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21ST CENTURY GENETICS:

RIISING TO THE CHALLENGE SOUTHERN STYLE

Defining Feed Efficiency

by Micky Wilson



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CHOCTAW, MISS. (April 20, 2006) — Gordon Carstens, Texas A&M University, presented information defining feed efficiency at the general session "Where Do I Fit With My Production Environment?" at the 2006 Beef Improvement Federation (BIF) annual research symposium.

Feed inputs and outputs are measured in targeted stages of the beef production cycle, Carstens said. Since it is not practical to measure forage intake of mature cows, emphasis is placed on growing animals.

"Expectations are that appropriate use of a feed efficiency trait in growing cattle, which accounts for genetic variation in efficiency of feed utilization to support maintenance and growth requirements, will generate progeny that are efficient in all segments of the industry," Carstens said.

Efficiency is a ratio of outputs to inputs. Live-weight gain and daily dry-matter intake (DMI) are typically used to measure efficiency ratios.

"A phenotypic linear regression equation, computed using intake and performance data from a contemporary set of animals, is used to determine an animal's expected feed intake based on its weight and growth rate over a given test period," Carstens explained. "The animal's actual feed intake net (more or less) its expected intake is referred to as residual feed intake (RFI)."

Animals that require less feed than expected to put on one pound of gain are considered efficient and show a negative RFI number. On the other hand, inefficient animals require more feed than expected to put on one pound of gain and show a positive RFI number.

"A notable feature that distinguishes RFI from other feed efficiency traits is that it is phenotypically independent of the production traits used to compute expected intake," Carstens noted.

Through research field trials, Carstens observed that FRI is highly correlated phenotypically with feed conversion ratio (FCR, feed-to-gain ratio), even though FCR is negatively correlated with growth traits. Further, RFI has been shown to be moderately heritable, suggesting that selection for improved post-weaning RFI has the potential to produce progeny that are efficient in all segments of the industry.

"Studies indicate that RFI is a trait that appears to reflect inherent variation in biologically relevant processes that are related to feed efficiency," Carstens said, "but not growth."

In closing, Carstens said considerable genetic variation exists in cattle feed intake that is unaccounted for in weight and growth rate. RFI provides opportunities to improve profitability through reductions in feed inputs, while having minimal effects on growth and mature size. 