Beeftips
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NCBA Carcass Merit Project completed

Dan W. Moser, assistant professor, genetics
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In 1998, the U.S. cattle industry initiated the Carcass Merit Project, a large multibreed study to evaluate the genetics of tenderness in the nation's beef cattle population. The project was jointly funded by the $1 per head beef checkoff, and participating breed associations. The primary objectives of the project were to generate data from which genetic evaluations for tenderness and sensory traits could be computed, and to validate DNA markers discovered in previous checkoff-funded research for use in marker-assisted selection programs to improve carcass traits in the industry. Scientists from Cornell University, Kansas State University, Texas A&M University, Colorado State University and the U.S. Meat Animal Research Center conducted the research.

Fourteen U.S. beef breeds participated in the Carcass Merit Project. Commercial cows were inseminated to several of the most widely used AI sires of each breed. Fifty progeny each of 10 sires were used for DNA analysis and shear force (tenderness) observations. A taste panel assessed tenderness, juiciness and flavor on progeny of five of the sires. In addition, shear force measurements were collected on progeny of additional sires for shear force EPD calculation.

Progeny were fed at numerous commercial feedyards and harvested at several cooperating packers. The project was not designed to provide comparisons between breeds, so no valid breed comparisons can be made from these data. A breed's average relative to the overall project average is due to management of that breed's groups as much as genetics.

Final results of the project were released in May 2004. More than 7,200 progeny of 279 sires representing 14 breeds were harvested for collection of carcass and meat quality data. Carcass and shear force analyses were conducted on 7,015 and sensory panel data collected on 2,406. Carcass traits of the project cattle were representative of the beef industry, with average hot carcass weight of 771 lb., fat thickness of 0.48 inches, ribeye area of 13.2 square inches, yield grade of 2.8 and marbling score of small. Although the cattle were young, mostly from AI sires, and managed optimally, 26 percent of the steaks had shear force values greater than 11.0 lb. (considered tough), and 19.4 percent had sensory panel tenderness scores of less than 5.0 (5 = slightly tender; 4 = slightly tough).

Analysis of the phenotypic data showed significant variation among all breeds for shear force. Ranges of sire progeny means for shear force within breed varied from 1.90 to 6.62 lb., indicating that every breed has significant variation in tenderness and opportunity to improve. The relationship between shear force and marbling score was weak at best, indicating selection for marbling alone will not significantly improve tenderness. Shear force was moderately to highly heritable, consistent with other studies. If adequate amounts of shear force data can be collected, significant improvement in tenderness is possible through selection.

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Upcoming Events

Range Management School
Aug. 25-27
Scott City, Kan.
Details on page 2

Applied Reproductive Strategies in Beef Cattle
Sept. 1-2
Details on page 5

Beef Stocker Field Day
Sept. 17
KSU Beef Stocker Unit
Manhattan
West Marlatt Ave.
Lois Schreiner
785-532-1267
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"...selection for marbling alone will not significantly improve tenderness."

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In addition to collecting data for shear force EPDs, the project also evaluated whether previously identified candidate gene locations could be used to improve carcass traits in the general cattle population. Of the 11 locations evaluated, five showed highly significant effects on carcass traits such as tenderness and marbling. Two others, while less significant, also appeared promising. Additional research will be needed to develop these locations into diagnostic tests that can be widely used.

The economic portion of the project also revealed useful findings. Improvement of tenderness has the potential to significantly increase market price, quantity and revenue of fresh beef sales. Improvement of tenderness both increases the value of beef and stimulates greater demand, leading to higher consumer expenditures. A 10 percent improvement in tenderness would result in approximately a 1 percent improvement in industry revenue.

The most direct and immediate way for cattle producers to use this information is for more breed associations to compute and publish EPDs for shear force and sensory traits from the data generated by the Carcass Merit Project. Currently, four breeds (Simmental, Simbrah, Shorthorn and Hereford) have calculated and publicly released shear force EPDs on a total of more than 200 sires. Some project sires have thousands of recorded progeny in their respective breed associations. In time, the candidate gene regions may be developed into commercial tests to identify sires that have favorable individual genes. Until then, selection using carcass EPDs, including tenderness EPDs, remains the most powerful tool for genetic improvement.

Besides the stated objectives, several other benefits have resulted from the Carcass Merit Project. The project has raised the awareness of genomics in the beef industry, and has tested and refined methodology to evaluate results of such studies. The project's most significant result may be the sizeable database of phenotypic information and DNA samples stored for a wide cross-section of U.S. beef germplasm. Already, data and samples stored by breed associations are being used to validate gene tests marketed to cattle producers. The potential to further study this resource to refine the positions of candidate gene locations and create genetic tests for them should accelerate the genetic improvement of carcass merit in beef cattle.

More information can be found at *www.beef.org/documents/ACF4913.pdf* and *www.bifconference.com/bif2004/BIF symposium_pdfs/carcassmerit.pdf*.

Rangeland management school scheduled for August

Western Prairie Resource Conservation and Development (RC&D) Area, Inc. is holding a three-day Rangeland Management Advanced School Aug. 25-27, 2004, at the Methodist Camp Lakeside at Scott Lake in Scott City, Kan.

Educators from Kansas State University, University of Missouri, Natural Resources Conservation Service and ranchers will provide information on developing management plans. The school is split into classroom and in-field activities.

The first day will be an introduction to rangeland management. The second day will be intense one-on-one training about planning options. Participants will learn how to identify problems, opportunities and concerns on managing rangeland. They will inventory resources, evaluate alternatives, and plan implementation and evaluation.

On the final day, participants will work with range condition calculations, grazing duration and stocking rates, grazing dates, percentage grazing and plotting grazing schedules.

Registration of $100 per student will cover two nights' lodging, meals and materials.To register and for more detailed information, contact Duane Cheney at 785-462-2602, *duane.cheney@ks.usda.gov*, Western Prairie Resource Conservation and Development, Inc.

Crop selection, stage of harvest, preservation and feeding management: keys to making quality silage

Twig Marston, cow-calf management specialist

Silage is an important cropping system in Kansas. Consider the following information when making silage.

Value of the stored crop

- Corn is the standard for high quality silage.
- Forage sorghums have about 75 percent of the energy value of corn. Hybrid or variety selection is critical for forage sorghum. Avoid phenotypic extremes.
- Sudan grass and sudan-sorghum crosses have 65 to 80 percent the value of corn silage.
- Drought-stricken crops can make excellent silage, but silage energy content is directly related to grain content.

Moisture content and stage of plant maturity

- Whole-plant corn silage should contain 30 to 36 percent dry matter (66 to 70 percent moisture) when the kernel is in the 60 to 80 percent milk-line stage of maturity.
- Grain sorghum should be harvested at the mid- to late-dough stage of kernel maturity.
- Moisture content of sudan grass and sudan-sorghum crosses can be a major problem; wilting will produce satisfactory results. Regardless of the length of the field-wilting period, these forages must be cut at the correct stage of maturity (soft dough).

Chopping

- Chop corn or sorghum silage at 1/4 to 3/8 inch.
- The value of fine chopping increases as the plant matures.
- Keep knives sharp to increase machine efficiency, improve packing, decrease cell bruising, and increase palatability.

Storing for effective preservation

The three most important rules of bunker silo management are pack, pack, pack.

- Pack firmly to reduce oxidative losses.
- When packing horizontal silos, add thin layers between packing runs.
- Pack horizontal silos continuously while filling, and continue packing after the last load of the day.
- Crown the silo so rain will drain off and unsupported and unpacked edges will be eliminated.
- Fill the silo as rapidly as possible. Delayed filling increases dry matter losses and reduces silage quality because of reduced respiration and oxidative losses.
- Make piles as deep as practical. This will reduce the percentage of silage exposed to air and help get a firmer pack.
- Use a bacterial inoculant on every load. Inoculant should provide at least 100,000 colony-forming units of viable lactic acid-producing bacteria per gram of forage.
- Seal tops of horizontal silos with plastic sheets and tires. Covering silage piles reduces dry matter losses to 20 percent in the top 3 feet. If unsealed, losses will be 50 percent.
- Losses in good silage range from 5 to 15 percent, whereas losses in bad silage run 25 to 50 percent. Losses are caused by effluent, respiration, primary and secondary fermentation, and aerobic activity during storage and feed out.

Feeding management

- The height, width and depth dimensions of the silo should be small enough to allow a rapid progression through the silage mass during feed out.
- Minimize disturbing the silage face or pile.
- Leave the silage face as even and perpendicular to the floor and sidewalls as possible.

"The three most important rules of bunker silo management are pack, pack, pack."

Research Highlights

Fenceline contact of beef calves with their dams at weaning reduces the negative effects of separation on behavior and growth rate.

E.O. Price, J.E. Harris, R.E. Borgwardt, M.L. Sween and J.M. Connor.
J. Anim. Sci. 2003:81:116-121.

The purpose of this study was to determine if fenceline contact of cows and calves at weaning reduced the behavioral stress and temporary reductions in weight gain normally associated with weaning. In each of three years, two groups of 10 calves were assigned to each of the following five treatments: 1) nonweaned controls on pasture, 2) fenceline separation from dams on pasture, 3) total separation from dams on pasture, 4) total separation from dams in drylot preconditioned to alfalfa hay 10 days before weaning, 5) same as 4 but no prior preconditioning to hay. Treatments were administered for seven days following weaning. Both unweaned pasture controls and the fenceline calves spent more time eating than separated calves. The calves weaned on pasture but totally separated from dams spent more time walking and less time lying down than most other treatments. Weight gain postweaning was greater in the fenceline contact pasture weaned calves than any of the separated groups at two weeks postweaning and was still greater at 10 weeks postweaning. Fenceline contact between the dam and calf at weaning minimized behavioral distress compared to total separation and minimized reductions in weight gain often associated with weaning. Calves that were totally separated from dams at weaning did not compensate for the early weight loss even after 10 weeks.

Summary by Sandy Johnson

Mean percentage of observations in which calves exhibited various behaviors and cumulative postweaning weight gain

Behavior	Nonweaned, Pasture	Fenceline Contact, Pasture	Separated, Pasture	Separated, Drylot, Preconditioned	Separated, Drylot, No Preconditioning
Eating	41.1 [a]	37.3 [a]	23.7 [b,c]	28.9 [b]	21.5 [c]
Walking	8.6 [a]	10.1 [a,b]	28.1 [c]	9.6 [a,b]	14.8 [b]
Lying down	22.9 [a]	23.3 a	16.0 [b]	21.9 [a]	20.6 [a,b]
Vocalizations/ h/10-calf group	0.1 [a]	216.7 [b]	434.6 [c]	371.2 [b,c]	518.2 [c]
Cumulative weight gain, lb					
2 weeks	44 [b]	47.1 [b]	29.5 [c]	23.3 [c]	19.8 [c]
10 weeks	142.6 [b]*	110 [c]	90.4 [d]	79.4 [d]	81.8 [d]

[a,b] Within row, means with different superscripts differ P < 0.05

**Calves weaned by total separation on pasture, eight weeks after weaned treatment groups.*

Beef cattle reproduction symposium scheduled

New methods and technologies to control and improve reproductive success in beef cattle are the focus of the "Applied Reproductive Strategies in Beef Cattle Symposium" scheduled for Sept. 1-2, 2004, at the Sandhills Convention Center in North Platte, Neb.

The symposium is designed to improve the understanding of the physiological processes of the estrous cycle, currently available procedures to synchronize estrus and ovulation along with proper application of these systems, and to improve the understanding of methods to assess male fertility and how it affects the success of AI programs. The program features nationally recognized speakers from several universities and companies.

Topics featured in the symposium include: estrous synchronization systems and costs, measuring breeding soundness, improving conception rates, nutrition and reproductive interactions, early pregnancy diagnosis, and more. The program will also include panel discussions with producers and veterinarians as well as instruction on ultrasound, reproductive tract scoring, and semen quality assessment techniques. CE credit is available for veterinarians.

The symposium is sponsored by the North Central Region Bovine Reproduction Task Force and the Cooperative Extension Services of multiple states.

For more information and to register, contact Rick Funston, University of Nebraska, West Central Research and Extension Center, 461 W. University Dr., North Platte, Nebraska 69101, 308-532-3611, Ext. 140, or *rfunston2@unl.edu*. Registration fee is $150. Checks should be made to University of Nebraska.

Lodging reservations can be made by contacting Sandhills Hotel and Convention Center at 800-760-3333.

Focus on Feedlots

The latest report from Focus on Feedlots can be found at: *www.oznet.ksu.edu/dp_ansi/nletter/fof.htm*
To receive e-mail notification of the monthly report contact Linda Siebold, *lsiebold@oznet.ksu.edu* or 785-532-1281.