STUDY SAYS LOW RFI BULLS SIRE FEED-EFFICIENT CALVES

The results are just in from one of the first trials to validate the selection of bulls for feed efficiency as measured by residual feed intake (RFI). No surprise, but this four-year study showed low RFI sires produce low RFI offspring. And those more efficient offspring shaved $8.50 per head from a commercial feedlot's feeding costs during the finishing period. Equally significant, improved efficiency was passed on with no loss in rate of gain or carcass quality.

The study, led by Dr. John Basarab, a beef research scientist with Alberta Agriculture and Rural Development, involved a number of industry co-operators.

Beefbooster supplied the yearling bulls that were RFI rated using GrowSafe bunks at the Olds College bull test facility. The bulls were bred to cows provided by BeefBooster and Three Cross Cattle of Airdrie, Alta. and the resulting calves were finished at the Morison Feedlot, near Airdrie. In the final phase of the trial the finished steers and heifers were processed at XL Lakeside at Brooks earlier this year. The research team collected carcass data at the plant and striploins were recovered from each carcass for evaluation at the Lacombe Research Centre. The University of Alberta's Bovine Genomics Program DNA tested the bulls and progeny.

RFI is a measure of feed efficiency in that it represents the amount of dry matter consumed above or below the animal's requirements for maintenance and production. In beef cattle, this is calculated as the difference between an animal's actual feed intake and its expected feed intake based on body size and growth over a set period. Animals that consume less than expected have a lower RFI value than animals eating more than expected. Hence, animals with a negative RFI, expressed in kilograms DM per day, are more efficient, and more desireable, than cattle with a positive RFI. The lower the value, the better.

Grader Fred Talyor (r.) and researcher Dr. John Basarab assess the RFI carcasses.

The trial

The trial began during the winter of 2006-07 when 73 yearling Beef-Booster bulls were tested for individual feed intake and growth over an 87-day test period. The RFI of each bull was calculated and they were ranked from the most efficient (low RFI) to least efficient (high RFI). Nine low RFI and nine high RFI bulls were selected for the breeding program. The mean RFI value for the nine low RFI bulls was -0.64 kg DM/day versus +0.70 kg DM/day for the nine high RFI bulls. All of the bulls in the test underwent blood sampling for DNA testing and breeding soundness exams.

The cows were split into three groups for the 59-day breeding period. There were an equal number of low RFI and high RFI bulls in each breeding group. The cows calved from the end of April through June, 2008. That November, 244 calves were weaned and placed into a backgrounding program for six months. Each calf was blood sampled to determine parentage.

The finishing period began with a 28-day warm-up period in April of this year. All of the 113 heifers and 138 steers were housed in pens fitted with GrowSafe bunks so individual feed intake could be recorded for the 85 days of the trial. The feeders were weighed twice at the beginning, then every 28 days until they were shipped for processing between the first week in August this year through to the middle of September.

Results

The results found no relationship between sire RFI and the number of progeny produced. Both the high and low RFI groups had one bull who sired 38 calves. The others fell in line behind. Five low RFI bulls and two high RFI bulls sired 16 to 23 calves apiece. Three low bulls and six high ones sired anywhere from zero to nine calves. Overall, low RFI sires produced 60 per cent of the progeny in the trial.

The second significant finding was that there is a high correlation between sire RFI and offspring RFI. Seven of the eight low RFI sires that went into the breeding pastures produced offspring that had low RFIs for the finishing period. Likewise, all but one of the high RFI bulls sired high-finishing RFI calves.

Feeder cattle from low and high RFI sires had similar start-of-test weights and grew at the same rate during the 85-day test. However, the calves from low RFI sires consumed an average 0.61 kg per day less than calves from high RFI sires. That translated into an RFI value of -0.12 kg DM/day for the low RFI sired feeders compared to +0.30 kg DM/day for high RFI sired feeders. Put another way, feed efficiency was improved by 0.42 kg DM/day just by using low RFI sires.

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The final step was to determine the economic benefit of selecting low RFI sires. The ration for the test period was priced at the going rate of $210.04 per ton of DM. Spread over a typical 120-day finishing period, the calves from low RFI sires cost $16.98 per head less to feed than calves from the high RFI sires.

Compared with calves from bulls not measured for RFI, it would cost about $8.50 per head less to feed calves from low RFI sires. This is because the average sire in the population not measured for RFI is assumed to have a genetic merit RFI value of zero — halfway between low and high RFI sires in this study.

Selecting low RFI bulls had no negative effect on carcass weight, grade fat, ribeye area, marbling, yield grade or saleable meat yield.

Future

One caution, these are preliminary results, and the researchers want to expand this study to other herds. Still to be investigated are the relationship between RFI value and meat quality, heifer and bull fertility, and lifetime productivity in cows.

Dr. Stephen Moore's team with the Alberta Bovine Genomics Program recently developed a Mark 2 panel for DNA testing of RFI. The Mark 1 panel is already available. The Mark 2 panel, when available, should more accurately predict genetic merit of an animal for RFI, and the proportion of the genetic variation explained by the markers.

BeefBooster CEO Jennifer Stewart-Smith, says the interest now is in the work being done to link RFI to genetic markers. DNA testing to identify low and high RFI animals costs less than running trials in GrowSafe pens.

She agrees the results of the trial are encouraging, but says it's just the first step in understanding the value of RFI to the beef industry. "When it comes right down to it, fertility trumps everything else, and we don't know how RFI affects the female side," she explains. Beefbooster is looking forward to further testing of larger numbers of cattle to determine whether there is a genetic layering effect — that is, how one trait (RFI in this case) interacts with others.

At Three Cross Cattle, Todd McKinnon had his own reasons for getting involved in this experiment. "With any new technology, my interest from a producer's point of view is to see how it applies to our operation and if it's practical," he says. "With RFI, we may be able to select breeding stock to produce more efficient calves for the feedlot."

As a cow-calf producer and feeder, Stuart Thiessen of Namaka Farms near Strathmore, has already installed GrowSafe feed bunks to test their own calves. "I really hope RFI will work and we can make it fit into the production system. The challenge will be how the market will reward low RFI cattle," he says. "If the market pulls it, cow-calf producers will look for low RFI bulls."

He foresees the day when buyers will be willing to pay more for low RFI calves. But to get there from here, he says, will require some sort of cross-herd scoring system to understand which herds are different from others.

"Assuming RFI works, we will be able to improve production and not hurt what our customers want. At the end of the day — though there's something to be said for good marketing — you have to have good production numbers."

— Debbie Furber