

## **BEEF CATTLE RESEARCH UPDATE**

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### **BREEDING/GENETICS**

#### **Selection for Increased Milk Production May be Antagonistic to Udder Quality**

The expected progeny difference (EPD) for maternal weaning wt. (sometimes referred to as “milk” EPD) is calculated from the preweaning gain of calves. This EPD can then be used by producers as an aid in selection to alter milk production levels of cows. In spite of over 20 years of using maternal weaning wt. in this manner, there is still a degree of distrust of this statistical prediction among some producers. There is also some concern that selection for increased milk production may result in a deterioration of udder and teat quality, thereby reducing longevity in the herd.

USDA scientists at the Miles City, Montana Research Station used 10 years of data from their Line 1 Hereford herd with the objectives of: 1) confirming the usefulness of the EPD for maternal weaning wt. as a predictor of genetic merit for milk production; and 2) evaluating the relationship between udder structure and milk production. Milk production was measured four times per year on each cow. Within 24 hours of calving, the udder of each cow was scored subjectively on a 1 to 9 scale (1=Very pendulous udder and balloon teats; 9=An ideal mammary system).

Heritability estimates for preweaning gain, milk production, and udder score were 0.25, 0.25, and 0.23, respectively, indicating that reasonable progress can be made to improve these traits through selection. The genetic correlation between maternal weaning wt. and milk production was 0.80, which indicated that the EPD for maternal weaning wt. is an effective predictor of genetic differences in milk production. Genetic correlations of maternal weaning wt. and milk production with udder score were -0.26 and -0.36, respectively, indicating that a moderate genetic antagonism exists between selection for increased milk production and udder quality. These results indicate that selection pressure on maternal weaning wt. EPD will change milk production, but some caution is advised in selecting for extremely high milk production due to a potential erosion of udder quality (SOURCE: Fort Keogh Research Newsletter, Dec., 2005).

#### **Intense Selection for Reduced Birth Weight Could be Antagonistic to Bull Fertility Traits**

Profitability of the cow-calf enterprise is highly dependent on the percentage of calf crop weaned, which in turn depends on the fertility of parents and survival of progeny. Scrotal circumference and semen traits may be indicative of sire fertility, and birth wt. may be indicative of calf survival. In a

collaborative study, scientists at Montana State Univ. and the Miles City Research Station used records on 841 Line 1 Hereford bulls to estimate heritability for scrotal circumference (SC) and semen traits and their genetic correlations with birth wt. (BW).

The heritability estimate for SC was high (0.57) and in line with previous estimates. The heritability estimate for BW was moderate (0.34). Heritability estimates for semen traits were low to moderate (0.0 to 0.37). Genetic correlations of SC with semen traits were generally moderate to high (0.20 to 0.77), indicating that selection for SC should result in a correlated improvement in semen quality. Genetic correlations of BW with SC and semen traits were also moderate to high (0.20 to 0.60), indicating that intense selection for reduced BW would be antagonistic to SC and semen quality. These results suggest that placing extreme selection pressure on reducing BW would eventually result in a decline in male fertility (Kealey et al. 2006. J. Anim. Sci. 84:283).

### **A Single Change in the Calpastatin Gene Affected Beef Tenderness**

Calpastatin is a protein in meat that inhibits tenderization by tending to prevent the breakdown of muscle fibers during postmortem aging. Recent research has shown that a single nucleotide change (C to G) in the calpastatin gene may be associated with increased toughness in beef. Univ. of Guelph and Washington State Univ. researchers used data from a total of 628 feedlot cattle to determine the relationship between this single nucleotide change and meat tenderness as well as other carcass traits. Warner-Bratzler shear force was used to evaluate tenderness.

The homozygous CC genotype was significantly more tender than the homozygous GG genotype, and the heterozygous CG was intermediate. At 7 days postmortem, the percentage of unacceptably tough steaks was decreased by 24 and 35% in cattle carrying 1 and 2 copies, respectively, of the C allele compared to cattle with zero copies of the C allele. However, the C allele tended to reduce ribeye area and lean yield and increase fat yield. The authors concluded that the C allele is associated with tenderness during postmortem aging and, importantly for the beef industry, resulted in a significant reduction in the percentage of steaks rated unacceptably tough (Schenkel et al. 2006. J. Anim. Sci. 2006. 84:291).

## **COW-CALF**

### **Interactions Between Nutrition and Reproduction in Beef Cows**

Virginia Tech animal scientist, John Hall, presented an excellent review of the interactions between nutrition and reproduction at the Applied Reproductive Strategies Conference. Following is a brief summary of key management strategies he presented (Hall, J.B. 2005. Proc. Applied Reproductive Strategies in Beef Cattle, Nov. 1-2, 2005, Lexington, KY).

#### **1. Ensure sufficient energy is available to support reproduction.**

- a) Body condition score (BCS) females and achieve BCS 5 in cows and BCS 6 in heifers by calving time (latest) or 60 days before calving (preferred).
- b) Maintain body condition from calving through breeding for cows in proper body condition, and increase body condition in cows that are below optimal BCS at calving.
- c) Feed thin cows and first-calf heifers in separate group(s) from the main herd.
- d) Provide energy supplementation from the most economical local source in order to minimize costs.

**2. Provide optimum level of dietary protein.**

- a) Rather than balancing diets on crude protein (CP), balance diets on metabolizable protein (MP), if possible, which is a measure of the protein reaching and absorbed by the small intestine.
- b) Provide sufficient digestible intake protein (DIP) for adequate rumen function, especially in females on medium to low quality forages.
- c) Avoid over-supplementation of protein, which may reduce pregnancy rates.
- d) Inclusion of by-pass or undegradable intake protein (UIP) may not prove to be effective.

**3. If possible, include ionophores (e.g., Rumensin® or Bovatec®) in the diet, which can help decrease postpartum intervals in mature cows and first-calf heifers.**

**4. Base mineral supplementation on forage mineral content and local mineral deficiencies.**

- a) Supplement phosphorus only when needed.
- b) Pay attention to trace mineral levels, especially copper, selenium, manganese, and zinc.

**Body Condition Score at Parturition Influenced Cow Reproduction,  
But Postpartum Supplemental Fat Had No Effect**

In a 2-year study, Univ. of Wyoming researchers nutritionally managed 3-yr.-old crossbred cows to achieve a body condition score (BCS) of either 4 or 6 at parturition to evaluate the effects of prepartum energy balance and postpartum fat supplementation on cow and calf performance. At 3 days postpartum, cows within each BCS group were allotted to be fed hay plus a low-fat control supplement or hay plus high-fat safflower seed supplements containing either oleic or linoleic fatty acids. Diets were formulated to be equivalent in energy and protein. Safflower seed diets were formulated to provide 5% of dry matter intake as fat, and were fed until day 60 of lactation.

- Ultrasonic rib fat thickness and ribeye area were significantly lower for BCS 4 cows throughout the study.
- BCS 4 cows maintained their condition over the course of the study, whereas BCS 6 cows lost some condition.
- BCS score had no effect on milk yield or composition, except for protein percentage, which was lower for BCS 4 cows.
- BCS had no significant effect on first-service conception rate, but overall pregnancy rate was greater in BCS 6 cows (88.9 vs. 63.9%).
- BCS did not influence calf birth wt. or calf avg. daily gain.
- Dietary fat supplementation did not affect cow wt. change, BCS change, rib fat thickness, milk yield, milk composition, cow reproduction, or calf performance.

The authors concluded that although BCS 4 cows seemed capable of maintaining BCS during lactation, the overall decrease in pregnancy rate indicates that cows should be managed to achieve a BCS greater than 4 before parturition to achieve satisfactory reproduction (Lake et al. 2005. 83:2908).

**Strategic Marketing of Cull Cows Can Substantially Increase Income**

South Dakota State Univ. Extension Beef Specialist, Cody Wright, recently presented some interesting data on managing and marketing cull cows at the 29<sup>th</sup> Annual Range Beef Cow Symposium. He noted that cull cow receipts account for a significant amount of income, generally accounting for 15 to 30% of income from the cow-calf enterprise. He went on to make the following points:

- Slaughter cows fall into one of five grades: Commercial, Utility-Breaker, Utility-Boner, Cutter, and Canner in order of decreasing value. Mature cows (over 4 yrs. old) will fall into the bottom three grades. Younger cows are more likely to be in the top two grades.
- Cull cow prices are very seasonal. Following are approximate averages by month at the Sioux Falls market for 2000-2003 (expressed as a % of annual avg.): Jan., 92; Feb, 96; Mar, 100; Apr., 103; May, 106; June, 107; July, 103; Aug., 102; Sept., 102; Oct., 98; Nov, 96; Dec., 95. As indicated, prices tend to peak in May-June and bottom out in January.
- Increasing grade and delaying marketing for a period of time offers producers a substantial opportunity to add value to cull cows and increase revenue.

The following table illustrates several scenarios and the associated increases in price received by increasing grade from Cutter to Utility-Boner and marketing at a more favorable time.

**Table 1. Market Price Change Associated With Upgrading Cows from Cutter to Utility-Boner at Sioux Falls, SD, 2000-2003**

Feeding period	\$/cwt change	% change
Sept. to Dec.	0.54	1.3
Sept to Jan.	-0.71	-1.8
Oct. to Jan.	0.95	2.4
Oct. to Feb.	2.59	6.7
Nov. to Feb.	2.35	6.0
Nov. to Mar.	4.03	10.3
Dec. to Mar.	4.87	12.7
Dec. to Apr.	6.30	16.5
Jan. to Apr.	6.78	18.0
Jan. to May	7.73	20.5
Feb. to May	6.05	13.3
Feb. to June	6.20	15.7
Mar. to June	4.86	11.9
Mar. to July	3.98	9.8

As shown above, the greatest changes were in scenarios where cows were fed from mid-winter months, Dec. and Jan., through early-spring, Apr. and May (Wright, C. 2005. Proc., The Range Beef Cow Symp. XIX, Rapid City, SD).

### **Late Gestation Nutrition of Dams Had Lasting Effects on Their Heifer Calves**

Univ. of Nebraska researchers conducted a 3-yr. study to determine the effects of nutrition of dams on growth and reproductive performance of their heifer calves. During the last trimester of gestation (Dec. 1-Feb. 28), cows received either 1 lb/head/day of a 42% CP supplement fed three times/week or no protein supplement. During calving season (Mar. 1-Apr. 30), cows were managed as a single group. For one month (May 1-May 31), half the cows were fed cool-season grass hay while the other half grazed sub-irrigated meadow. On June 1, cows were recombined and managed as a single group throughout the breeding season.

- Supplementing cows with protein during late gestation resulted in heifers that were heavier at weaning and breeding, had higher pregnancy rates, and earlier calving dates.
- Cows grazing meadows after calving had heifers with heavier weaning wts. than those fed hay. However, there were no differences in heifer reproductive performance.

- Dam nutrition had no effect on heifer body condition score or gain/feed. However, residual feed intake (actual minus predicted feed intake) was improved in daughters of cows fed hay.

The authors concluded that supplementing cows with protein during late gestation has lasting effects on their heifers calves' growth and reproductive performance (Martin et al. 2006. Univ. of Nebraska Beef Cattle Report MP 88-A).

### **Early Weaning Improved Carcass Wt., Quality Grade, and Meat Tenderness**

Univ. of Missouri and Southwest Missouri State scientists used 140 spring-born Angus and Angus-cross steer calves to evaluate the effects of early weaning (EW) vs. traditional weaning (TW) on growth, body composition and meat tenderness. Average ages were 90 days and 174 days for EW and TW calves, respectively. EW calves were fed a 39-46% corn diet from 90 to 201 days of age. Both groups were fed a finishing diet consisting of 50% corn from 202 days to slaughter, which occurred at an average age of 370 days.

- EW calves required more intense management and slight adjustments in feed during the first 56 days on feed.
- At slaughter, EW calves had significantly heavier carcasses (640 vs. 617 lb), and a higher percentage that graded Choice or greater (57 vs. 37%).
- There were no significant differences in ribeye area or backfat thickness.
- EW calves had significantly lower shear force values than TW steers after 14 days of postmortem aging, but there were no differences in tenderness after 21 days of aging.
- The minor health problems experienced by EW calves early in the experiment were not found at slaughter through evaluation of liver abscesses or scarring.

The authors concluded that the improvements in hot carcass wt. and quality grade of EW calves could be attributed to the extra time spent on feed. They also noted that the results of the study indicate that EW of calves may be used as a tool to more effectively manage the cow-calf production system without compromising the quality of the offspring (Meyer et al. 2005. J. Anim. Sci. 83:2752).

### **Wasteage From Feeding Hay on Top of Snow Was Significant**

In Canada and the Northern U.S., hay is commonly fed to cattle on snow-covered ground over the winter. The objective of this Alberta Agriculture project was to measure the losses that may occur when feeding dry hay, either processed or unrolled, on the ground versus hay processed into portable feed bunks. The trial was conducted at the Lacombe Research Centre in February, 2005.

A total of 55 heifers were allotted to one of three different feeding treatments using meadow brome hay: 1) Hay processed into portable feed bunks; 2) Hay processed on to tarps covered with snow; or 3) Hay unrolled on to tarps covered with snow. Hay was supplied at 90% of expected intake to ensure the heifers cleaned up as much as they could. Snow, ice, wasted feed, and manure were gathered off the tarps after the feeding process, which was repeated four times. This material was dried, manure removed, and weighed for total hay loss. The wasted hay was sieved and weighed to determine the amount of fine and coarse material.

There was no wasteage of hay processed into feed banks. However, there was a 20% loss of hay processed on top of snow and 12% loss of hay that was unrolled on top of snow. In both hays fed on snow, the percentage of lost material that consisted of fines was over 40%. The authors noted that the

lower forage quality due to fine material loss can reduce animal performance as well as create the potential for winter tetany to occur due to losses of magnesium and calcium in the fine material. They concluded that in order to minimize the loss of feed and feed quality, the use of portable feed bunks or some other method to prevent feed trampling is recommended (Ziegler et al. 2005. Western Forage/Beef Group Newsletter, Vol. 9, Issue 2).

### **Creep Feed Consumption by Calves on Range Was Extremely Variable**

Agriculture Canada and Univ. of Alberta researchers conducted a 51-day study to determine free-choice creep feed intake by nursing calves on range. Individual animal attendance and creep feed intake was made possible by use of a creep feeder with an electronic identification system (GrowSafe®). Fifty-one nursing calves (3-4 mo. of age) were tagged with electronic identification ear tags and placed on pasture with their dams on June 26. The creep feed was barley based with a crude protein content of 16.7%.

Percentage of calves attending the creep feeder each day averaged 21% with a range of 2 to 43%. Days with a 30% or greater attendance at the feeder occurred more frequently during the latter half of the study. Only 62.7% of the calves consumed creep feed at least once. For these calves, individual creep intake averaged 2.22 lb/calf/day with a range of 0.15 to 7.55 lb/calf/day. The authors concluded that variability in the attendance rate to the creep feeder, and individual consumption of creep feed would make the provision of pharmaceutical products to nursing range calves difficult and potentially risky for those additives that may have a narrow range between prescribed and toxic concentrations. They went on to note that, unfortunately, there are very few options currently for the mass delivery of pharmaceuticals to calves on range (Ralston et al. 2005. Can. J. Anim. Sci. 85(3):401).

### **Cattle Grazing May Prove Beneficial to Wetlands**

Contrary to popular belief, cattle grazing may prove beneficial for maintaining the health of wetlands—or at least the well-being of some endangered wetland species. Ecologists Christopher Pyke and Jaymee Marty recently led a study of the wetlands on a 12,000-acre ranch in California, simulating the effects of grazing. They found that eliminating grazing reduced the duration of wetland flooding by an average of 50 days per year, depriving two endangered species of time to mature before their habitats disappear. They concluded that conservationists may have to change their minds about grazing always being a negative factor in ecosystems (Pyke and Marty, *Conservation Biology*, October, 2005).

### **Supplementation of Pregnant Cows With Selenium Yeast Provided Highest Concentrations of Selenium in Calves**

Univ. of Florida workers allotted Angus cows at 115 to 130 days of gestation to five different selenium (Se) treatments: 1) no Se supplementation (Control); 2) one 9-ml injection of barium selenate; 3) a 5-ml injection of sodium selenite every 4 months; 4) free-choice mineral mix containing 11.8 mg of Se/lb as sodium selenite; or 5) free-choice mineral mix containing Se yeast (Sel-Plex®). The objective of this study was to evaluate effects of these different sources of Se for cows on Se concentrations in their calves. Blood Se was determined in calves at 0 (birth), 30, 90, and 205 days of age. Liver biopsies were performed on all calves at 205 days.

- At birth, blood Se of calves was adequate for all treatments.

- At 30 and 90 days of age, the control, both injectable products, and the free-choice selenite treatments had blood Se concentrations that were at or near adequacy, and the Se yeast treatment was well above adequate.
- At weaning (205 days), blood Se levels for calves from control dams and calves from dams on the two injectable treatments were deficient, calves from the free-choice selenite treatment were marginal, and those from the Se yeast treatment were above adequate in blood Se.
- Liver Se concentrations were inadequate at weaning in most calves. The calves from dams on both free-choice treatments had greater concentrations than those of calves from dams on control or the two injectable treatments.

The author concluded that free-choice supplementation of Se yeast to cows resulted in adequate calf blood Se throughout the study, whereas the control and other treatments produced calf blood Se concentrations that were marginal or deficient after 30 days of age (Davis et al. 2005. Prof. Anim. Sci. 21:486).

## **STOCKER/FEEDLOT**

### **Preconditioning Programs Can Increase Returns to Both Cow-Calf Producers and Cattle Feeders**

Kansas State Univ. researchers used 5 years of data from a Kansas auction barn to estimate premiums received for preconditioned calves and the expected returns in the feedlot from a preconditioning program. Preconditioned calves sold in the fall received premiums that ranged from \$0.045 to \$0.05/lb compared with non-preconditioned calves. Premiums were less for calves sold in the winter, less for heavier calves, and less when cattle markets were strong. Based on a premium of \$0.045/lb along with seasonal and body weight price adjustments and total costs of \$60/head, a 45-day post-weaning preconditioning program increases returns by about \$14/head to cow-calf producers compared with selling calves at weaning time. Based on data from other studies, the authors concluded that the value of preconditioned calves is between \$40 to \$60/head in the feedlot, which equates to price premiums of \$0.07 to \$0.11/lb that could be paid for preconditioned calves (Dhuyvetter et al. 2005. Prof. Anim. Sci. 21:502).

### **Optimal Wet Corn Gluten Level in Steam-Flaked Corn-Based Finishing Diets was 20% of Dry Matter**

Univ. of Nebraska researchers conducted a feedlot trial to test the hypothesis that wet corn gluten feed (WCGF) would improve the performance of cattle fed steam-flaked corn-based finishing diets and provide the required digestible intake protein (DIP). A total of 360 steer calves (635 lb) were assigned to four different levels of WCGF (0, 20, 30, or 40% of DM) and three different levels of crude protein (13.0, 13.7, or 14.4% of DM).

Relative to the 0% WCGF treatment, the 20, 30, and 40% treatments increased dry matter intake by 4, 5, and 5%, respectively, avg. daily gain by 7, 6, and 3%, respectively, and feed efficiency by 102, 101, and 98%, respectively. Avg. daily gain, feed efficiency, and hot carcass wt. increased linearly in response to increased DIP. Fat thickness, marbling, ribeye area, and USDA yield grade were not affected by either WCGF or DIP. The authors concluded these results show that the inclusion rate of WCGF for maximizing avg. daily gain and feed efficiency in steam-flaked corn-based finishing diets is

approximately 20% of dry matter. The DIP requirement determined was 9.4% of dry matter (Block et al. 2005. J. Anim. Sci. 83:2798).

### **Effect of Corn Processing Method on Performance of Steers Fed a Finishing Diet Containing Wet Distillers Grains**

The increased availability of wet distillers grains plus solubles (WDGS) has resulted in greater use of this coproduct in feedlot diets. The objective of this Univ. of Nebraska experiment was to evaluate the effects of six corn processing methods in a feedlot diet containing 30% WDGS: whole, dry-rolled, high-moisture, a dry-rolled/high-moisture mix, steam-flaked, and fine-ground. The trial involved a total of 360 steers (700 lb) fed for 168 days.

- Steers fed dry-rolled or whole corn had significantly higher dry matter intakes than those on the other four treatments.
- Avg. daily gain was highest for steers fed dry-rolled, high-moisture, or the dry-rolled/high-moisture mix.
- Avg. daily gain was lowest for steers fed either fine-ground or steam-flaked corn.
- Steers fed high-moisture corn had the best feed conversion, whereas those fed fine-ground or whole corn had the poorest.
- There were no significant differences among treatments in ribeye area.
- The fine-ground and steam-flaked treatments had significantly lower marbling scores and percentages of carcasses grading Avg. or High Choice.

The authors noted that the cattle fed fine-ground or steam-flaked corn did not perform as well as expected. They concluded these results indicate there is a performance advantage in processing corn as either dry-rolled or high-moisture when included with WDGS in finishing diets (VanderPol et al. 2006. Univ. of Nebraska Beef Cattle Report MP 88-A).

### **Conjugated Linoleic Acid Content and Economic Considerations for Pasture-Finished Beef**

It is well-documented that conjugated linoleic acid (CLA) in the human diet can provide protection against a number of health problems (heart disease, cancer, diabetes, and obesity). The objectives of this Univ. of Missouri study were to compare carcass characteristics and CLA content of beef from cattle finished in a feedlot with beef from cattle finished on pasture alone or on pasture plus grain supplementation. A total of 48 crossbred steers (800-850 lb) were allotted to four finishing treatments: 1) Pasture only; 2) Pasture + grain supplement (cracked corn and soyhulls fed at 1.2% of body wt.); 3) Pasture + soyoil supplement (cracked corn and soyhulls plus soyoil premix fed at 1.2% of body wt.); and 4) Feedlot diet (cracked corn and soyhulls offered free-choice in drylot with a self feeder). The grazing period was from July 23 to Dec. 3, 2002. The author noted that it was a season of extreme drought and that pasture conditions were very poor throughout the study. Results are summarized in the following table.

Item	Treatment			
	Pasture only	Pasture + grain	Pasture + grain + soyoil	Feedlot
Avg. daily gain, lb/d	1.12 <sup>b</sup>	1.79 <sup>c</sup>	2.03 <sup>c</sup>	3.47 <sup>d</sup>
Hot carcass wt., lb	561 <sup>b</sup>	619 <sup>c</sup>	632 <sup>c</sup>	732 <sup>d</sup>
Fat thickness, in.	.14 <sup>b</sup>	.21 <sup>bc</sup>	.25 <sup>c</sup>	.44 <sup>d</sup>
Yield grade	2.1 <sup>b</sup>	2.4 <sup>bc</sup>	2.6 <sup>c</sup>	3.2 <sup>d</sup>
Quality grade	Lo Select <sup>b</sup>	Lo Select <sup>b</sup>	Lo Select <sup>b</sup>	Lo Choice <sup>c</sup>
Shear force, lb	6.6	6.4	6.4	6.4
Consumer ratings <sup>a</sup>				
Tenderness	5.8	6.1	6.1	6.3
Flavor	5.7 <sup>b</sup>	5.7 <sup>b</sup>	5.6 <sup>b</sup>	6.4 <sup>c</sup>
Juiciness	5.7 <sup>b</sup>	5.5 <sup>b</sup>	5.4 <sup>b</sup>	6.5 <sup>c</sup>
Overall	5.8 <sup>b</sup>	5.8 <sup>b</sup>	5.9 <sup>b</sup>	6.5 <sup>c</sup>
CLA, cooked beef (mg/g fat)	7.36 <sup>b</sup>	6.14 <sup>b</sup>	11.48 <sup>c</sup>	3.97 <sup>d</sup>

<sup>a</sup>1=Dislike extremely; 9=Like extremely

<sup>bcd</sup>Means within a row lacking a common superscript differ significantly (P<.05).

As expected, cattle on the three pasture treatments gained less and had leaner carcasses and lower quality grades than those on the feedlot treatment. There were no significant differences in shear force or consumer tenderness ratings among treatments. However, flavor, juiciness, and overall palatability ratings favored the feedlot treatment. CLA content of beef from cattle on the three pasture treatments was significantly greater than beef from lot-fed cattle, and beef from cattle on the soyoil treatment had the highest CLA concentration.

These results clearly show that CLA content of cooked beef can be increased by pasture finishing, with or without grain supplementation. The author noted, however, that at the levels of CLA reached in this study, one serving of beef per day would not be sufficient to achieve a dietary intake of CLA that has been shown to be beneficial in human and animal trials (Lorenzen, C.L., Univ. of Missouri Pasture Finished Beef Workshop, Nov. 10, 2005).

In a companion paper, Agricultural Economist, K.C. Moore, conducted an economic analysis of the study reviewed above. Actual average gross revenues/head were \$664, \$792, \$805, and \$972 for the pasture only, pasture + grain, pasture + grain + soyoil, and feedlot treatments, respectively. After receiving some information on the benefits of CLA, the consumer panelists indicated they would be willing to pay the following premiums for beef from the four treatments: 7.94%, 15.81%, 18.03%, and 5.51%, respectively. Gross revenues after applying the proposed premiums were: \$717, \$917, \$950, and \$1026, respectively. These results suggest that even greater premiums will need to be paid for pasture finishing to be comparable to feedlot returns. This appears to be especially true for pasture finishing without supplementation.

### **Texas and New Mexico Ranch to Rail Results 2004-05**

The Texas and New Mexico Ranch to Rail Programs provide valuable benchmarks for the cattle industry. All cattle were started on feed in Oct.-Nov., 2004. Following is a summary of the 2004-05 results.

<b>Item</b>	<b>Texas South</b>	<b>Texas North</b>	<b>New Mexico</b>
<b>Income (carcass value), \$</b>	\$1072.95	\$1084.90	\$1020.30
<b>Expenses</b>			
Feeder calf value, \$	\$629.06	\$691.81	\$706.19
Feed, \$	\$309.29	\$290.75	\$278.22
Processing, \$	\$8.87	\$17.10	\$18.38
Medicine, \$	\$27.30	\$8.08	\$20.74
Other expenses, \$	\$26.84	\$9.72	\$9.46
<b>Total expenses, \$</b>	\$1001.36	\$1017.46	\$1032.90
<b>Net return, \$</b>	\$71.59	\$67.45	(\$12.60)
No. head	186	86	210
Off-truck wt., lb	632	628	671
Sale wt. (shrunk)	1,193	1,224	1,238
Avg. daily gain, lb/day	3.04	3.26	2.95
Cost of gain, \$/lb	\$1.14	\$0.53	\$0.60
Dressing %	64.2	63.0	63.1
Carcass wt., lb	766	771	781
Ribeye area, sq. in.	13.7	13.5	13.4
Ribeye area/cwt carcass, sq. in.	1.79	1.75	1.72
Fat thickness, in.	.39	.41	.51
Prime, %	0.5	1.2	1.5
Choice, %	47.0	54.7	50.0
Select, %	51.4	43.0	45.0
Standard, dark cutters, etc., %	1.1	1.2	3.5
Yield grade 1 & 2, %	64	75.6	61.0
Yield grade 3, %	25	24.4	36.5
Yield grade 4, %	11	0	2.0
Yield grade 5, %	0	0	0.5

South Texas cattle were profitable in spite of their high cost of gain. The authors noted that this was due to a very high level of morbidity (62.4%) that reduced gains of many of the cattle and increased medicine costs. In addition it was increased by the effect of four railers sold after 94 days on feed. Net return on New Mexico cattle was slightly negative due to relatively high total expenses compared to income. As might be expected, there was a wide range in both costs and returns among individual cattle (SOURCES: Clay Mathis, New Mexico State Univ. and Joe Paschal, Texas A & M Univ.).

### **Dry-Rolling Provided Most Effective Use of Field Peas in a Finishing Diet**

In the northern plains, surplus field pea production can provide a high quality, palatable protein and energy source for beef cattle. Energy content is similar to corn (.67 Mcal NEg/lb). Crude protein content is approximately 24%. Previous research has shown that the optimum inclusion rate for feedlot diets is 20 to 30% of dry matter (DM). However, little information is available on the degree of processing needed to maximize cattle performance. In this North Dakota State Univ. study, 127 crossbred heifers (800 lb) were fed peas as a protein supplement at 28% of DM. They were assigned to one of three processing treatments: 1) whole; 2) rolled; 3) or ground. Diets were formulated to contain equivalent amounts of crude protein (13.5%) and energy (.565 Mcal NEg/lb). Heifers were harvested when fat thickness was estimated to be 0.40 in. for the entire group.

DM intake was significantly greater for heifers fed rolled than for those fed ground or whole peas. The same was true for avg. daily gain. Feed efficiency did not differ, but tended to favor rolled and ground over whole. Carcass traits did not differ significantly, but percentage grading Choice tended to be higher for heifers fed rolled (85%) versus heifers fed ground (72%) or whole (69%). The authors concluded that field peas can be successfully included in feedlot diets, with the greatest intake and gain from dry-rolled peas (Anderson and Schoonmaker. 2005. Carrington Res. & Ext. Center, North Dakota State Univ., Research Report, Vol. 28).

### **Field Peas Can Be Fed Up to 30% in a Finishing Diet**

Field pea production has been increasing in the U.S. Peas that do not meet guidelines for human consumption are available for use as animal feed. Univ. of Nebraska researchers used a total of 205 yearling steers to determine the effect of varying levels of field peas and processing in finishing diets. Field peas were used to replace dry-rolled corn in the following treatments: 1) No field peas; 2) 15% dry-rolled peas; 3) 15% whole peas; 4) 30% dry-rolled peas; and 5) 30% whole peas.

Dry matter intake increased as level of field peas increased. However, there were no significant differences in avg. daily gain or feed conversion between processing methods or between levels of field peas. Furthermore, there were no significant differences in carcass characteristics among treatments. These results indicate that it is not necessary to process whole peas and that they can be fed up to 30% of diet dry matter without compromising performance. This is in partial agreement with North Dakota research, except that North Dakota scientists found that dry-rolling resulted in significantly improved performance compared to feeding unprocessed whole peas (Fredrick et al. 2006. Univ. of Nebraska Beef Cattle Report MP 88-A).

### **TOP TEN ANIMAL HEALTH PRODUCTS COMPANIES**

<b><u>Company</u></b>	<b><u>2005 Sales, first 9 mos. (\$)</u></b>
Pfizer Animal Health	1, 576
Merial	1, 520
Intervet	987
DSM Animal Nutrition	914
Bayer Animal Health	774
BASF	735
Fort Dodge	697
Elanco Animal Health	662
Novartis	645
Schering-Plough Animal Health	629

SOURCE: Fountain Agricounsel, LLC.

### **CARCASS/MEAT SCIENCE**

#### **Biosensor to Sort Meat into Tough and Tender Categories**

Calpastatin, a protein found in meat, is responsible for regulating meat tenderness by inhibiting the protein calpain, whose action is to break down muscle fibers, thereby enhancing tenderness. A higher level of calpastatin leads to tougher meat. Therefore, the ability to accurately evaluate the

concentration of calpastatin at the packing house would enable processors to sort beef into tender and tough categories. Univ. of Missouri scientists developed a biosensor, using technology known as fluorescence resonance energy transfer (FRET), to predict calpastatin concentrations in meat. Response time for accurate prediction was very rapid (5 minutes), compared to other methods that require up to 3 days. The authors concluded that such a sensor could be installed in a commercial setting and could correctly sort carcasses into categories of tough and tender that would provide the ability to market guaranteed tender meat, allowing the meat industry to recapture millions of dollars that are annually lost due to inadequate tenderness (Grant et al. 2005. Biosensors and Bioelectronics 21:438).

### **Most U.S. Consumers Prefer Domestic Corn-Fed Steaks over Australian Grass-Fed or Canadian Barley-Fed Steaks**

In order to compare consumer acceptance of U.S. domestic corn-fed, Canadian barley-fed, and Australian grass-fed beef, Univ. of Nebraska scientists conducted 24 taste panels (273 consumers) in Denver and Chicago. Strip steaks were evaluated for flavor, juiciness, tenderness, and overall acceptability on an 8-point scale (1=extremely undesirable; 8=extremely desirable). A silent auction was used to obtain sealed bids on steaks from the same strip loins sampled in the taste panel.

- Domestic steaks were given significantly higher ( $P<0.001$ ) scores for all four palatability characteristics than Australian grass-fed steaks.
- Consumers placed an average value of \$3.68/lb on domestic steaks compared to \$2.48/lb on Australian grass-fed steaks ( $P<0.001$ ).
- Consumers scored Canadian steaks numerically lower for juiciness ( $P=0.09$ ) and significantly lower ( $P<0.005$ ) for flavor, tenderness, and overall acceptability than domestic steaks.
- Consumers placed an average value of \$3.95/lb for domestic steaks compared to \$3.57/lb for Canadian steaks ( $P<0.01$ ).
- In contrast to the majority of consumers surveyed, 19% preferred Australian grass-fed steaks, and 29% favored Canadian steaks.

The authors hypothesized that because a steady supply of corn-fed beef is available to most consumers in the U.S., Americans may have become accustomed to the flavor of corn-fed beef and therefore prefer it. They went on to say, however, that because a small proportion of American consumers preferred the imported products and was willing to pay more for them, a niche market for them may be feasible in the U.S. (Sitz et al. 2005. J. Anim. Sci. 83:2863).

### **Injection of Enzyme and Phosphate Solution Improved Tenderness of the Eye of Round**

The uniform and moderate portion size of the semitendinosus muscle (ST; eye of round) makes it appealing to retail shoppers. However, this muscle is unacceptably tough and is resistant to tenderization by conventional methods. The objective of this collaborative study by the Universities of Alberta and Saskatchewan, and the Lacombe Research Center was to determine the effect of enzyme injection on tenderness as measured by shear force (SF). ST muscles were subjected to one of four different treatments, an uninjected Control (CON) and three water-based injection solutions: an enzyme treatment (ENZ), a salt/phosphate brine (BR), and a combination of enzyme with brine (ENZBR). The enzyme used was porcine pancreatin. There were two levels of injection, 105 or 110% of muscle wt.

There were no significant differences in shear force between the CON, ENZ, and BR treatments. However, the combination ENZBR treatment resulted in a significant improvement in tenderness (9-15% reduction in shear force), but injection level had no effect. The authors noted that further research is warranted to evaluate the tenderization potential using higher levels of pancreatin enzyme than the relatively modest level (0.01%) used in this study. They concluded that with careful attention to phosphate and enzyme application combined with appropriate preparation techniques, this type of improved beef product can be created from the beef eye of round (Janz et al. 2005. *Can. J. Anim. Sci.* 85(3):327).

### **Carcass Price Spreads Are Widening**

Cattle Fax ® recently reported that during the past 2 years (2003-2005), price spreads on various grades of boxed beef have widened significantly. Cyclically low beef production totals have limited the available supply at the same time that the demand for higher quality beef products has increased.

The Premium Choice (Avg. & Hi Choice) – Select spread has averaged \$15.66/cwt. Assuming an average carcass wt. of 750 lbs, this indicates that a Premium Choice carcass is worth \$117.45 more per head than a Select grade carcass. A Prime grade carcass (2.8% of available supply) has generated \$23.73/cwt or about \$178 more per head than a Choice carcass and \$247.50 more than a Select carcass. Other price spreads have been \$6.38/cwt for Premium Choice – Choice, and \$9.28/cwt for Choice – Select. These price spreads show why more producers are inclined to sell fed cattle on programs that reward carcass merit as opposed to selling on the average cash market.

Cattle-Fax analysts went on to predict that during the next 3 to 4 years, fed cattle supplies will grow, and product branding and niche markets will become more prevalent. As this happens, a growing percentage of the total fed cattle supply is expected to sell on grids, formulas, alliances, and branded beef programs. Producers that hit the target can reap significant rewards (SOURCE: Randy Blach, Cattle-Fax®).

## **PACKING/PROCESSING**

### **Packer Share of Total Beef Retail Value is Low**

There is a perception that packers generally receive more than they deserve of the total beef retail dollar. The reality is that packer margins are razor thin and they operate in the red about as much as they do in the black. Economists Erica Rosa and Jim Robb recently tracked producer, packer, and retailer shares of total beef retail value over time. In recent years, their shares have been running in the following ranges: producer, 45-50%; packer, 5-10%; and retailer, 40-50% (SOURCE: NCBA Issues Update, Nov.-Dec., 2005).

## **FOOD SAFETY**

### **E. Coli Incidence is Down**

The Food Safety & Inspection Service (FSIS) recently announced a dramatic decline of 54% in E. coli 0157:H7 positive test results on raw ground beef from fiscal 2003 to 2005. A recent report from the Centers for Disease Control (CDC) indicated that, for the first time, incidence of E. coli infections fell below the 2010 National Health Objective of one case per 100,000 persons (SOURCE: John Gregerson, *Meat Marketing & Technology*).

## **Plant Oils May Reduce Bacteria and Odors**

Recent research has shown that certain plant oils may be able to minimize bacteria and odors in livestock manure. Researchers have reported that thymol, a component of oils in certain plants, can serve as an antiseptic in cattle and swine manure if added to the feed (SOURCE: *Kiplinger*).

## **RETAIL**

### **New Organic and Natural Products Offered by Retailers**

Safeway stores recently introduced a new line of organic meats labeled “O.” The market target is the more upscale consumer. The new organic line will be placed in the meat case along with its “Rancher’s Reserve” brand. These products will fit into its new “Lifestyle” format, which Safeway hopes will differentiate itself from competitors such as Wal-Mart by attracting more affluent consumers.

SuperValu markets will be opening 50 new stores in the next five years that will feature value-priced organic and natural products in an upscale environment. They will also launch a new private-label line, “Nature’s Best.” According to SuperValu, many consumers would prefer to purchase organic foods, but they are often put off by the price. The company plans to offer organic/natural products at value prices that will compete with non-organic products (SOURCE: *Meat Marketing and Technology*).

### **It’s a Wal-Mart World**

The scale of Wal-Mart is mind-boggling. It has become the world’s largest retail business. If its \$285 billion in annual sales were a country, it would be the 20<sup>th</sup> largest in the world. If its 1.6 million employees were a city, Wal-Mart would be America’s 5<sup>th</sup> largest.

At some point, nearly all of Wal-Mart’s conventional stores will be transformed into its combined grocery/general merchandise supercenters. The company already operates over 500 million square feet of retail space, the equivalent of about 10,000 football fields. Even if Wal-Mart were to never build another new store, the conversion of its conventional stores to supercenters will further strengthen its position as America’s number one food retailer with nearly 20% of total market share. Recently, however, Wal-Mart announced that it plans to add another 600 stores in 2006 (SOURCES: *Farm Journal*, *Meat Marketing & Technology*, and *Progressive Grocer*).

### **Supermarket Profits Were Up in 2005**

The Food Marketing Institute (FMI) reported that fiscal 2005 supermarket industry profits rebounded over the previous year, with net profits at 1.16% of sales. This is the first time in three years that the industry has surpassed the 1% mark. The top 25% supermarket chains accounted for a disproportionate share of profits, with an average net profit of 3.68%. The report indicated that stores targeting specific market niches such as income level, gourmet products, organic, or health-oriented products are performing especially well (SOURCE: FMI).

## **Big Shift in Supermarket Sector**

SuperValu Inc. recently made a quantum leap in the supermarket industry by purchasing most of Albertson's Inc. supermarkets. SuperValu, currently the 10<sup>th</sup>-largest supermarket company, will become the 3<sup>rd</sup>-largest firm with its acquisition of 1,124 Albertson's stores throughout the U.S. Another 655 Alberston stores were acquired by equity firms led by Cerebrus Capital Management Ltd. With its acquisition, SuperValu would emerge with 2,695 supermarkets and \$44 billion in annual sales (SOURCE: Rod Smith, *Feedstuffs*).

## **Certified Angus Beef® Sales Increased in 2005**

Certified Angus Beef® (CAB) recently reported its fiscal 2005 sales and its projections for 2006. Overall sales for 2005 totalled 533.0 million lbs compared to 503.8 lbs for 2004, a 5.8% increase. This came in spite of an 11.4% decline in international sales due primarily to a drop in sales to Japan. The percentages of 2005 sales by sector were as follows: Retail, 54.9%; Foodservice, 33.8%; International, 6.3%; and Miscellaneous, 5.0%. CAB projects that its sales for 2006 will amount to 565 million lbs, which would be a 6% increase over 2005. The CAB acceptance rate for 2005 was 15.6%. Its acceptance rate for 2006 is projected at 15.9% (SOURCE: Certified Angus Beef®, Wooster, Ohio).

## **FOODSERVICE**

### **More Americans Are Eating Away From Home**

According to a National Restaurant Association forecast, U.S. restaurant industry sales are predicted to exceed a whopping half-trillion dollars in 2006. The projected \$511 billion in sales represents a 5.1% increase over 2005. With more Americans eating away from home, the restaurant industry's share of the consumer food dollar will reach nearly 48% (SOURCE: *Meat Marketing & Technology*).

### **Kids' Menus Affect Parents' Restaurant Selections**

A new study by Chicago-based Technomic, Inc. revealed that nearly 80% of parents consider kids' menus a major factor in choosing a limited-service restaurant. But kids' menus are less important for parents that dine in full-service restaurants, and then only if they have very young children. The study also found that there are more than 1,100 items on kids' menus at the top 250 restaurant chains. Interestingly, toys, prices, and healthfulness all take a back seat to kids' specific food preferences when they place orders at those establishments (SOURCE: *Meat Marketing & Technology*).

## **CONSUMERS/FOODS**

### **Americans Are Consuming More Food**

In spite of warnings about increasing obesity, the USDA's Economic Research Service (ERS) has reported that Americans are eating more food than ever before. The report compared per capita food consumption in 2003 with per capita consumption in 1970, as shown in the following table.

<b>Food group</b>	<b>1970 (lb)</b>	<b>2003 (lb)</b>	<b>% increase in pounds, 1970-2003</b>	<b>Increase in daily calories 1970-2003</b>
Fats and oils	53	86	63	216
Grains	136	194	43	188
Sugar & sweeteners	119	142	19	76
Meat, eggs, and nuts	226	242	7	24
Vegetables	337	418	24	16
Fruits	242	275	12	14
Dairy	564	594	5	-11
<b>OVERALL</b>	<b>1,675</b>	<b>1,950</b>	<b>16</b>	<b>523</b>

As shown above, there was a 16% increase in total pounds of food consumed per capita from 1970 to 2003. The greatest increases were in fats and oils and in grains. There was a corresponding increase in calories, from 2,234 in 1970 to 2,757 in 2003, an increase of 523 calories, representing a change of 23%. Only in dairy products did daily calories decline (-11), partly due to the switch from whole to low-fat milk (SOURCE: USDA/ERS).

### **Branded Beef is Growing**

Based on recent trends in the marketplace, it is estimated that 80% of U.S. beef will carry a brand by the year 2010 (SOURCE: *Meat Marketing & Technology*).

### **Top Five Food Flavors**

The *Kraft Food & Family* magazine recently identified the hottest five foods for the year. They are beef, chocolate, cilantro, honey, and nuts. These foods were selected because of each food's distinctive flavor and diversity of preparation options (SOURCE: *Food Systems Insider*).

### **Beef With Mushrooms**

According to Pennsylvania State Univ. food scientists, mushrooms may be nature's best source of antioxidants. It is known that antioxidants help reduce the risk of developing chronic diseases such as heart disease and cancer. The most commonly consumed mushroom varieties in the U.S., portabellas, white buttons, and criminis, contain the highest levels of ergothioneine, a metabolite with strong antioxidant properties that has been shown to provide cellular protection in the human body. Beef with mushrooms would make a tasty, healthy entrée.

### **Low-Income Consumers Eat More Beef than Higher-Income Consumers**

A recent study by USDA's Economic Research Service (ERS) revealed a rather surprising statistic: low-income, non-white, and rural consumers eat more beef than higher-income, white, and suburban/urban consumers. The study also showed that Midwestern consumers eat more beef than those in other regions of the U.S. Overall, the authors noted that beef lost its leadership position to chicken in the early 1990's. Nevertheless, beef still remains the most popular of the livestock meats and the third most consumed protein in the world, excluding fish. They went on to say that

understanding the underlying demographics of beef consumption may better enable the industry to design effective marketing strategies (Davis and Lin. 2005. USDA/ERS).

**AMERICA’S LARGEST PRIVATE COMPANIES\***

<b>Company/Business</b>	<b>Headquarters</b>	<b>2004 revenues (Bil. \$)</b>
1. Cargill/ag. commodities, food	Minneapolis, MN	66.7
2. Koch Industries/chemicals, energy	Wichita, KS	60.0
3. Mars/candy, pet food	McLean, VA	19.1
4. PriceWaterhouse/accounting	New York, NY	18.7
5. Publix Supermarkets/food	Lakeland, FL	18.6
6. Bechtel/engineering, construction	San Francisco, CA	17.4
7. Ernst & Young/accounting	New York, NY	16.9
8. C&S Wholesale Grocers/food	Keene, NH	15.2
9. Semgroup/oil, gas marketer	Tulsa, OK	12.6
10. Meijer Supermarkets/food	Grand Rapids, MI	12.5

SOURCE: *Forbes*, Nov. 29, 2005.

\*It is interesting to note that five out of the top ten private companies in America are involved in the food industry.

**Organic Food Sales are Soaring**

Some organic meat, poultry, and dairy products are seeing annual increases of as much as 40% in sales volume. In 2006, overall organic foods sales will be double that of 2002. By 2010, up to 5% of the food market will be organic vs. 3% today. Overall organic food sales are projected to continue their annual increase of 20%, compared to 3% for mainstream foods.

Attracted by the rapidly growing demand for organic products, more large food firms are getting involved. Companies such as General Mills and Wal-Mart are jumping in. These big companies will take a larger share of the organic market. In doing so, they will likely squeeze smaller traditional operators, many of whom will have to increase output or merge with other operations to survive (SOURCE: *Kiplinger*).

**Canada and Australia Drop Dietary Cholesterol Restrictions**

U.S. Dietary Guidelines recommend that Americans restrict dietary cholesterol to less than 300 mg per day. However, the Canadian and Australian governments have decided not to impose a 300 mg cholesterol intake restriction. Cholesterol is a component of animal tissues, such as meat and eggs, but not of plant tissues. Surveys have shown that older U.S. people have markedly reduced their consumption of animal protein, especially eggs, due to fears of increasing heart disease. Current and previous research does not support the need to limit dietary cholesterol intake. Nonetheless, U.S. guidelines continue to recommend the 300 mg limit. Univ. of Connecticut researchers recently reported three eggs per day do not raise the risk of heart disease in healthy senior citizens. It will be interesting to see if U.S. Dietary Guidelines are amended like those in Canada and Australia (Adapted from R.J. Smith, *Feedstuffs*).

## **Demand for Bison Meat is Increasing**

In response to an increasing demand for bison meat, bison ranchers are building their herd numbers. In 2005, the slaughter volume for bison was 34,715 head, topping the previous record set in 2003. The bison herd in the United States now numbers over a quarter of a million (SOURCE: *Kiplinger*).

## **FUTURE TRENDS**

### **Outlook for Cattle and Beef**

At its 2006 Outlook & Strategies Seminar, Cattle-Fax® analysts made the following points.

- Average per capita beef consumption in the U.S. has held steady at 65-67 lbs for the past 15 years.
- Beef demand growth has been phenomenal since 1999, which has allowed U.S. producers to sell the same amounts of product at prices 25% higher than before. This is what has led to the record high price levels on all classes of cattle in each of the last 3 years.
- If per capita beef consumption remains between 65-67 lbs for the next decade, the market will require a substantial increase in supply to meet the growing U.S. population.
- If this is the case, net beef supplies will be close to 30.5 billion lbs by 2015 compared to 27.8 billion lbs in 2005. Therefore, the U.S. cow herd is expected to grow during the balance of this decade.
- Prices for all classes of cattle will decline from their record 2005 highs during the remainder of the decade. Long-term projections for 2010 are as follows: fed cattle, \$75/cwt; feeder cattle, \$90/cwt; feeder calves, \$100/cwt.

### **Long-Term Beef Industry Trends**

Concentration in the cattle and food industries is occurring at every level and is predicted to accelerate at an even faster pace in the future. The following table presents the current situation, based on data from CattleFax®.

<u><b>Concentration in the Cattle and Food Industries</b></u>	
<u><b>Industry Segment</b></u>	<u><b>% of market share</b></u>
Cow-Calf Producers, Largest 9%	51%
Feedlot Operators, Largest 2%	85%
Packing Companies, Top 5	83%
Supermarket Chains, Top 10	55%
Foodservice Distributors, Top 10	45%
Restaurant Chains, Top 10	30%

CattleFax analysts went on to make the following projections:

- About 50% of all beef is now sold through foodservice operations compared to only 30% twenty years ago. By the end of the decade, foodservice will likely account for about 55% of all beef sales.

- Since 1995, the top five supermarket chains have increased their marketshare from 26% to nearly 49%.
- By the end of this decade, there will be fewer operators and a larger average size in most of the industry segments.
- Coordinated production systems will continue to develop and the beef industry will become increasingly coordinated.
- Producers will make breeding decisions with a specific end market in mind.
- More cattle will be sold on a carcass merit system and fewer will sell in the open cash market.
- The U.S. beef market will become more highly branded and differentiated.
- Instrument grading will be in place during the next few years which will provide more pricing points in the market system.
- Individual animal I.D. systems will continue to develop, and source and age verification will become the norm.
- The market will send stronger economic signals to producers in the years ahead; larger premiums as well as larger discounts are expected.

### **Cattle-Fax® Price Projections for 2006**

Cattle-Fax® has projected that fed cattle are expected to average slightly lower in 2006 than in 2005 at \$86-\$87/cwt, ranging from the upper \$70's to the mid \$90's. Beef production is expected to increase by about 1 billion lbs (approximately 4%). Feeder cattle are projected to average \$2-\$4 lower at \$106-\$108/cwt for the year. Feeder calf prices are expected to average about \$125/cwt.

Cattle-Fax also noted that the increase in beef demand since 1998 has added about \$250 per head to the price of fed cattle and about \$200 per head to the price of calves.