After the sky-high feed costs of 2008, the beef industry has a renewed momentum toward finding ways to produce cattle more efficiently — particularly with a focus on reducing feed costs.

“It should be pretty clear to cow-calf producers that feed cost is the largest variable cost on their operations,” says Jason Ahola, an Extension beef specialist with the University of Idaho. But, he adds that it is a variable over which they have control.

Ahola points out that the “profitability equation” of profit = revenue − expenses means that if expenses like feed can be reduced, then profit increases.

Ahola explains that in the past the seedstock industry has primarily focused on developing genetic predictions for growth and carcass traits, since they were easy and inexpensive to measure. But, unfortunately, these traits only focus on the “revenue” side of the profitability equation. Further, most producers have inadvertently focused on maximizing production of these traits in an attempt to maximize revenue, with limited consideration for cost.

But, today new efforts to develop expected progeny differences (EPDs) to help combat key “cost” traits, such as feed efficiency, are coming of age.

“The ability to reduce feed intake (and, therefore, feed cost) without negatively affecting reproduction, growth, carcass performance or meat quality is becoming a priority in beef cattle selection programs,” Ahola says.

Challenges in measuring feed efficiency

According to Ahola, in the past there have been two major hurdles associated with genetically predicting feed efficiency: 1) historical methods used to calculate and select for feed efficiency are generally lacking, flawed, and/or unproven and 2) the collection of daily feed intake on individual cattle is very expensive.

To calculate an animal’s RFI, Ahola offers the following explanation:

“The ability to reduce feed intake (and, therefore, feed cost) without negatively affecting reproduction, growth, carcass performance or meat quality is becoming a priority in beef cattle selection programs.”

—Jason Ahola

Moving toward RFI

Today, a new method to evaluate seedstock cattle for Residual Feed Intake (RFI) — instead of the traditional Feed Conversion Ratio or FCR — is underway. An animal’s RFI value is the difference (in pounds) between the animal’s actual feed intake and its predicted feed intake. These two numbers are acquired easily but still require that an animal’s daily feed intake and bi-weekly weight be recorded during a uniform test period, Ahola explains.

The RFI method is based on the approach that Australian seedstock producers have taken toward predicting feed efficiency. The Angus Society of Australia already publishes an expected breeding value or EBV (generally equivalent to an EPD) for a trait referred to as Net Feed Intake — commonly called RFI in the U.S.

To calculate an animal’s RFI, Ahola offers the following explanation:

The first value — an animal’s actual feed intake — is collected daily during a
gained an average of 3.2 lb. per day. At the University of Idaho, two steers for RFI during a 70-day test at 35% are common. For instance, in a variation in feed intake of more than 11 lb. of yearling steers receiving a growing diet, the RFI value is considered desirable, Ahola says. 

“Surprisingly, the RFI trait appears to be independent of growth rate (average daily gain, ADG), which enables the selection of more efficient animals without affecting performance or mature weight,” Ahola says. The relationship among RFI and carcass performance or reproduction traits has not yet been studied as extensively; however, preliminary data indicate that RFI is probably independent of these traits as well, he reports.

Ahola says that studies are yielding new insight on feed efficiency. As an example, he says that a typical group of weaning steers receiving a growing ration (high in forage), it appears that variation in feed intake of more than 35% is common. For instance, in a group of 54 Angus steers evaluated for RFI during a 70-day test at the University of Idaho, two steers gained an average of 3.2 lb. per day but consumed 27 lb. and 38 lb. of feed (dry matter basis), respectively. This difference of 11 lb. of feed per day represents the typical variation inherent in any beef cattle population, Ahola says. 

Ahola concludes, “RFI is becoming the broadly accepted ‘gold standard’ for measuring feed efficiency. Due to the variation of RFI within a population and the fact that RFI is moderately heritable, it offers a genetic selection method to improve beef cattle feed efficiency without negatively affecting growth rate, mature size or performance.”

**DNA tests for feed efficiency**

As the beef industry begins to build a database on feed efficiency in cattle, cost is still one of the greatest hurdles to collecting residual feed intake (RFI) data, explains University of Idaho extension beef specialist Jason Ahola.

The most reliable data result from actually measuring RFI in multiple progeny during a standard 70-day post-weaning test, but that can be quite expensive. Thus, researchers have begun to search for useful indicator traits for RFI including blood hormone concentrations and candidate genes to reduce the cost of determining RFI values.

Currently, this DNA marker technology has enabled two companies to offer genetic tests for feed efficiency: Pfizer Animal Genetics offers a GeneStar test, and Meinal offers the Igenity profile.

Since these tests are relatively new, it is not yet clear how much genetic improvement in feed efficiency they will enable seedstock producers to achieve, Ahola says. Also, both tests only include a very small number of markers, even though a very large (but unknown) number of markers actually influence feed efficiency.

Ahola adds that much of the initial research to create these tests was conducted in Australian cattle where the cattle were evaluated for RFI while receiving a grain-based finishing diet. “In the U.S., initial indications are that cattle should really be evaluated for RFI only during the growing phase when a forage-based diet is fed. This schedule enables cattle to be evaluated at a time when body composition (relative amounts of muscle, fat and bone) is similar across the contemporary group,” Ahola says. In contrast, composition is usually more varied during the finishing phase when mostly grain is fed.

Ahola concludes, “RFI is becoming the broadly accepted ‘gold standard’ for measuring feed efficiency. Due to the variation of RFI within a population and the fact that RFI is moderately heritable, it offers a genetic selection method to improve beef cattle feed efficiency without negatively affecting growth rate, mature size or performance.”

**Producer education**

Producer education is also a critical step as the beef industry moves toward implementing new residual feed intake selection methods, Ahola says. At the recent Beef Improvement Federation (BIF) symposium held in early May in Sacramento, Calif., Ahola reported the results of a survey conducted to determine producer awareness of RFI, evaluate willingness to pay for RFI data, and predict willingness to adopt RFI as a production practice.

The survey asked what genetic prediction information is currently used and asked respondents to compare it to the information they would like to use. Results showed that producers still use and seek raw data, ratios and expected progeny difference (EPD) data; however, the demand for genetic marker data is substantially larger than for other types of data.

Producers indicated they’re making efforts now to select for feed efficiency by evaluating mature body size, growth rate and body condition score (BCS). However, more than 60% of respondents said they had “no knowledge” or “limited knowledge” of F:G ratio. Only about one third of respondents said they were aware of the term “residual feed intake.”

The survey also asked how much more respondents would be willing to pay for bulls that had been evaluated for RFI via a 70-day postweaning test. About 28% said they would not be willing to pay anything extra, 24% would pay $1-$100 extra, 19% would pay $101-$200 extra and about 29% said they would pay more than $200 extra. About 51% of the seedstock respondents said they would pay $1-$100 per head to have a bull evaluated for RFI.

The survey was conducted in January-February 2008 by the University of Idaho and the Red Angus Association of America (RAAA) using a stratified random sample of 1,868 names from the Idaho Cattle Association, the RAAA and Red Angus bull buyers. The response rate was 49.9%, consisting of 13% seedstock producers, 59% commercial cow-calf producers and 28% producers that identified themselves as both commercial and seedstock.