INDUSTRY NEWS

Research Update

►**Summaries** of current **beef cattle** research

Summer research highlights

The following research highlights are presented by Harlan Ritchie, Steven Rust and Daniel Buskirk, beef cattle specialists at Michigan State University, East Lansing. The reviews summarize studies reported at scientific meetings or in scientific and industry publications.

COW-CALF

Effect of group marketing feeder calves from small producers

In a collaborative project, Fort Valley State University and ABS Global worked with small-scale cow-calf producers in Georgia to put together truckload lots of feeder calves. The objective was to assist small producers in achieving greater returns by selling in load lots of uniform, source-verified calves.

The calves were backgrounded on a corn silage diet formulated to support a daily gain of 2.2 pounds (lb.) per day.

In August 2004, 168 calves were marketed for an average return per calf of $108.77 over the local auction market. Average daily gain (ADG) was 1.78 lb. per day, and cost of gain was $1.62 per day during the backgrounding period.

In November 2004, 430 calves were marketed for an average return per calf of $23.93 over the local market. ADG in the November group was 2.01 lb. per day, with an average feed cost of $0.98 per calf per day.

There was no sickness or mortality during backgrounding in the August group. Twelve calves became sick in the November group, but there were no mortalities. No calves were rejected in August, while in November there were 17 no-loads. Health of the calves after sale was reported to be excellent.

These results suggest that it is possible to work with small-scale beef producers and have a positive effect on enterprise profitability.

(Freeman and Getz. 2006. Southern Section ASAS. Abstract 130)

AI, ADG, frame and disposition affect sale price of pregnant heifers

University of Georgia researchers analyzed data from the Georgia Heifer Evaluation and Reproductive Development (HERD) Program. The data involved 839 pregnant replacement heifers that were sold during a six-year period (2000-2005). The objective was to determine factors that affected sale price.

Heifers begin the program at approximately 12 months of age. The breeding period begins at about 14.5 months of age. Heifers are bred by artificial insemination (AI) for 30 days, followed by natural service for 35 days, and evaluated for pregnancy to AI breeding six weeks following the end of the AI period. Heifers are sold approximately four and a half months following the start of AI.

Average annual sale price ranged from $936 to $1,280. Heifers pregnant by AI sold for an average of $1,052, while those bred by natural service brought $123 less at $929. Registered and commercial heifers sold for the same average price ($1,030). Buyers paid more for heifers that had a greater ADG, a higher frame score, and a more docile disposition. Buyers also tended to pay more if they had purchased heifers in a previous sale.

(Rossi et al. 2006. Southern Section ASAS. Abstract 127)

Vaccination program, breed affect feeder-calf prices

The objective of this collaborative study between Colorado State University (CSU), Certified Angus Beef LLC (CAB), and Pfizer Animal Health was to determine the effect of vaccination programs and breed on feeder-calf prices sold through Superior Livestock Auction video sales. Vaccination program records were collected on 3,121,970 calves sold from 1995 to 2005. Breed records were collected on 1,725,811 calves sold from 2001 to 2005. Three types of vaccination programs were recorded:

1) clostridial and pasteurella vaccines, but no respiratory viral vaccines (NT);
2) clostridial, pasteurella, and four-way respiratory vaccine two to four weeks prior to shipping (Vac 34); and

Acronym Quick Reference

ADG	average daily gain	FDA	Food and Drug Administration	n	number
AI	artificial insemination	FE	feed efficiency, as measured in pounds of feed per pound of gain	NE_g	net energy for growth
ASAS	American Society of Animal Science			NE_m	net energy for maintenance
BCS	body condition score	HERD	Heifer Evaluation and Reproductive Development Program	OSHA	Occupational Safety and Health Administration
BI	*Bos indicus*			QG	quality grade
BT	*Bos taurus*			REA	ribeye area
bu.	bushel	IMF	intramuscular fat	RFI	residual feed intake
CL	corpus luteum	J. Anim. Sci.	*Journal of Animal Science*	RTS	reproductive tract score
CO	carbon monoxide	KPH	kidney, pelvic and heart fat	Se	selenium
CO_2	carbon dioxide	K-State	Kansas State University	sq. in.	square inch
CSU	Colorado State University	lb.	pound(s)	USDA	U.S. Department of Agriculture
Cu	copper	MARC	Roman L. Hruska Meat Animal Research Center	WBSF	Warner-Bratzler shear force
cwt.	hundredweight			WCGF	wet corn gluten feed
DM	dry matter	mg	milligrams	WDGS	wet distillers' grains with solubles
DMI	dry-matter intake	Mn	manganese	YG	yield grade
EPA	Environmental Protection Agency	MSU	Michigan State University	Zn	zinc
EPD	expected progeny difference				

3) full vaccination schedule plus boosters at weaning, and weaned 45 days prior to sale (Vac 45).

Breeds were classified as British × British-crosses, British × Continental-crosses, primarily Angus, black or black-white-face, or cattle with ear.

Using NT as a base, the premium per hundredweight (cwt.) for Vac 34 cattle ranged from $0.99 in 1996 to $3.47 in 2004; and for Vac 45 cattle, from $2.47 in 1995 to $7.91 in 2004. Using cattle with ear as a base, the premium per cwt. for British × British-cross calves ranged from $1.74 in 2001 to $4.33 in 2004; for British × Continental-crosses, from $2.22 in 2002 to $3.94 in 2004; for primarily Angus calves, from $4.60 in 2001 to $6.77 in 2004; and for black or black-white-face calves, from $3.79 in 2002 to $5.57 in 2004. Pooled premiums per cwt. for breed classes were 0, $0.90, $3.93, $5.58 and $4.42, respectively.

The authors concluded that type of vaccination program and breed both had statistically significant effects ($P<0.05$) on calf sale prices.

(Corah et al. 2006. Midwest Section ASAS. Abstract 227)

Bioavailability of trace minerals in ruminant feeds

The effectiveness of trace mineral supplementation is not only dependent on concentration in the diet, but also the bioavailability of the trace mineral once it reaches the animal's digestive tract. Jerry Spears, North Carolina State University, recently presented a review of the bioavailability of certain trace minerals in feeds.

Selenium (Se) in feeds is more bioavailable in ruminants than inorganic selenium from selenite. A portion of the zinc (Zn), copper (Cu) and manganese (Mn) in plants is present as various complexes or "chelates." A sizable portion (20% or more) of the zinc, copper and magnesium in forage is associated with the plant cell wall. A prerequisite for trace mineral absorption is release of the mineral from feeds in a soluble form in the digestive tract.

Several studies have shown that more than 50% and 70% of the zinc and copper, respectively, in dried forages is rendered soluble in the rumen. Research with grass silage indicates that more than 90% of the total zinc and copper present is released in the rumen.

Another study found similar absorption of zinc in calves from radioactive ^{65}Zn in calves from radioactive-labeled ^{65}Zn in ZnCl or from corn forage where labeled zinc was incorporated during plant growth. However, retention of labeled zinc at seven days postdosing was higher in calves fed zinc-labeled corn forage compared with ZnCl.

The author concluded that additional research is needed to further characterize the bioavailability of trace minerals from ruminant feeds.

(Spears. 2006. Midwest Section ASAS. Abstract 191)

U.S. cow costs increased in 2005

Cattle-Fax® recently summarized results of its 2005 cow-calf survey. Cash costs averaged $351 per head in 2005, which was $36 per head more than the 2004 average of $315 per head. During the past 10 years, annual cow costs have ranged from $292 to $351 per head, with a 10-year average of $307 per head. Cattle-Fax analysts attributed the increase from 2004 to 2005 largely to the increased cost

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of energy and fuel and the effect these factors have on all cow-calf operations. It is important to note that these costs do not include depreciation, opportunity costs or returns to management.

Overall, 96% of producers selling weaned calves were profitable in 2005, a record-high percentage. Of the producers that sold their calves at weaning, 80% made a profit of $100 per head or more, 44% made $150 per head or more, and only 4% were not profitable. The results showed there is a strong correlation between high-return producers, and lower costs and higher production performance. The average cow cost for those who profited $100 per head or more was $347. Those who profited less than $100 per head had an average cow cost of $377 per head.

The average cow cost for the least-cost one-third of producers was $267 per head compared to the highest-cost one-third of producers at $445 per head, a $178-per-head difference. The results also showed a positive correlation between weaning percentage and profitability. Producers who made more than $150 per head weaned 4% more calves compared to those who either broke even or lost money.

Other results of the survey revealed that 79% of producers use the internet, 53% said they had registered a premises, 84% preconditioned their calves, and 78% felt the market rewarded them for preconditioning.

(Tod Kalous, Cattle-Fax® Update)

BREEDING/GENETICS

Selection for favorable calpastatin, calpain alleles can improve beef tenderness

Previous research has shown that two enzymes are responsible for the postmortem meat tenderization process: calpain, which promotes tenderness, and calpastatin, which inhibits calpain and is therefore associated with meat toughness. Scientists at the Roman L. Hruska Meat Animal Research Center (MARC), near Clay Center, Neb., conducted a study to evaluate the association of different genotypes of these enzymes with tenderness, juiciness and flavor. Three populations of cattle were used: *Bos taurus* (BT), *Bos taurus* with *Bos indicus* (Brahman) influence (BT/BI), and purebred *Bos indicus* (BI).

Those animals in the BT and BT/BI populations that inherited the CC and CT genotypes of the calpastatin gene produced tougher meat than those that inherited the TT genotype. It was also observed that animals inheriting the CC genotype produced blander steaks than those inheriting the CT and TT genotypes. There was no significant association of the calpastatin gene with meat sensory attributes in the BI population.

For the calpain gene, animals in the BT and BT/BI populations that inherited the CC and CT genotypes produced significantly more tender meat than those inheriting the TT genotype in the BT and BT/BI populations, but not in the BI population.

These results indicate that selection for the favorable alleles of the calpastatin and calpain genes would likely improve tenderness of beef from populations of BT and BT/BI cattle.

(Casas et al. 2006. J. Anim. Sci. 84:520)

Cull heifers with low reproductive tract scores

A recent survey revealed that only 1% of U.S. cow-calf producers use the prebreeding reproductive tract score (RTS) system that evaluates uterine development and ovarian activity of heifers on a 1-to-5 scale [1=least developed; 5=most developed and presence of a corpus luteum (CL)].

Texas A&M University researchers conducted a two-year study to establish the value of the RTS system in an extensively managed, natural-mating, 90-day breeding season program and to determine factors that may influence RTS. A total of 106 yearling Bonsmara-cross heifers were palpated and assigned an RTS just prior to the start of the breeding season. They were turned out with Bonsmara bulls at a bull-to-female ratio of 1:53 and 1:48 in Years 1 and 2, respectively.

RTS was positively correlated with frame score, age, weaning weight, and weight of the heifer on the day of the RTS exam. For the two breeding seasons, pregnancy rate differed significantly for heifers of RTS 1 and 2 (62.5%) compared to heifers of RTS 3, 4 and 5 (91.2%). Females with an RTS of 1 conceived later during their first breeding season, weaned lighter first calves, and had a lower fall body weight and body condition score (BCS) each year than heifers having RTS 3 or higher.

The authors concluded that yearling heifers having an RTS of 1 immediately prior to their first breeding season should be culled, and that reproductive performance is reduced in heifers with an RTS of 2.

(Rathmann et al. 2006. Southern Section ASAS. Abstract 48)

Relationship of dam's milk production to postweaning calf performance

Scientists at the U.S. Department of Agriculture (USDA) Grazinglands Research Lab, El Reno, Okla., measured the milk yield of 157 Brangus cows to determine the relationship of cow milk yield and their calves' postweaning ADG over a three-year period on two postweaning management systems (wheat pasture or drylot). Their calves were sired by bulls of six different breeds (Bonsmara, Brangus, Charolais, Gelbvieh, Hereford and Romosinuano). Milk yield was measured six times per year.

Results showed that calf postweaning ADG was linearly related to dam milk yield, but the relationship was dependent on either sire of calf or the postweaning treatment/sex of calf combination. The trend for relationship of dam milk yield to postweaning ADG of calves sired by Brangus, Charolais and Romosinuano bulls was positive, whereas the trend was negative for calves sired by Bonsmara, Gelbvieh and Hereford bulls.

The trend for the relationship of milk yield to postweaning ADG was positive for calves in drylot environments, whereas the trend was negative for calves managed on wheat pasture.

The authors concluded that these results indicate the importance of matching the preweaning maternal environment to both postweaning management and the sire breed used.

(Wang et al. 2005. Southern Section ASAS. Abstract 28)

Genetics play larger role in carcass performance of calf-feds

Iowa State University researchers analyzed carcass data from the American Simmental Association on 10,439 cattle to determine any similarities or differences in heritabilities of calf-fed and yearling-fed cattle. Groups of cattle younger than 480 days of age were considered calf-feds, while those older than 480 days of age were considered yearlings. Calf-fed cattle were adjusted to a constant 430-day end point, and yearling-fed cattle were adjusted to a constant 525-day end point. Table 1 provides a summary of heritability estimates.

As shown in Table 1, the heritability estimates for carcass traits are higher for calf-feds than for yearling-feds. This analysis indicates that genetics play a greater role in the control of these traits in calf-feds than in yearling-feds, and that management assumes more importance as cattle are on feed longer.

(Tait et al. 2006. Midwest Section ASAS. Abstract 330)

Table 1: Heritability estimates of carcass traits for calf-fed vs. yearling-fed cattle

	Trait			
Age group	Marbling score	Fat thickness	Ribeye area	Carcass weight
Calf-fed	0.38	0.47	0.38	0.45
Yearling-fed	0.30	0.10	0.28	0.29

STOCKER/FEEDLOT

Industry experiences record profitability during past five years

A recent analysis by Cattle-Fax revealed that the last five years have been the most profitable in the history of the cattle industry.

As shown in Table 2, from 1980 to 2000 the cow-calf sector was just above the breakeven point at an average of $2.33 per head. During the same period, the feedlot sector was slightly more profitable at $5.11 per head.

The beef industry has experienced a significant rebound during the past five years. Return for cow-calf producers has averaged $109 per head, and for feedlots, it has been about $28 per head.

This improvement in profitability is likely due to the near 25% increase in beef demand experienced during the past five years. It is in stark contrast to the decline in beef demand that occurred from 1980 to 1999.

(Cattle-Fax® Update)

Table 2: Cattle industry profitability

	Cow-calf return		Feedlot return	
Years	Total	$/head/year	Total	$/head/year
1980-2000	$203 million	$2.33	$2.5 billion	$5.11
2001-2005	$16.2 billion	$109.00	$3.7 billion	$27.86

Selection for RFI could affect pasture carrying capacity

Most feed efficiency research has been conducted on feedlot cattle fed a high-energy diet, with relatively little research conducted on breeding females. The objective of this University of Missouri experiment was to determine the variation in efficiency of 42 Hereford heifers. The measure of efficiency was residual feed intake (RFI), defined as actual minus expected feed intake. A lower RFI value would indicate greater efficiency, whereas a higher RFI value would indicate lower efficiency. The heifers were fed alfalfa-grass hay *ad libitum* for a period of 51 days.

During a period of one year, heifers with the higher RFI would consume about 10,143 lb. more forage than heifers with low RFI values.

The five heifers with the lowest RFI values consumed 32.1 lb. per day, while the five heifers with the greatest RFI values consumed 60.4 lb. per day. When expressed as a percent of body weight, forage intake for the lowest RFI group was 2.50%, and for the highest RFI group was 5.05%. These differences were statistically significant.

There were no significant differences between groups in ADG or BCS. During a period of one year, heifers with the higher RFI would consume about 10,143 lb. more forage than heifers with low RFI values.

The authors concluded that selection for animals that have low RFI values should affect carrying capacity of pastures.

(Miller et al. 2006. Midwest Section ASAS. Abstract 83)

Feeding a byproduct alone, in combination improved feedlot performance

The objective of this University of Nebraska (NU) feedlot study was to evaluate feeding a byproduct combination or a byproduct alone. Wet corn gluten feed (WCGF) and wet distillers' grains with solubles (WDGS) were fed in a combination at two levels [30% and 60% dry matter (DM)] or fed alone (30% DM) in dry-rolled, high-moisture corn diets. A corn-based control diet was also fed. All diets contained 7.5% alfalfa hay and 5% supplement. The study consisted of a total of 250 backgrounded steer calves fed for 124 days.

Final body weights were heaviest for 30% WDGS and lightest for control cattle (1,341 lb. vs. 1,266 lb.), while cattle fed the 60% combination were slightly heavier than controls, and those fed the 30% combination had final body weights between those fed 30% WCGF and 30% WDGS.

ADG increased significantly ($P<0.01$) with the addition of any level of byproduct in the diets. Feed efficiency was greatest for cattle fed 30% WDGS, while feeding the 60% combination was still superior to controls. Other than carcass weight and USDA Yield Grade (YG), no other carcass differences were observed among treatments.

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PHOTO BY MICKY WILSON

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The authors concluded that feeding the two byproducts in combination or alone to feedlot cattle improved gain and feed efficiency over control-fed cattle.

(Buckner et al. 2006. Midwest Section ASAS. Abstract 15)

Effects of Optaflexx® dose and feeding duration on feedlot performance, carcass traits

In a collaborative effort involving a total of 1,867 steers in four studies, Elanco, Nebraska, South Dakota, Texas Tech and Illinois researchers evaluated the effects of feeding Optaflexx® (ractopamine) on growth and carcass traits when fed at three doses (0, 100 or 200 mg per head per day) for the final 28, 35 or 42 days of the finishing period.

As shown in Table 3, ractopamine supplementation significantly improved ADG, feed efficiency (FE), carcass weight, ribeye area (REA) and YG, while having no effect on dressing percentage, fat thickness or marbling score. The dose levels of 100 and 200 mg per head per day did not differ in their effect, except for carcass weight and REA, which favored the higher dose.

Although not shown in the table, there were no significant differences among feeding durations, except for a tendency for increased carcass leanness at 42 days. According to the report, these results indicate that ractopamine can maintain improved feedlot performance and carcass weight throughout the approved 28- to 42-day feeding duration.

(Van Koevering et al. 2006. Midwest Section ASAS. Abstracts 60 and 61)

Table 3: Effects of ractopamine dose on feedlot performance, carcass traits

	Ractopamine, mg/head/day		
Item	0	100	200
Daily feed, lb.	23.2	23.2	22.9
Avg. daily gain, lb.	3.18[a]	3.40[b]	3.53[b]
Feed:gain, lb.:lb.	7.60[a]	6.99[b]	6.73[b]
Carcass weight, lb.	820.0[a]	826.4[b]	831.0[c]
Dressing percent, %	64.00	64.08	64.23
Fat thickness, in.	0.51	0.49	0.50
Ribeye area, sq. in.	13.33[a]	13.56[b]	13.76[b]
Yield grade	3.00[a]	2.92[b]	2.88[b]
Marbling score	529.7	531.1	523.1

[a,b,c] Means differ significantly (P>0.05).

A finishing dietary protein concentration of 12.5% may be optimal for steers, heifers

Researchers at the University of Arizona assigned feedlot steers and heifers to one of three dietary protein concentrations — 11.0%, 12.5% or 14.0% — to determine the effect on finishing performance and carcass characteristics.

Heifers consumed significantly less DM and gained less than steers, and were significantly lower than steers in carcass weight, marbling score, backfat and YG. Feed conversion, dressing percentage and REA did not differ between genders.

Dry-matter intake (DMI) and ADG gain increased from 11.0% to 12.5% protein, and then tended to decline from 12.5% to 14.0%, respectively. Carcass weight, backfat and YG increased linearly as dietary protein increased from 11.0% to 14.0%. Dressing percentage, REA and marbling score were not affected by dietary protein concentration.

Regarding feed conversion, steers were most efficient at 12.5% protein, while heifers tended to be most efficient at 14.0% protein, which could be a reflection of the heifer's overall advantage in leanness. Nevertheless, the authors concluded that the peaks in DMI and ADG at 12.5% for both sexes suggest that 12.5% protein concentration is optimal for either steers or heifers.

(Bailey et al. 2006. Midwest Section ASAS. Abstract 318)

Performance, carcass traits of steers implanted with Synovex Choice or Revalor-IS

In a collaborative study, scientists at NU, Kansas State University (K-State), Fort Dodge Animal Health and Cattlemen Nutrition Services used 892 crossbred calf-fed steers (642 lb.) to compare two implant strategies:

1) initial implant of Synovex Choice followed by a second dose of Synovex Choice (Ch/Ch); and
2) initial implant of Revalor-IS followed by a dose of Revalor-S (IS/S).

The second implants were given at 90 days after the first implant. The objective was to compare a more aggressive implant program (IS/S) with a less aggressive program (Ch/Ch). Steers were harvested after 171 days on feed.

Steers implanted with Ch/Ch had slightly higher ADG than those implanted with IS/S when calculated from final live body weight (3.99 lb. vs. 3.94 lb.). Ch/Ch steers were also slightly more efficient in feed conversion than IS/IS steers.

Carcass weight was not different; therefore, no differences were observed in ADG or feed efficiency between the two implant programs on a carcass-adjusted basis. Marbling score was numerically higher for Ch/Ch than for IS/S (531 vs. 514), and USDA YG score was significantly higher for Ch/Ch steers, suggesting a higher fat end point.

The authors concluded that using Ch/Ch appears to produce similar or slightly better feedlot performance without affecting carcass quality compared to a more aggressive implant.

(Loza et al. 2006. Midwest Section ASAS. Abstract 168)

Effect of corn test weight on feedlot performance, carcass characteristics

North Dakota State University scientists allotted 144 crossbred steers (985 lb.) to one of three dietary treatments:

1) heavy-test-weight corn [53.7 lb. per bushel (bu.); HTC];
2) medium-test-weight corn (46.9 lb. per bu.; MTC); and
3) low-test-weight corn (39.1 lb. per bu.; LTC).

The diet was composed of 81% dry-rolled corn, 5% beet pulp, 5% mixed hay and 9% supplemental ingredients. Steers were harvested after 66 or 82 days on feed.

There were no significant differences among treatments for final weight or ADG. LTC steers tended to have higher daily DMI than HTC steers (27.3 lb. vs. 25.4 lb.). However, there was no effect of treatment on FE, which averaged 5.55:1. Apparent net energy for maintenance (NE_m) and gain (NE_g) were similar among treatments.

At harvest, carcass weight and marbling score did not differ among treatments. LTC carcasses tended to have smaller REAs than either MTC or HTC steers (12.74 sq. in. vs. 13.49 sq. in. and 13.46 sq. in., respectively). Treatments did not differ in backfat thickness (0.45 in.) or kidney, pelvic and heart (KPH) fat (1.96%). However, LTC carcasses tended to have greater yield grades compared to MTC or HTC carcasses (3.04, 2.80 and 2.73, respectively).

The authors concluded that, although those steers fed the LTC diet had greater DMI, LTC is a suitable substitute for HTC.

(Larson et al. 2006. Midwest Section ASAS. Abstract 133)

Concentration in the feedlot sector

James Mintert, K-State agricultural economist, recently examined the concentration that has been occurring in the nation's feedlot sector. Following is a summary.

In 1975, there were 56,221 feedlots in the seven major cattle-feeding states (Arizona, California, Colorado, Iowa, Kansas, Nebraska and Texas). These same feedlots marketed approximately 15 million head of cattle. Average marketings per feedlot were just 267 head per lot. Feedlots with a one-time feeding capacity of more than 1,000 head totaled 1,211 lots, and they marketed about 74% of the fed cattle in the U.S.

By 2004, the number of feedlots in the seven states declined to just 14,932. However, total fed marketings rose by 36% compared to 1975, reaching 20.4 million head. Number of feedlots with a one-time capacity of more than 1,000 head increased to 1,632 lots. Market share of feedlots with capacities of more than 1,000 head increased from 74% to 95%.

These figures demonstrate that cattle are increasingly being fed in larger feedlots, but they don't indicate what size feedlot is most competitive. A simple method of determining the size categories that are most competitive is to examine feedlot marketing by the various size categories and see which ones are gaining market share over time.

A review of the data indicates that only one size category (more than 32,000 head) has been gaining market share over time. In 1979, feedlots of 32,000 head or more capacity marketed 29% of all fed cattle in the U.S. By 2003, these large feedlots had increased their market share to 49% of all cattle fed in the U.S.

In contrast, market share of feedlots with a capacity of 16,000-32,000 head declined from 27% in 1979 to 20% in 2003. And the market share of feedlots with a capacity of 8,000-15,999 head decreased from 17% to 13% over the same time period.

Why is the feedlot sector concentrating? Mintert suggested that there may be a multitude of reasons, but he went on to say it is clear that larger feedlots have a lower cost structure than smaller lots. He noted that larger firms are in a better position to use new technology, much of which requires relatively large volumes to successfully implement. Furthermore, larger feedlots are able to capture advantages in labor, financial and marketing management. This means that smaller and medium-size feedlots must continually strive to lower their costs of operation in order to survive in this industry.

(Feedlot magazine)

CARCASS/MEAT SCIENCE

Relationship of GeneSTAR® marbling marker to IMF deposition and EPD for marbling

University of Illinois researchers used a total of 192 early-weaned Simmental steers to evaluate the relationship of the GeneSTAR marker for marbling to intramuscular fat (IMF) deposition and the expected progeny difference (EPD) for marbling. Steers were weaned at 88 days of age, fed a high-concentrate diet and harvested at 423 days of age. DNA samples were taken for GeneSTAR marbling analysis.

Steers with allele types of no-star (n=47), one-star (n=95), and two-star (n=33) had no significant effect on marbling score, chemically determined IMF percentage, or percent grading low-Choice and higher. Furthermore, there were no significant differences in performance or other carcass traits among the three genotypes.

Conversely, marbling EPD was highly correlated with marbling score and IMF percentage. The authors concluded that the GeneSTAR marker for marbling was not an efficacious predictor of IMF deposition under the conditions of this study.

(Rincker et al. 2006. J. Anim. Sci. 84:686)

7/7 postmortem aging process improves steak tenderness

The objective of this Louisiana State University experiment was to determine the effect of a 7/7 days postmortem aging treatment on the tenderness of steaks compared to seven and 14 days of cooler aging. The 7/7 days treatment was an alternative method in which steaks were aged for seven days, frozen and thawed, and then aged for an additional seven days.

Loin muscle steaks were taken from a total of 341 steer and heifer carcasses over a period of five years. Overall means for Warner-Bratzler shear force (WBSF) for the three treatments were as follows: seven days, 10.23 lb.; 14 days, 9.13 lb.; and 7/7 days, 8.64 lb. The WBSF for steaks aged seven days was significantly greater ($P<0.001$) than the WBSF for steaks aged 14 days and steaks given the 7/7 treatment. Furthermore, the WBSF for steaks aged 14 days was significantly greater ($P<0.001$) than for steaks given the 7/7 treatment.

The authors concluded that the 7/7 days aging process improved the tenderness of steaks compared to either one of the other two aging procedures.

(Daniels et al. 2006. Southern Section ASAS. Abstract 8)

Researchers evaluate effects of breed, aging time, muscle location on tenderness

Because there are conflicting data on the effect of breed, aging time and core locations on shear force tenderness values, Purdue University scientists took loin muscle samples from 136 crossbred steers representing five sire breeds (Angus, Simmental, South Devon, Charolais and crossbred). Samples were cut into 1-in.-thick steaks and assigned to one of four aging times (one, seven, 14 or 21 days). Cores were taken from the top and bottom portions of each steak, and shear force tenderness was evaluated.

South Devon-sired cattle were significantly more tender than the other five breeds. Bottom portions of the steak were significantly more tender than the top portions at all aging times. Steaks aged one day were significantly tougher than those aged seven, 14 or 21 days.

No significant differences were attributed to differences in USDA Quality Grade (QG) or REA. These results indicate shear force values vary with location in the loin muscle, and this variation does not change with aging time. The authors concluded that these differences are inherent to the steak and may be related to either a differential physical stretching of the muscle or changes in connective tissue characteristics.

(Weaver et al. 2006. Midwest Section ASAS. Abstract 57)

PACKING/PROCESSING

Three meat-processing companies make 'most admired' list

Fortune magazine recently published its annual list of America's Most Admired Companies. For the fourth consecutive year, Smithfield Foods Inc. was named to the list, this time moving up seven places to third among food production companies. Pilgrim's Pride ranked second, while Tyson ranked fifth.

(Meatingplace.com)

Kill cost decreases dramatically

Research indicates that in 1977 the inflation-adjusted kill cost for packers was about $131 per head. By 1992 it had declined by about

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$35 per head to $96.50. By 1997 it was down to $90, and by 2002 it was down to about $85. During a period of 25 years, kill cost had gone down by $46 a head, a decline of 35%

(James Mintert, economist, K-State)

FOOD SAFETY

Sensor to detect *E. coli* in meat

Medical scientists at the University of Rochester have developed a sensor that uses a protein from *E. coli* bacteria to direct the sensor to *E. coli* bacteria in body cells. They expect other pathogenic bacteria could be detected using the same electronic system, called "arrayed imaging reflectometry." The sensor would be used by physicians to identify bacterial pathogens infecting patients, but could also be adapted to check meat, poultry or other foods in a processing plant or store. The system would be faster and less expensive than current tests for pathogens.

(Kiplinger)

The carbon monoxide controversy

Research has shown that a very small amount of carbon monoxide (0.4%) with much larger amounts of carbon dioxide (CO_2) and nitrogen in case-ready packaging can increase the shelf life of fresh meat. Shelf life is increased because carbon monoxide (CO) together with low oxygen maintains the bright red color of fresh meat for more days. Assuming the meat is fresh at the time of packaging, the shelf life of ground beef doubles from 10 days to 20 days or more, although the Food and Drug Administration (FDA) has designated 28 days as the outer limit "use-by" date. Some intact primal cuts have shelf lives of up to 35 days, also the outer limit. Nearly all fresh meat, particularly beef, flows far more quickly through the supply chain than that. This means that meat lasts longer in the consumer's refrigerator.

Some opponents of CO are concerned that it may represent a safety hazard. Research by Cargill, however, reveals that while meat absorbs about a third of the CO, cooking removes 85% of that amount. Even if 100% of the CO were absorbed and consumed, the consumer would be exposed to only 2.18 mg of the gas, far below safety limits established by the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).

(Meatingplace magazine)

RETAIL/RESTAURANT/FOODSERVICE

Branded beef is increasing rapidly

According to a recent study, it was found that 42% of beef in the retail meatcase carried a brand in 2004. It is projected that by 2007, the percentage of branded beef in retail stores will be greater than 50%.

(2004 National Meat Case Study)

SuperValu plans to offer natural, organic food products

SuperValu, the nation's third-largest supermarket company, plans to build 50 stores during the next five years that will offer natural and organic items that include meat, poultry and seafood from animals that have not been administered hormones or antibiotics. The objective is to nudge natural and organic products into the mainstream with these stores, which will be named "Sunflower Markets."

These stores will be built on the premise that consumers want organic and natural products for their families, but believe cost is an obstacle. Consequently, Sunflower Markets will offer these products at lower price points. Over time, SuperValu plans to support the stores with a phased deployment of more than 200 private-label items marketed under the brand name of "Nature's Best."

(Meatingplace)

The reign of the supermarket may be over

By 2007, supermarkets will account for less than half of all food sales. This will mark the end of a 60-year run in which supermarkets claimed more than 50% of U.S. food sales.

Big supermarket chains are now being squeezed between giant discount stores and mass marketers as well as small convenience and specialty food shops. It is predicted that discount stores will sell more than 33% of all food in the U.S. in 2006, a tripling of their market share since 1998. At Wal-Mart, Target and other superstores, food sales are rising 11%-12% per year.

Consumers are saving about 20% on groceries by shopping at superstores, discount clubs and other nontraditional food outlets, according to a USDA study. Also, new food companies are forcing supermarkets to reduce their prices. Some supermarkets have slashed their margins 50% since 2001. That kind of competition will help hold retail price gains to 2%-3% in 2006.

(Kiplinger)

"Loose meat" restaurant chain expanding rapidly

The restaurant company Maid-Rite Corp., Des Moines, Iowa, well-known in the Midwest for its popular sandwiches, announced it plans to open as many as 60 new Maid-Rite units in Wisconsin and Michigan during the next 10 years. It currently operates 70 quick-service restaurants in Iowa, Illinois, Minnesota, Colorado, Missouri, Nebraska and Ohio.

Maid-Rite specializes in "loose meat" sandwiches, which consist of seasoned ground beef on a bun, similar to a sloppy joe. They also offer pork tenderloin sandwiches as well as chicken strips and Broaster chicken.

(Meat Marketing & Technology Group)

Organic Food Industry Growth

In a recent meeting, John Scanga, meat specialist from CSU, presented the following information regarding the organic food industry.

- While the conventional food industry grows at the rate of 5% per year, the organic niche was growing about 20% annually before 2002. It grew 50% between 2004 and 2005, and they anticipate about 213% by 2009.
- Fruits and vegetables make up about 43% of the organic market, dairy products about 11%, and meat about 3%. It's a lot easier to raise fruits and vegetables organically than it is livestock.
- About 27% of Americans are eating more organic foods than they did a year ago. About 54% of the population has tried organic foods, and 9% use them regularly.
- About 58% of consumers who eat organic foods say they do because it's better for the environment, 54% say it's better for their health, 57% say they eat organic foods to support local organic farmers, and 42% think it's better-tasting.
- Organic or natural foods are no safer than conventional food products.
- Some companies are now even producing organic pet foods. It's growing at three times the rate of organic human food.

(Livestock Weekly)

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