in April 2012, Scott has tested existing calibrations, run many analysis/separation scenarios on Canadian-grown grain and studied how to expand the use of the Bomill to address other crop-quality issues. His findings to date will be music to the ears of any farmer who's ever received bad and costly news about a grain sample.

“We have seen spectacular results in terms of fusarium,” says Scott. “You start with a grain sample that's 7% fusarium-damaged kernels. We can use the machine to take out the bottom 10% of the kernels in terms of crude protein. This 10% of the kernels consists of 31% fusarium-damaged kernels. The other 90% has 0.7% fusarium damage, which brings it within the parameters of the #1 grade. This also helps a great deal in terms of food safety, since you're removing the mycotoxins associated with fusarium.”

Another example is grain that's been compromised by sprouting. Even a 1% rate of sprouting knocks \$100 per tonne off the value of grain. The hope is that, with modifications to the Bomill, you could identify and remove virtually all of the sprouted kernels and get almost all of the \$100/tonne back.

Coming soon to a processor near you?



By Scott's math, 10 Bomill machines working together would equip an effective – and potentially very profitable – upgrading program for a grain company, processor or seed cleaning plant.

“Operating 10 machines would cost a total of \$10 per tonne,” says Scott. “If I can take feed wheat and turn 80% of it into #1 wheat that would produce a profit of \$70 per tonne.”

Rex Newkirk liked the potential of the Bomill and Scott's work with it – so much so that he contributed his entire applied research budget for 2012 to the project.

“This is technology that has the potential to bring substantial value to farmers,” says Newkirk, CIGI's Director of Research and Business Development. “While it took a little while to get set up, so far it has been quite productive.

“If you can take feed-grade grain and turn it into a milling product that will have a tremendous effect on its value. You could share the cost with producers and they could easily make an additional \$40 to \$50 per tonne.”