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## Heifers sired by bulls with low residual feed intake estimated breeding values have lower residual feed intake than heifers sired by bulls with high residual feed intake estimated breeding values

### Abstract

Feed is one of the largest costs in a cow/calf or feedlot operation. However, very little data is available to aid producers in genetically improving their herd for feed efficiency. In Australia, bull tests record individual feed intakes, which are used to calculate Estimated Breeding Values (EBV) (analogous to EPD) for residual feed intake (RFI). Residual feed intake measures the degree to which feed intake deviates from expected levels based on the animal size and rate of gain. Negative values are good; they indicate the animal ate less than expected for its size and growth rate. Our objective was to determine differences in feed efficiency traits of progeny from bulls with divergent genetic merit for RFI.

### Keywords

Cattlemen's Day, 2008; Kansas Agricultural Experiment Station contribution; no. 08-212-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 995; Beef; Cattle; Estimated breeding values (EBV); Residual feed intake (RFI)

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**HEIFERS SIRED BY BULLS WITH LOW RESIDUAL FEED INTAKE  
ESTIMATED BREEDING VALUES HAVE LOWER RESIDUAL FEED INTAKE  
THAN HEIFERS SIRED BY BULLS WITH HIGH RESIDUAL FEED INTAKE  
ESTIMATED BREEDING VALUES<sup>1</sup>**

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**Introduction**

Feed is one of the largest costs in a cow/calf or feedlot operation. However, very little data is available to aid producers in genetically improving their herd for feed efficiency. In Australia, bull tests record individual feed intakes, which are used to calculate Estimated Breeding Values (EBV) (analogous to EPD) for residual feed intake (RFI). Residual feed intake measures the degree to which feed intake deviates from expected levels based on the animal size and rate of gain. Negative values are good; they indicate the animal ate less than expected for its size and growth rate. Our objective was to determine differences in feed efficiency traits of progeny from bulls with divergent genetic merit for RFI.

**Experimental Procedures**

Angus bulls with high and low RFI EBV were selected from the Australian Angus Association sire summary. Average EBV of the three low RFI (efficient) bulls was -1.06 lbs, and the average EBV of the two high RFI (inefficient) bulls was 0.73 lbs. These sires were mated to Angus cross commercial cows from the Kansas State University Cow-Calf Unit in

spring of 2005. Resulting heifer calves (n=50) were blocked by sire into two groups, and feed intake data were collected on each group for 42 days using the Calan gate (American Calan, Inc., Northwood, NH) feed intake measuring system. After the feed intake test was completed, the gain test was continued; heifers were on gain test for a total of 58 days. Heifers were allowed free-choice access to a high-roughage, complete diet. Bi-weekly body weights were used to calculate a regression to determine mid-test body weight and average daily gain (ADG). Actual feed intake was regressed on mid-test metabolic body weight and ADG for the test group to calculate a predicted feed intake for each heifer. RFI was calculated for each heifer by subtracting predicted intake from actual intake. Test group was used as a fixed effect in all analyses.

**Results and Discussion**

Least square means for heifer RFI were -0.53 lbs for heifers sired by low RFI EBV bulls and 0.64 lbs for heifers sired by high RFI EBV bulls (P = 0.18). Least square means for heifer feed:gain ratio were 12.14 lbs/lb for heifers sired by low RFI EBV bulls and 12.52 lbs/lb for heifers sired by high RFI EBV bulls (P = 0.87). Average daily gain of heifers sired

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<sup>1</sup>The authors thank the American Angus Association and Angus breeders for their support of this project.

by low RFI bulls (2.6 lbs/day) was similar to that of heifers sired by high RFI bulls (2.7 lbs/day;  $P = 0.47$ ). Regression of heifer RFI on sire RFI EBV was 0.63 lbs of heifer RFI per pound of sire RFI EBV, which is similar to the expected 0.50 lb of heifer RFI per pound of sire RFI EBV.

### **Implications**

Differences in daughter RFI were similar to that predicted by sire RFI EBV. Additional research will be conducted to determine correlations between RFI and other traits, such as fertility and carcass traits.