

Selecting Feed Barley Based on NIRS

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The most limiting and expensive traits to select for whether you are breeding new varieties or marketing/buying product are the quality traits. However, these are often the most economically important traits that we are using our grain for. Quality traits are not simply inherited; they have other physiological effects on the seed or end product and are significantly affected by the environment. Figures 1 to 4 show the variability of various quality characteristics found in Alberta grown barley. Simply measuring test weight (bushel weight) and kernel weight (seed plumpness) do not define seed quality (Table 1).

Over the last 40 years, I have looked at many different techniques to rapidly screen breeding populations for many different economic quality traits. Most techniques are too expensive or unreliable to screen large numbers of samples. NIRS (Near Infrared Reflectance Spectroscopy) is accurate, repeatable and rapid as well as non-destructive to the sample, allowing breeding programs to screen large numbers of lines for multiple characteristics at the same time.

What is NIRS?

NIRS technology uses near infrared light to scan a sample and produce a light reflection 'fingerprint' of the sample. This data is then matched with data from traditional wet chemistry sources or to feed trial data to produce a calibration equation. This NIRS equation can then be used to analyze samples to predict feed quality characteristics such as protein and energy - all in just a matter of minutes.

New NIRS project

New funding received from the Alberta Crop Industry Development Fund has begun the process of transferring the NIRS technology used in genetic development to commercial use, which will define the major feed quality components of feed ingredients into a standard format. This will allow both feed producers and livestock producers to price the ingredients according to their true feed value.

It will ultimately mean considerable savings for livestock producers and feed mills by giving quick reliable analysis of feed quality components and allowing them to formulate more accurate feeding rations. Feed grain producers will also benefit from NIRS by having their grain samples analyzed and then using this to market their grain according to its specific quality traits; and they will be paid for its actual quality.

Figure 1. Variability in digestible energy content and protein digestibility of 2-row, 6-row and hulless barley. The (-) line indicates the average.

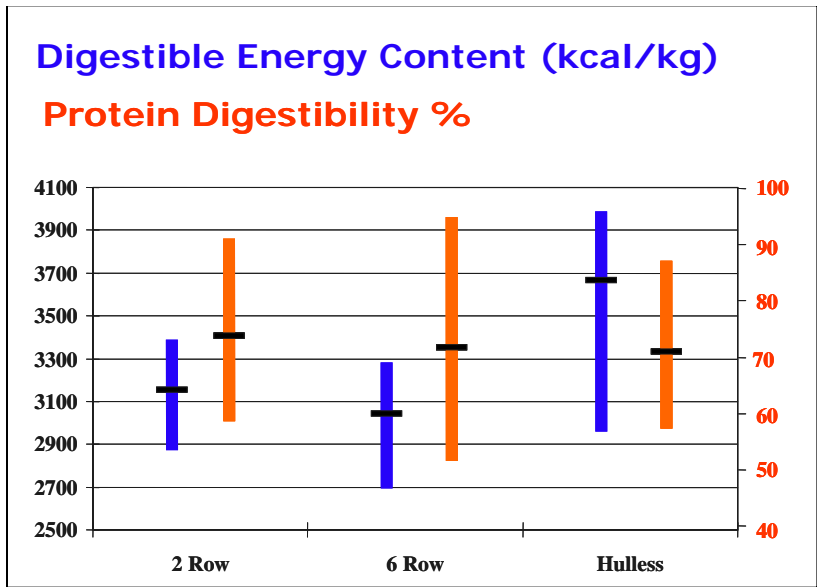


Figure 2.

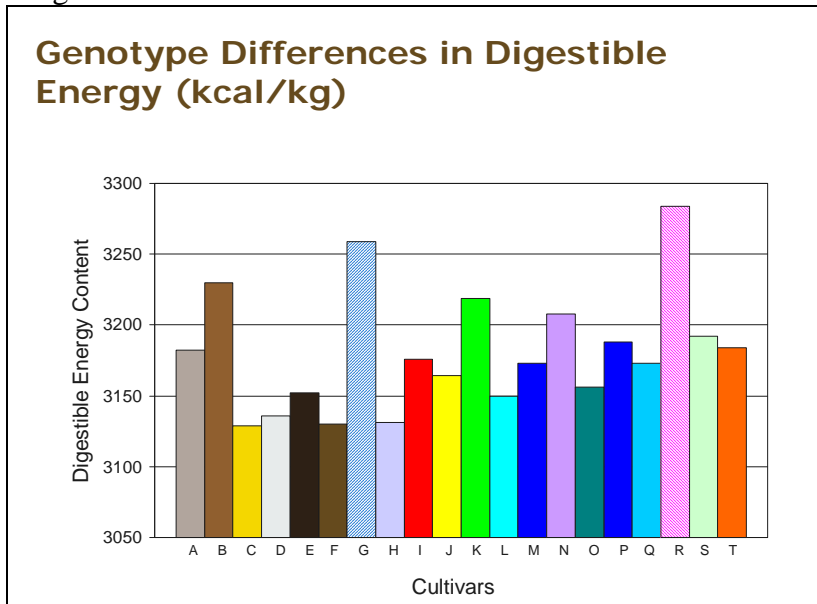


Figure 3.

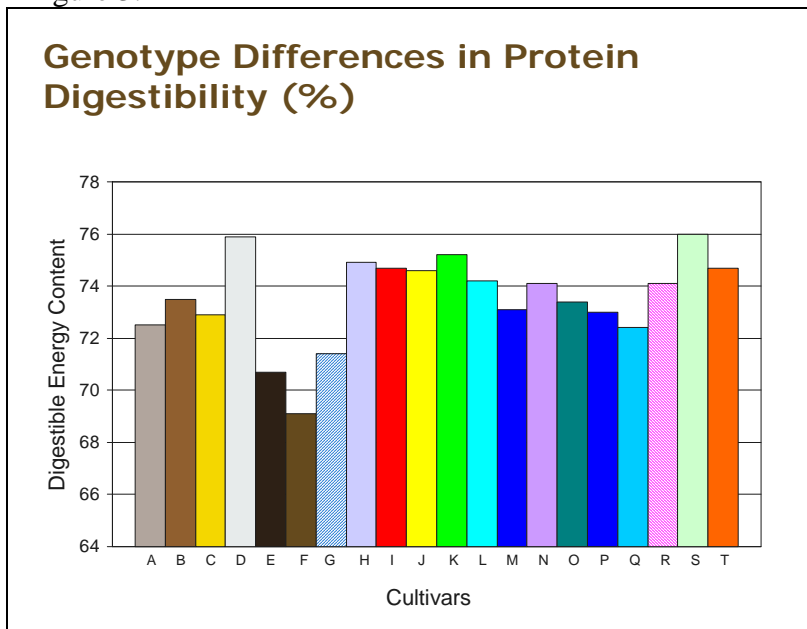


Figure 4.

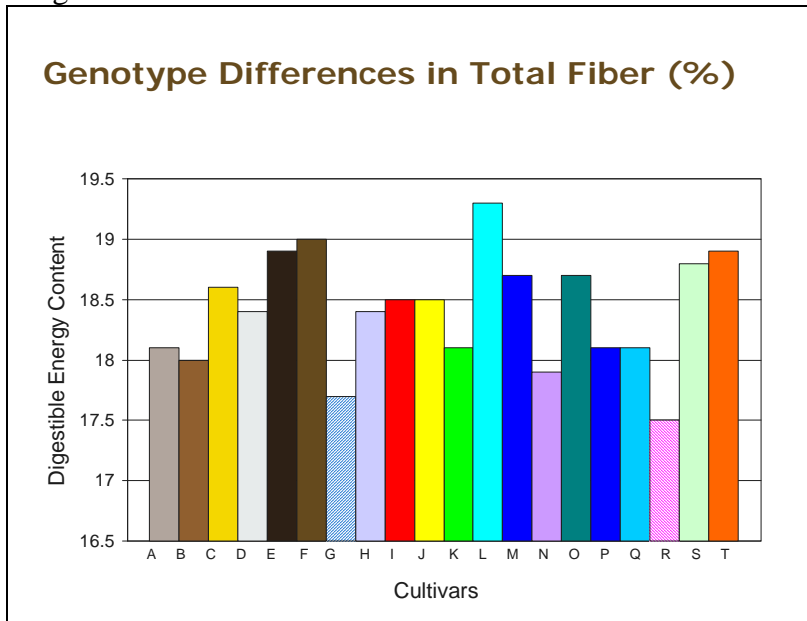


Table 1.

Is what you see..what you get?

Barley Type	1000 KWT g	Bushel Weight lb	Protein ----- %	Protein Dig %	Gross Energy kcal/kg	Digestible Energy kcal/kg	Value of Grain* \$/MT
6 Row Feed Barley	43.6	52.1	11.7	75.6	4000	2700	\$120.00
6 Row Feed Barley	47.7	52.4	10.9	70.8	4000	2900	\$140.23
6 Row Feed Barley	37.8	49.1	12.6	64.4	4000	3000	\$155.80
2 Row Feed Barley	47.1	54.8	13.0	68.1	4000	3000	\$155.80
6 Row Hulless Barley	32.2	64.6	13.2	75.3	4100	3600	\$227.39
2 Row Hulless Barley	49.6	65.5	14.3	76.3	4100	3600	\$227.39

*For this comparison canola oil (pure DE source) at \$880/MT was used