Culled Cow Management: Adding Value to a Product

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Culling in beef cow herds generally refers to identifying and removing animals from the breeding herd which have failed to maintained performance criteria established for the herd. Animals can be culled for health reasons, poor reproductive performance, age, and low productivity.[1] Each operation has its own unique decision criteria, both biological and economic for placement of an animal into a cull category. The majority of culled beef cows in the United States are removed from the herd in the fall of the year following weaning. The USDA estimates that 14% of beef cow herds are culled annually. Based upon seasonal marketing patterns culled cows are removed from the herd and sold immediately. Using the average utility slaughter cow price from 1987 to 1996 of \$45.67 per cwt_1, a 100 brood cow producer culling 14 - 1050 lb cows annually, would have cull cow sales account for an average annual revenue of \$6,713.49 for the 10 year period. Cull cow sales constitute 15-25% of annual operational revenue for a cow/calf enterprise.[2,3]

Culled animals have a market value based upon what order buyers or packers are willing to pay to the producer for the health and quality of the animals being sold. Their pricing decisions are based upon cattle numbers, seasonality, transportation costs, health status of individual animals and cut-out value of the carcass.[4] For the producer the market value of the culled animal is based upon buyer established price times weight. At the time of sale the price is established within narrow limits.

The beef industry is becoming increasingly aware of the need to transform many of these slaughter cows into a value added product. Opportunities exist for a producer to develop a culled cow management program by identifying marketing options which allow marketing pounds of meat and by-products at the most opportune time for the greatest return. Key areas of such a program are maintenance of a quality assurance program, seasonal marketing flexibility, and cow weight.

Quality Assurance

When cows are culled from the herd, cow/calf operators are offering for sale a market-ready, meat product. With over 3 million beef cows slaughtered annually, meat quality, food safety, consumer concerns, and animal welfare become primary issues for meat products derived from those animals. Cow quality assurance programs need to be established as part of the day-to-day ranching operation. A cow program focuses on disease condition identification, early intervention in the course of a disease process, residue avoidance, injection-site selection, minimizing hide damage, animal handling and transportation, and maintaining cow body condition. The producer's veterinarian can play a large role in the establishment of the program by aiding in product selection, route of administration, observance of appropriate product withdraw times, facilities design, cow selection and record-keeping.

Most culling decisions are made following pregnancy examination at fall processing or in the spring after calving season during the spring herd processing. While the incidence of violative chemical residues in beef cow carcasses is low,[5] care should be taken when processing cows to avoid the use of antibiotics, topical insecticides or parasiticides, vaccines or other products which may create residues or blemish the carcass for those cows which may be culled soon after processing. An audit of injection site lesions in the rounds of cull cows purchased by retailers found evidence of lesions in 28.9% of the rounds.[6]

Fluid-filled/abscessed lesions indicative of recent product administration were evident in 2.2% of audited rounds. Average tissue trim loss per lesion in the audit was 276 gm, while the trim loss from fluid-filled lesions was 515 gm. The economic loss because of injection site trim is estimated at \$0.66/carcass for all cows slaughtered annually in the United States.

The 1994 National Cattlemen's Association National Non-fed Beef Quality Audit (NNFBQA) identified a number of health/quality defects on live animals preslaughter (Tables 1 and 2).[6] The advanced nature of many of these defects would seem to indicate that many cows are culled and dumped on the market with little concern for the health and well-being of the animal or the public perception of the quality of the meat products marketed for human consumption. Industry-wide losses from carcass condemnation, edible offal condemnation, trim losses, and hide devaluation attributable

Table 1. Incidence of quality defects in 1548 head of beef cows evaluated pre-slaughter as reported for the live animal evaluation of the 1994 National Cattlemen's Association's National Non-Fed Beef Quality Audit.*

Quality Defect	Incidence (%)
Brands	55.0
Hide Defects[a]	30.7
Rectal or vagina prolapse	1.4
Udder[b]	5.0
Lameness[c]	11.4
Actinomycosis	1.9**
Knots/abscesses	5.8**

* Adapted from the National Non-Fed Beef Quality Audit (NCA/CSU, 1994).[6]

[a] latent defects (hide scarring or scratches), insect damage, ringworm/warts

[b] enlarged "bottle" teats, failed suspensory ligaments, nonfunctional quarters, torn/missing teats, and mastitic udders

[c] elongated or cracked hooves, structurally incorrect, foot rot, arthritic, stifled and disabled or non-ambulatory

** observation includes slaughter bulls and non-fed beef steers and heifers

Table 2. Occurrence and severity of ocular neoplasia in beef cows.*

Classification **	Affected Cows (%)
0 - no lesion	86.8
1 - eyelid (keratoma)	4.1
2 - ocular plaque	3.0
3 - third eyelid or vascular ocular tumor	2.5
4 - bone/lymph system involvement	2.0
5 - prolapsed &/or necrosis	1.6

* Adapted from the National Non-Fed Beef Quality Audit (NCA/CSU, 1994)[6]

** 5 point scoring system used to evaluate eyes in a 1994 pre-slaughter audit of slaughter cows

to live animal quality defects and those defects found on post mortem examination amount to $32.34 per head of non-fed beef slaughtered in the United States.

Quality losses to include hide brands are considered part of doing business by the packing industry. Every producer marketing cows pays through pricing discounts received at the time of marketing on all cows sold because of latent quality losses. True price discovery for the value of the animals being sold through

Table 3. Effect of Health on Cull Beef Cow Price.[4]

Health Status	Percent of Cows	Price Change ($/cwt)
Bad Eyes	4.5	-8.97*
Hardware Disease	0.4	-5.33*
Knots	5.0	-3.69*

* indicates significantly different from base price at the .05 level The study data set included observations of 4,711 lots of cows, consisting of 7,103 head.

livestock markets is not part of the formula unless an animal appears unhealthy at the time of sale. A study of price premiums or discounts attributable to physical characteristics of culled beef cows sold at livestock markets was conducted to evaluate selling price as to health status. Cows with ocular neoplasia, swelling in the brisket, or swelling caused by actinomycosis, injection-site reactions or abscesses were classified as unhealthy in the study. Unhealthy cows received severe price discounts (Table 3).[4] Cow buyers want healthy cows.

Decisions to sell cows based upon health aspects should be made before those animals suffer from debilitating health conditions. Cows suffering advanced ocular neoplasia, lymphosarcoma, actinomycosis or other diseases that permanently render the animal unfit for human consumption or which become debilitated or non-ambulatory should not be offered for sale or sold at public livestock markets. Veterinarians can play an important role in educating clients to the benefits associated with early recognition and intervention in the course of common cow pathological conditions. In the decision process to treat or not treat an animal, the risks associated with medical or surgical intervention and nursing unhealthy animals back to good condition should be weighed against the salvage value of the animal and expected discounts unhealthy cows receive at sale. In many instances, the earlier a cow is marketed the better. A record system should be maintained on all treated and salvaged cows which records animal identification, date of diagnosis, diagnosis, product usage, withdrawal dates and final dispensation.

In larger operations which return animals to the herd following treatment to resume production or for delayed sale, the use of contrast tag such as a blue tag, in conjunction with the animal's herd identification tag may be employed. "Blue tagged" cows tend to be eye catching when the owner is observing the herd. They allow the owner to more closely observe an animal for signs of recurrence of the original medical or surgical problem. The tags can be coded by the original diagnosis, e.g. notched in the lower left corner for prolapse, lower right corner for lameness, no notch for ocular neoplasia, etc. Cows treated for ocular neoplasia which

didn't require enucleation can have the tag placed in the ear on the same side as the treated eye. Upon recovery or sale of the cow, the tag can be removed for reuse, generally the next time the herd is processed through the chute.

Extensive bruising in slaughter cows is a major industry problem. Bruises have to be trimmed from the carcass at the abattoir. Bruising can occur at any point in the marketing chain from initial gathering and handling on the ranch, through transportation to a livestock market or to the abattoir, and within the abattoir, immediately after stunning to the time the blood pressure reaches zero during exsanguination.[7-10] Smith *et al.* (1994) found major bruises in 51.5% of non-fed cattle, requiring an average trim of 1.45 kg of meat.[6] This level of bruising is significantly higher than the total bruise incidence of 39.2% found in traditionally fed cattle.[11] Trimming bruises from carcasses is expensive because it is labor intensive and it reduces carcass yield and carcass value. Bruised meat cannot be used for human consumption. The extra handling of a carcass to remove bruised tissue leads to increased microbial contamination.

Loss of carcass value from bruising can be calculated by a bruise trim method (total weight of the carcass minus weight of tissue trim X per pound price) or a carcass-discount method (value of tissue trim and primal cuts lost because of excessive bruise trim). In 1994, the estimated cost of bruised trim loss for cull cows and bulls was $23 million and the devaluation of rounds and loins due to major bruising was $52 million dollars, totaling $11.73/head slaughtered in the United States.[6] Bruising in culled cows becomes everybody's problem. Producers selling through livestock markets while not seeing a direct reduction in the gross return per head marketed as the result of incidental bruising are actually being discounted. Bruises become the responsibility of the packer, who as with other quality defects indirectly lowers the purchase price of all slaughter cows to offset anticipated bruise trim losses.

The method of marketing cattle has been thought to contribute to the incidence of bruising in mature cows.[6,12-14] Cows marketed through a livestock market are subjected to additional handling than cattle marketed directly to the abattoir. At the livestock market, cows are handled during loading, unloading, sorting, and movement through the facility. Additional stressors associated with livestock markets are commingling with other animals, blood testing for brucellosis, environmental changes, and removal of feed and water sources for extended periods of time prior to slaughter. When cows are sold at the livestock market, they may go directly to an abattoir, or they may be transported to several other livestock markets as a truckload is being gathered, then transported to an abattoir. These factors could contribute to an increase in the risk of carcass bruising in livestock market-origin cattle. To study the effects of marketing origin, a trial was designed to measure the severity, frequency and distribution of carcass bruising in mature beef cows originating from either the original farm or ranch, a salebarn in a state not requiring first point brucellosis testing, or sale barns in state requiring first point testing.[15] A significant difference in total carcass, loin, rib and chuck bruising was found in cows originating from livestock markets requiring first point testing compared to other marketing systems (Table 4). The extra handling of cattle to obtain blood for brucellosis testing appeared to be the major contributing factor to the higher bruising incidence associated with the method of marketing cattle not the method of marketing *per se*.

Table 4. Effect of origin (livestock auction or ranch) on carcass bruising in mature beef cows.[15]

	Incidence of major bruising (%) Origin of cow (n)		
Primal Cut	Trt 1 (14)	Trt 2 (49)	Trt 3 (26)
Whole Carcass	12.8[a]	15.2[a]	24.0[b]
Loin	4.8[a]	5.3[a]	9.6[b]
Rib	1.6[a]	5.2[b]	8.6[c]
Chuck	2.9[a]	3.5[a]	6.1[b]

[a,b,c] Within rows, values with different superscripts are significantly ($p<.05$) different
n= number of procurement lots in each treatment
Data are expressed as LSM. MSE=±0.3;.08;.08;.07 (whole carcass, loin, rib, and chuck, respectively).

Trt 1 = cows shipped directly from ranch of origin to slaughter
Trt 2 = cows shipped through a livestock market to slaughter
Trt 3 = cows shipped through a livestock market requiring first point testing for brucellosis prior to transport to slaughter

Seasonal Marketing

Marketing strategies for culled beef cows have as a central focus the interaction of cow weight and market price. Both cow weight and price are influenced by seasonal effects. Optimum profitability will be derived from offering a product for sale at a time which can take advantage of optimal carcass yield and pricing advantage. The producer needs to have a basic understanding of marketing outlets (live weight through an auction facility or carcass sales through direct sale to a packing company), prediction of pricing spread (cow and fed cattle numbers, weather, beef imports, seasonality of price fluctuations, grade spread and carcass yield), risks (seasonal price changes, weight increases, quality and yield grade changes, feed costs, labor and facilities cost,

sickness and death losses, and marketing costs), and alternatives for capital (opportunity costs, tax implications, and interest cost) to aid in their decision process for the culled cow program.[2]

The marketing option with the least risk is the immediate sale of all culled cows following selection for culling. The cow weights are easily determined and market price can be reasonably fixed as cow prices at regional livestock markets or abattoirs are known. Culling cows in the fall is important for many operations because they are not equipped to carry over culled cows for any length of time on additional feed and have low culled cow numbers available for sale. Immediate sale in the fall may have the producer missing peak annual cow prices and offering a product at the lower end of grade spreads because of health or low carcass weights. When merchandizing cull cows for immediate sale, package cows in as large a group as possible. Larger lot sizes have been shown to increase sale price by $0.40 to $1.20/cwt as lot sizes vary from 3 to 15 head, respectively.[4]

Sixty-six percent of beef cow marketings occur in the fall of the year.[4] This has created a historical pattern of seasonal price variation which can be used to anticipate price several months in advance (Table 5). Utility slaughter cow pricing from 1987 through 1996 have varied monthly by as much as 11% from a high of 104% of annual average market price in March to a low of 93% in November. The historical low point in the annual market pricing coincides with a seasonal decline in cow body weight. Altered timing of culled cow sales provides a unique opportunity to take advantage of this market trend. Unlike the stocker cattle market where the calves' weight is bought at a higher market price and sold at a lower price, cull cows, given previous market trends, can be sold before anticipated late fall and early winter weight loss and seasonal price declines or if held through the winter will increase in price from seasonal lows in spite of their weight changes.

The 1994 NNFBQA live animal evaluation found 21.5% of beef cows in a body condition of 4 or less (1= thin, 9=fat) at slaughter.[6] This high number of thin cows reflects that in the herd of origin, the balance between body nutrient needs and nutrient intake in the period immediately preceding slaughter was not being maintained. Lactating cows grazing warm season grasses regain weight during the summer grazing season. It is not uncommon for cows to gain up to 24% in body weight from late spring through August. Lactational demands and a decline in forage quality in late season pastures cause cow weights to plateau then decline by 6-10% from October through February, if cows are left unsupplemented.[16] As cows lose weight, fat then muscle mass are lost from the carcass. Body condition scoring can be used as an aid in estimating carcass composition. The degree of external fat cover particularly in cows with body condition ≥5 is highly related to empty body fat (r=.70).[17] As body condition changes, carcass composition changes concomitantly with thin cows having 10% or less carcass lipid and less lean meat (Table 6).

Seasonal weight loss preceding the sale of culled cows can severely impact final market price. Besides less sale weight, the changes in body composition and dressing percentage negatively impacts bid prices for thin cows (Table 7). Dressing percentage indicates the amount of saleable product that is obtained after the cow is slaughtered and processed. A nearly linear relationship exists between the price received for a cow and her dressing percentage. Using a base price of a 970 pound cow of average grade with a 45% dressing percentage, discounts of $2.61 per cwt. and $1.66 per cwt, respectively were received for cows with estimated dressing percentages of 40 and 42. Cows having estimated dressing percentages of 48 and 50 brought premiums of $1.93 per cwt and $3.36 per cwt, respectively compared to the base cow price.[4]

Accelerated and delayed marketing of culled cows are alternatives to traditional fall marketing. Altered marketing times take advantage of anticipated seasonal pricing variations and cow quality and yield changes . Accelerated late summer marketing are immediate sales marketings taking place in August or early September prior to the expected October through January seasonal price declines. This management option requires early weaning (90 -180 days of age) of the calf crop and the development of alternate calf management programs.

Table 5. Monthly Variation in Utility Slaughter Cow Price (1987-1996).

January	February	March	April	May	June
99%*	103%	104%	103%	102%	101%
July	**August**	**September**	**October**	**November**	**December**
102%	102%	100%	96%	93%	95%

*100% equals 1987-1996 average annual utility slaughter cow price (Source:Cattle-Fax®,1997)

Table 6. Cow body condition score and carcass characteristics.[a]

	Body Condition Score Carcass Characteristic				
	1 - 2	3 - 4	5	6 - 7	8 - 9
12th rib backfat, cm	.001	.076	.339	.630	.915
Carcass lipid, %	4.2	10.4	17.6	25.1	31.3
Carcass Protein, %	10.9	11.0	11.4	11.6	13.0
Total Empty Body Lipid, %	3.1	8.7	14.9	21.5	27.2
Total Empty Body Protein, %	8.7	9.1	9.3	9.6	10.6

[a] adapted from Houghton *et.al.*,1990.[17]

Table 7. Cull Cow Average Prices for Winter Seasonal Advance and Quality Grade change

	Canner/Cutter Quote			Utility Quote			
	Previous November $	February $	Change $	Previous November $	February $	Change $	Change with Upgrade* $
1988	38.79	44.19	5.40	45.13	50.24	5.11	11.45
1989	40.33	43.05	2.72	46.63	49.68	3.03	9.36
1990	42.14	46.23	4.09	47.30	52.42	5.12	10.28
1991	44.49	47.23	2.75	50.81	53.39	2.58	8.91
1992	41.61	43.48	1.87	46.44	49.62	3.18	8.01
1993	40.48	44.29	3.81	47.10	49.75	2.65	9.27
1994	39.78	43.90	4.12	44.70	48.71	4.01	8.93
1995	34.14	37.53	3.39	39.22	42.41	3.19	8.27
1996	25.76	29.16	3.40	30.48	33.91	3.43	8.15
1997	25.35	29.11	3.76	30.35	35.09	4.74	9.74
Mean Change			3.53			3.70	9.24

*Comparing February Utility price to November Canner/Cutter price
Source: Cattle-Fax®,1997

Accelerated marketings in normal rainfall years have cows coming off grass in good to excellent condition. In drought years, removing cull cows will reduce grazing pressures for retained cows and prevent further weight losses in marketed cows. Delayed marketings options include holding culled cows to feed for low gain or maintenance (< .5 lb/day) through the winter[18,19], holding to feed for maintenance or low gain early in the wintering period followed by high gain (>2.0 lbs/day) for 30 to 60 days in late winter, and holding and feeding for high gain 100 days or less.[2,18,20,21] Two factors become important when considering holding cows over for any period of time are the prediction of cow sale prices and estimating the holding (feed cost is the major cost in holding a cow over) costs.

If cows are large framed and in good to excellent body condition when culled, salvage is probably the best option. Even though they need only be to fed for maintenance, if retained, the increased market price in the spring may not be sufficient to offset the feed costs. If culled cows are medium framed in good condition, retaining through the winter may be the most profitable if an inexpensive feed source is available. Few animals can utilize roughages such as crop residue fields more efficiently than a mature cow and they require only minimal protein supplementation late in the grazing to achieve gains comparable to those seen in feeder cattle. Program costs generally run $0.23-0.40/day for the wintering period.$_2$ Management options involving less than 100 day high-grain feeding of culled cows requires additional facilities, a cheap feed source, and a group of healthy, thin cows. It is generally the riskiest option as direct costs are increased, extreme changes in carcass grade caused by fat deposition can result in carcass discounting in spite of upward seasonal pricing trends during the feeding period, and prices are vulnerable to fast fluctuations during short feeding periods.

Producers should not get locked into only one option for culled cow marketing program. Each marketing alternative should be considered that best fits an operation every year. Market conditions can change the most profitable option year to year. Careful consideration of alternatives and evaluation of all factors in the decision process are critical to arriving at a sound budgeting process for cull management.

Feeding Culled Cows

Annually a percentage of the cows will enter into short-term (<100 day) feeding programs following the concentrated seasonal marketing of slaughter cows. A United States Department of Agriculture summary of the last ten years *Cows on Feed Report* estimates approximately fifty thousand animals are on feed monthly from November through April.$_3$ The primary intent of these feeding programs is to ensure a continuity of supply into slaughter facilities rather than on developing a focus to improve cattle performance and product quality.[22] Producers with the herd resources to seasonally market cows or to put together groups of culled cows can seek to improve returns by feeding light-weight, relatively low dressing percentage animals for subsequent late-winter to early-spring marketings at higher carcass weights and dressing percentage.

Thin cows being marketed as canners or cutters can easily be fed (realimented) to utility grade in less than 56 days on feed. Healthy, thin cows tend to gain weight faster than normal due to compensatory gain associated with periods of undernutrition.[23] Cows fed 60-80% concentrate diets have been found to have average daily gains in the range of 2.2 to 4.5 lbs. with feed/gain ratios ranging from 5.6 - 8:1.[24-26] Seventy five percent of the live gain in realimented cows is carcass gain.[25] Muscle accretion will occur at a higher rate than fat deposition early in a feeding period, but as days on feed increase, carcass fat deposition comprises 50% of carcass gains.[26,27]

Carcass characteristics of marbling, quality grade (canner/cutter to utility grade), lean color (bright cherry red), external fat color (white to off-white), and Warner-Bratzler shear values (increased tenderness) will improve as days on feed increases beyond 28 days.[25,28] Not all of the fed cow carcass will be produced into a ground meat product. Cows fed less than sixty days will produce a higher value carcass with the middle meats of the rib, loin and round subprimals fabricated as a value-added products.[6] Target characteristics of value-added slaughter cow carcasses identified by the 1994 NNFBQA would have a 10 inch ribeye, whiter fat, bright red lean color, 0.25 inch backfat, yield grade 3 or less, and have a hot carcass weight of 525-575 lbs. **One type of management strategy that is evolving is the "White Cow" program. A "White Cow" or premium optimization program utilizes well fed, high yielding, white fat primal cuts as a value-added product. This typically involves feeding cows on high concentrate diets for periods of 60-120 days**

to increase marbling and external fat cover. Sales of beef from white cow programs are targeted toward the food service industry, institutional, warehouse and club shopper markets as well as fast food chains and meat counters of retail outlets.

The use of steroid implants in conjunction with feeding culled cows for compensatory gain is a more recent strategy designed for cull cow management. Steroidal growth-promoting implants are repartitioning agents or substances that direct absorbed nutrients to increase skeletal muscle and decrease fat deposition. The action of implants is generally accompanied by an increase in feed intake which results in an increased growth rate and an improvement in feed efficiency.[29] Implants containing either trenbolone acetate$_4$ or a combination of estradiol benzoate and testosterone proprionate$_5$ have been used in cows with favorable results. Average daily gains in thin culled cows, both dairy and beef, fed high concentrate rations and implanted with the estradiol benzoate+ testosterone proprionate combination have been shown to be increased by 0.4-1.28 pounds over non-implanted controls, while those implanted with trenbolone acetate have demonstrated increases of .22-1.32 pounds over controls.[26,30-32] Feed efficiency of implanted cows has been improved as much as 21% over non-implanted cows. Feed:gain ratios of 6:1 have been reported.[26] Implanted cows have larger carcass weights, less lipid deposition and greater lean composition than non-implanted cows.[21,26]

A key fact to remember when developing a feeding program for culled cows is that the producer is dealing with a market ready product from the first day in the feedlot through shipment to slaughter. The option for early slaughter before the projected slaughter date established when the cattle were placed on feed can be used when unanticipated price fluctuations occur, a cow exhibits poor performance or is not competitive, and for health reasons, particularly lameness, off-feed or injury.

On arrival at the feedlot, cows should be thoroughly examined for health defects which may limit performance, individually identified, implanted and grouped to avoid wide variation in frame size in a feeding pen. Cows that appear to be health risks should be immediately slaughtered. Minimal use of vaccines, anthelmintics, topical parasiticides, and antimicrobials should be practiced in fed cow management programs. Though these practices are accepted for use in traditional fed cattle operations, their use in cow feeding operations can produce unwanted carcass residues and injection site reactions which reduces the opportunities for exercising early slaughter options during short-feeding periods of less than 60 days. **Further research needs to be completed to assess the cost/benefit of vaccines and parasiticides in fed cow operations.**

As with traditional feeding programs a health record system should be developed to identify and track sick cows. Similar to young stock, most health related conditions tend to occur within the first three weeks of the feeding period. Musculoskeletal, digestive and ocular conditions are more of a concern than respiratory disease. Pens should be monitored closely for non-competitive cows. Non-competitive cows are those adapting poorly to feedlot environment. These cows may be timid and not compete in the pen or at the feed bunks with more aggressive cows, are reluctant to drink from automatic watering systems and/or do not adjust to high concentrate rations. These cows can be removed to smaller pens with other non-competitive cows or early slaughtered.

A wide variety of feedstuffs can be used in cow rations. Most final rations will be 60-80% concentrate. Cows entering the feedlot are coming off low quality, high forage rations. If cows are purchased and grouped from livestock markets, they may have had minimal feed and water for several days. For these reasons, cows should be received on high roughage diets with concentrate levels increased in 4-6 steps over a 2-3 week period depending on desired final gain rate. The use of ionophores is recommended after the initial starter ration. Good bunk management practices to minimize ruminal imbalances need to be maintained to aid in controlling digestive upsets and liver abscessation. The use of medicated rations to control liver abscesses needs to be further investigated in cull cows. Seventy percent of beef cows are culled for non-pregnancy.[33] Therefore, it would be assumed that a high percentage of fed cows will display estrus at some time during the feeding period. Cows displaying behavior estrus may be more prone to injuries and decreased feeding performance. Feeding melengesterol acetate (MGA) to cows at a rate of 4 mg/head/day will suppress estrus in cows on high grain rations.[34]

The use of periodic weighing of the cows and ultrasound imaging of ribeye area and backfat can be used to monitor feedlot performance. Cows can be weighed and scanned on arrival and at 28 days post-arrival. Cows fed an 80% concentrate ration at the end of the first 28 days on feed have ribeye areas reported to increase in the range of 1.25-1.65 inches and back fat increased by 0.1-0.15 inches.[25,26] At 28 days cows showing little or no weight gain or increases in ribeye area can be removed from the feeding program for early slaughter as the cost of maintaining poor performing cows decreases profitability for the entire program. Cows with >0.5 inches of back fat at 28 days should be considered for early slaughter as further deposition of carcass fat may lead to severe discounts at slaughter.

Conclusions

Management of cull cows is an area that has many options. The income from their sale is too large to be considered a by-product of the industry. Careful man-

agement and wise production choices can make a significant difference in culled cow revenues. Early marketing or holding cull cows from traditional fall marketings until market prices rise is a production strategy that historically increases income providing adequate resources are available to maintain the cattle. In fed cow programs the advantage gained by steroid implantation of thin cull cows and feeding for compensatory gain would appear to be economically beneficial. **Producers are encouraged to offer for sale a high quality product which addresses consumer concerns of meat quality, food safety and animal welfare.**

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[1]Pricing Source: Cattle Fax®, 1997.
[2]Kansas Agricultural Statistics: Agricultural Prices. Kansas State Board of Agriculture, Topeka, KS. 1975-1995.
[3]Source: USDA Ag Marketing News, 1996.
[4]Finaplex-H®: Hoechst-Roussel Agri-Vet Company, Sommerville, NJ.
[5]Synovex-H®: Fort Dodge Animal Health, Overland Park, KS.