

# ANGUS

## BEEF BULLETIN®

"The Commercial Cattleman's Angus Connection"

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PHOTO BY CORINNE PATTERSON

# In Search of Efficiency

*Research balances inputs, outputs with goal of developing genetic predictors of cow efficiency.*

by  
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*Angus Foundation*

Devastating storms and tornadoes, extreme flooding, record droughts. Across the United States, we saw it all in 2011. The unusual weather patterns have been cause for concern to many Angus breeders, who have faced significant hardships on their farms and ranches. Forage has been scarce this winter, reinforcing the desire — the need — for easy-keeping cows that can make the most of the feed resources available. Researchers at North Carolina State University (NCSU) and the University of Illinois (U of I) are working on just that. Starting in 2011, the Angus

Foundation provided these universities with a \$350,000, multiyear investment to research Angus beef cow biological efficiency. This project is a continuation of research already funded by the Angus Foundation and American Angus Association to estimating feed efficiency in Angus cattle at both universities. Both NCSU and the U of I have purebred Angus herds and use similar sires, so it made sense to collaborate and share data. "It doesn't make sense not to work together," says Joe Cassidy, associate professor of animal science at NCSU. "Instead of small data sets from each university, we can get better answers based on a combination data set, which really helps the American Angus Association."

### Start with the basics

Feed efficiency is trying to get more profit out of the same set of resources while facing higher production cost. Prior research in feed efficiency has been heavily focused on terminal cattle rather than the lactating female. Efficiency of feedlot cattle is important, and it is much easier for researchers to collect data on these cattle, compared to collecting feed efficiency data on females in the herd. As Cassidy explains, when feeders are buying corn, there is an immediate reaction to reduce the amount of corn to make more profit. Most cow-calf producers are not writing checks for semi-loads of corn.

"As soon as they have to start buying  
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## In Search of Efficiency *(from cover)*

hay, efficiency starts to become more real," he says, referencing the feed shortages felt this past year.

According to prior research, about 60% to 70% of overall energy costs for beef production go into the cow herd, and of that, about 70% is allocated to maintenance energy, or the energy the cow needs to survive. This does not include the energy needed for growth, lactation or gestation.

Dan Shike, assistant professor of animal sciences at the U of I, says it is hard to define an "efficient cow," as so many factors have to be considered. An efficient cow is one that makes

the most of the nutrients she consumes. She's one that gets pregnant every year, successfully delivers and weans a calf, and is able to utilize her nutrients to maintain herself in all kinds of weather conditions and environments.

Feed conversion, residual feed intake (RFI) and residual gain predictors all take into account, in some form, the three measures that determine nutrient utilization in cows: feed intake, average daily gain (ADG) and body weight or body composition. But, there is still not a clear-cut way to select females for efficiency.

### Working through the challenges

Although researchers have attempted to determine efficiency and nutrient utilization in cows, there are many challenges to overcome.

"There is no genetic information [available] today [that] I'm confident in saying is a good tool for predicting cow efficiency," Shike says. "We can't find low-input, efficient cattle based on phenotype. Small-frame, low-input cattle are often low-producing and have less growth potential."

"We know there are differences in efficiency in genetic lines in the same environment," says Doug Parrett, professor emeritus of animal sciences and extension specialist for beef and performance testing at the U of I. "We just cannot look over the fence and make that determination — that one is efficient, and that one is not."

Additionally, it is hard to determine efficiency when we don't know what the cows are eating.

"When you put cows in a pasture, they don't all eat the same thing. They select the clover or timothy, whatever is available," Cassady says. "We need to not only understand their feed intake, we need to also understand the forages they are selecting."

### Look at potential relationships

The current collaborative study seeks to assess

efficiency on two fronts: postweaning and as a brood cow. In the postweaning assessment, measures of growth, feed intake, feed efficiency, ultrasound backfat and ultrasound ribeye area are collected on developing heifers. Postweaning efficiency is important, Shike explains, because that is when most replacement selection is done.

For the brood cow performance assessment, data on cow milk production, based on the growth performance of their calves, and dry-matter intake are collected from first lactation up until cows are 5 years old.

"Our goal is to develop methods that will allow producers to identify the females who will become the most efficient cows and the sires whose daughters will become the most efficient cows," Cassady says. "At this time, little is known about the relationship between heifer performance during the postweaning developmental period and her performance as a brood cow."

Geneticists will also be involved in the evaluation of efficiency to hopefully find genomic indicators or tests to aid in selection.

"I hope, when we're done, we will come up with information producers need to select for efficiency without having to impact the other traits," Parrett says.

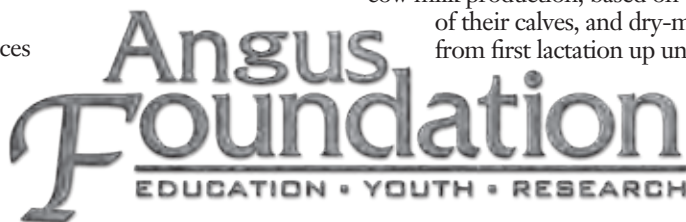
Finding that information will likely take some time based on the amount of data collection needed, and the Angus Foundation has funded the project for five years.

"On the feedlot side, researchers are able to generate a lot of data," Shike says. "When you're talking about retaining replacements and taking data on cows up to 5 years of age, it takes a lot of time."

Despite the challenges, studying brood cow efficiency and the potential relationships between postweaning and lactating cow performance has merit that Cassady, Shike, Parrett and other researchers at the two universities have recognized. They know the need to have efficient cows will never go away.

"While recent weather conditions and feed prices have heightened producers' concerns regarding feed utilization, the challenges have not changed," Cassady says. "Producers need to identify females that will utilize resources efficiently."

**Editor's Note:** *The research project is one of many supported by the Angus Foundation, a 501(C)(3) not-for-profit affiliate of the American Angus Association that secures and stewards charitable gifts to cultivate and foster the advancement of education, youth and research activities benefiting the Angus breed. For more information about the Angus Foundation visit [www.angusfoundation.org](http://www.angusfoundation.org).*



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## What we can apply today

- Choosing the right sire is critical, because your sire(s) contributes half of the genetics of your future calf crop. But, breeders also need replacement females that will improve herd efficiency.
- Maintenance costs and body weight are related. The increase in cow size must be accompanied with an increase in calf performance to maintain efficiency.
- The Cow Energy Value (\$EN) can be used to help reduce herd inputs. The American Angus Association's \$EN, expressed in dollars saved per cow per year, assesses differences in cow energy requirements in daughters of one sire compared to another. A larger value is more favorable when comparing two animals (more dollars saved on feed energy expenses). Components for computing the \$EN savings difference include lactation energy requirements and energy costs associated with differences in mature cow size.
- Research at North Carolina State University (NCSSU) has found that calmer heifers have lower feed intake but similar average daily gain (ADG) compared to more excitable heifers. Therefore, calmer heifers have a better feed conversion ratio, so selecting for more docile cattle can help improve herd efficiency.
- Another finding at NCSU is that feed intake can be determined for total lactation (112 days) in a 42-day window. This finding has allowed NCSU to analyze feed intake data on more cows during calving season.