



**STRATEGIES FOR PROFITABLE BREEDING, MANAGING
AND MARKETING OF FEEDER CALVES**

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INTRODUCTION

Cost of production must be recovered along with capturing an additional profit margin for the enterprise to remain viable. Cow-calf producers have been working on improving the efficiency of calf production by reducing costs and increasing output. As producers seek to remain competitive, serious considerations must be made to breeding and marketing of calves that meet today's consumer demands. The majority of calves in the US are sold through auction markets, finished and processed in a feedlot and packing plant in different states. Thus, direct consumer-derived feedback seldom reaches cow-calf operators through these industry segments. Therefore, one approach is to pay attention to what order buyers are looking for. Producers are also encouraged to balance these observations with knowledge of factors that are known to affect price in today's markets including value-added and niche markets. Factors that are known to affect price are: sex, physical characteristics, breed, marketing season, order in sale, lot size, lot uniformity, and health processing. Additionally, in a value-added market system, other factors such as potential to achieve certain grade, yield, and dressing percentage within a certain weight and age window are important to consider.

THE BUYER'S PERSPECTIVE

A survey conducted by Cattle Fax in 1995 described the desirable characteristics 600 feedlot, stocker, and backgrounding buyers were looking for when purchasing calves. These traits were ranked in Table 1 for the purpose of this discussion. The single most important characteristic buyers were looking and paying for was whether and when calves were weaned. This is not surprising when feedlot operators consider that calves that were weaned at the time of shipment gained .18 lb/day slower than those weaned 42 days before shipment (Peterson et al., 1989).

The second highest characteristic that was sought was knowing when and what vaccinations calves had received before delivery to the sales barn. Calves that were vaccinated the day of shipment gained .10 lb/day slower than those that were vaccinated 42 days before shipment (Peterson et al., 1989).

Other traits such as information on sire or herd breed, feeding management program, carcass information, and injection site received lower rankings. This does not imply that these traits were unimportant; but, relative to the ones scored highest, these traits were less important.

Table 1. Summarized scores for traits order buyers seek in calves ^a.

Trait	What buyer wants to know	Score	What producer needs to achieve it
Weaning	If and when performed	A	Feed, facilities
Health program	What and when dosed	A-	Medicines, facilities
Genetics	Sire, herd breed	C	Breeding program
Feeding program	Type and management	D	Feeding program
Carcass performance	Carcass traits, carcass EPDs	F	Carcass merit discovery program records
Injection site	Injection site	F	Injection site maps

^a Adapted from survey results (Cattle-Fax, 1995)

SEX AND PHYSICAL CHARACTERISTICS

It is well determined that steer calves trade at higher prices than heifer calves. The main reasons for this difference are that heifer calves are less efficient in the feedlot, and that they may be, or may become pregnant. The latter adds to their inefficiency in the feedlot as they spend additional energy when showing signs of heat, or directing nutrients to a growing fetus. Estimates about differences in cost of gain for heifers vs steers vary, but range between \$3 to \$6/cwt (Parker, 1998). This translates to differences of \$18 to \$36 additional costs per head. When prorating this difference to the weight at sale (weaning), this difference becomes \$4/cwt to \$8/cwt. In a recent study of over 5,000 calf lots traded through video auctions, heifers brought \$7.00/cwt less than steers (Table 2; King, 1997; King, et al., 1996, 1997).

An extensive study of factors that affect feeder cattle price differences (Schroeder et al., 1988) demonstrated that sick (showing symptoms of sickness, lame, lumpy hides, bad eyes), or ill-looking (stale, dead hair or mud) cattle, and prevalence of horns are factors affecting price between \$.50/cwt to \$19.50/cwt (Table 3). Lots with cattle showing mixed horns sold at the same price as the standard lot used for comparison.

Calves sold in the fall in thin or excessively thin condition commanded discounts ranging from \$1.10 to \$2.00/cwt (Table 3). Apparently, cattle buyers prefer fleshier conditioned cattle in the fall. Fleishy calves brought \$1.74/cwt more than the standard lot (Schroeder et al., 1988). King et al. (1996, 1997) observed similar results for calves marketed through video auctions. However, their results revealed that, perhaps, the right amount of flesh is light fleshiness (Table 2). For producers selling fall calves in the spring, this trend appears to be totally reversed. Thin and excessively thin calves traded at the same price as the standard lot, while fleshy calves brought a \$2.05/cwt discount (Schroeder et al., 1988).

Although buyers prefer fleshy, full-looking calves in the fall (\$3.36/cwt premium), tanked-looking calves were discounted \$1.30/cwt (Table 3). On the other hand, full or tanked calves traded in the spring were discounted \$4.06 to \$11.51/cwt. Thus, producers selling fall calves in the spring are cautioned against over-feeding their calves prior to weaning sales.

As the industry moves into value-based marketing, specific signals from the market place will dictate the direction of specific traits than enhance value-based marketing. One of these is degree of muscling. Although it is somewhat influenced by breed, genetic lines within breeds and breed crosses probably have a higher influence on muscling than breed alone. In the survey by Schroeder et al. (1988), medium- and light-muscling brought discounts of \$4.28 to \$14.79/cwt relative to the heavily muscled standard lot (Table 3). Also, in recent years, small- or large-framed cattle appear to be discounted against. Schroeder et al. (1988) observed that medium-to-small, and small-framed cattle were discounted \$1.38 to \$9.10/cwt. Medium-to-large cattle brought a \$.55/cwt premium. Compared to medium-framed cattle, premiums for medium-to-large cattle sold through video auctions were \$.84/cwt (King et al., 1997).

BREED

A full discussion on the advantages and disadvantages of each breed, and how these are perceived by order buyers or cattle feeders is beyond the scope of this paper. However, results from surveys conducted thus far indicate some definite trends that producers must be aware, and take into consideration when planning their breeding and marketing programs.

At the time Schroeder et al. (1988) conducted their survey, some definite trends were evident. Some of these remain to this day. For instance, calves of dairy, more than ¼ Brahman influence, and Longhorn were discounted (Table 3). Mixed breed (English x Continental), whiteface, and Continental x English crosses were either paid at the same price as the standard, or at a premium of \$.60 to \$.90/cwt, respectively. Data from studies by King et al. (1996, 1997), and King (1997) support these observations (Table 2). Brahman appearance (large ears) in English cattle caused discounts. This discount was greater if cattle showed a three-way cross between English, Continental and Brahman (King, 1997). The average discount for cattle having large ears was \$2.25/cwt. In contrast with earlier data (Schroeder et al., 1988), in all three years of the study, English x English crosses brought \$.67/cwt more than English X Continental crosses.

Table 2. Influence of sex, condition, frame, breed, and weight uniformity on price of calves sold through Superior Livestock video auctions ^a.

Trait	Year			Average ^b
	1995	1996	1997	
Sex				
Steers	68.62 ^c	62.71 ^c	90.91 ^c	74.08
Heifers	61.79 ^d	55.97 ^d	83.49 ^d	67.08
Fleshiness				
Light, light medium-medium	65.01 ^{c,d}	59.99 ^c	ND ^g	62.50
Medium	64.90 ^d	59.13 ^d	ND	62.02
Medium-medium heavy	65.70 ^c	58.90 ^d	ND	62.30
Frame				
Medium	ND	59.09 ^c	ND	59.09
Medium large-large	ND	59.93 ^d	ND	59.93
Breed				
English, English-x	66.27 ^c	60.67 ^c	88.70 ^c	71.88
English-Continental	66.00 ^c	60.05 ^d	87.58 ^d	71.21
English with ear	64.07 ^d	58.16 ^e	86.74 ^e	69.66
English-Continental with ear	64.49 ^d	58.49 ^e	85.79 ^f	69.59
Weight uniformity				
Even	66.64 ^c	ND	87.89 ^c	77.26
Uneven	64.88 ^d	ND	87.51 ^c	76.20

^aAdapted from King et al. (1996, 1997) and King (1997).

^bUnweighted average.

^{c,d,e,f}Mean values with different superscripts within year and trait differ ($P < .05$).

^gNot determined.

Table 3. Price differentials (\$/cwt) during the fall (1986) and spring (1987)^a.

Trait	Steers weights, lb	
	300 to 599	600 to 899
Illness or horns		
Sick	-19.52	-18.21
Lame or lumps	-19.14	-10.51
Bad eye	-10.03	-4.30
Stale	-4.65	-5.39
Dead hair or mud	-1.31	-.97
Horns	-.49	-.54
Mixed horns	.15 ^b	.17 ^b
Condition		
Thin, spring	-.22 ^b	-.59 ^b
Thin, fall	-1.13	-1.01
Fleshy, spring	-2.05	-.83
Fleshy, fall	1.74	.64
Fill		
Full, spring	-4.06	-1.54
Full, fall	3.36	.87
Tanked, spring	-11.51	-.68 ^b
Tanked, fall	-1.30	-5.77
Muscling		
Light	-14.79	-4.39
Medium	-4.28	-3.27
Frame		
Small	-9.10	-4.11
Medium-to-small	-1.38	-1.71
Medium-to-large	.55	0.04 ^b
Breed		
Dairy	-8.59	-7.32
Brahman, > ¼	-7.06	-3.88
Longhorn	-6.98	-5.24
Other English-x	-2.57	-1.73
Brahman, < ¼	-1.76	-1.52
Angus	-1.74	-.95
Mixed	-.10 ^b	-.48
Whiteface (black or red)	.60	.32 ^b
Exotic-x	.89	.06 ^b

^aAdapted from Schroeder et al. (1988).

^bNot different from a standard uniform lot of large-frame, heavy-muscled polled Hereford calves.

LOT SIZE AND UNIFORMITY

About the only other thing—in addition to spring calving herds—that is fairly consistent in the US beef industry is herd size. With an average herd size of 38 cows (Cattle-Fax, 1998), a producer is expected to bring only 17 calves to the sale barn at any given time. Yet, 60% of the nation’s feedlots have capacities over 2,000 head with pen sizes ranging from 80 to 250 head. This creates a unique situation that favors selection for larger lots at the sale barn. Compared to single head lots, lots with 45 to 50 head of lightweight calves commanded premiums of up to \$6.50/cwt (Schroeder et al., 1988).

Uniform lots commanded higher prices than uneven lots (Schroeder et al., 1988). More recently, differences between even and uneven lots were \$.38/cwt in 1997, and \$1.76/cwt in 1995 (Table 2). Differences between years reflect calf supply; the 1995 calf crop being larger than the 1997 calf crop.

HEALTH PROCESSING AND WEANING TIME

It was indicated that buyers were more willing to buy and pay premiums for calves that had been weaned, and those that had been vaccinated (Cattle-Fax, 1995). Many feedlot operators today will not bid on calves that have not been vaccinated before the sale.

However, for a cow-calf producer, the decision to process calves and/or wean before sale time must also be based on economics. Prices paid for calves that have been weaned or pre-processed must at least pay for the investments in vaccines, feeds, and labor.

Medicine, feed and labor costs vary for each operation; thus, Table 4 lists medicine and feed cost ranges and totals (based on averaged costs). Using this procedure, it is demonstrated that producers can cover their costs if they are paid an additional \$1.18 to \$3.21/cwt for calves that were pre-weaned and/or pre-processed. Similar determinations were made earlier (Hogan and Gutierrez, 1997).

Table 4. Determination of additional price to be received for a weaned and/or processed 550-lb calf.

Expense	Weaned 21 days	Health processed	Weaned 21 days, health processed
Medicine, \$/day	0.0	4 to 9	4 to 10
Feed, \$/day	.36 to .70	0.0	.36 to .70
Total ^a , \$	11.13	6.50	17.63
Additional price, \$/cwt	2.02	1.18	3.21

^a At average feed and health processing cost.

An extensive series of studies tracked prices of calves sold through Superior Livestock video auctions. Transactions tracked involved calves that had been enrolled in one of various programs that defined pre-weaning vaccinations or procedures (Table 5; King et al., 1996, 1997; King, 1997).

Data from 5,092 lots of calves sold between June and October of the years 1995 through 1997 were included. As a reference point, transactions involving calves that had not been pre-conditioned, or vaccinated against viral diseases at least one time between birth and date of shipment were also tracked. Table 6 lists price differentials for lots that were managed differently.

Vaccinating calves at branding with a 7-way clostridia, and then against viral diseases 3 to 4 weeks prior to weaning resulted in positive differentials ranging from \$.99 to \$1.60/cwt in favor of pre-processed calves (Vac 34). Similarly, vaccinating against viral and clostridia diseases at 2 to 4 months of age, then against viral 3 to 4 weeks prior to weaning, and weaning at least 45 days prior to shipment resulted in positive differentials ranging from \$2.47 to \$3.24/cwt in favor of pre-conditioned calves (Vac 45). Unweighted averages revealed that price differentials given to calves that were pre-processed (Vac 34), or pre-conditioned (Vac 45) were well within the range of differentials required to cover feed and vaccination costs (see Table 4 and 6). The differential between calves that had been vaccinated against one or more viral diseases sometime between birth and date of shipment and those that were not pre-processed supports results of the buyer survey (Cattle-Fax, 1995), and underlines the importance of pre-weaning health programs.

Table 5. Health programs for calves sold through Superior Livestock video auctions.

Program name	Vaccination against or weaning time	Time of procedure administration
Vac 34	7-way clostridia	At branding
	IBR (chemically altered modified live)	At least 3 to 4 weeks prior to weaning
	PI3 (chemically altered modified live)	
	BVD (killed)	
	BRSV (modified live or killed) <i>Pasteurella haemolytica</i> (with leukotoxoid component)	
Vac 45 Pre-weaning	7-way clostridia	At 2 to 4 months of age
	IBR (chemically altered modified live)	Or at least 3 to 4 weeks prior to weaning
	PI3 (chemically altered modified live)	
	BVD (killed)	
	BRSV (modified live or killed) <i>Pasteurella haemolytica</i> (with leukotoxoid component)	
	IBR (chemically altered modified live)	At weaning
	PI3 (chemically altered modified live)	
	BVD (killed)	
	BRSV (modified live or killed) <i>Pasteurella haemolytica</i> (with leukotoxoid component)	
		Weaned > 45 days before shipping
Vac 45 Weaning	7-way clostridia	At branding
	IBR (chemically altered modified live)	At weaning
	PI3 (chemically altered modified live)	Revaccinated 14 to 21 days later
	BVD (killed)	
	BRSV (modified live or killed) <i>Pasteurella haemolytica</i> (with leukotoxoid component)	
	Weaned > 45 days before shipping	

Table 6. Price differentials (\$/cwt) for calves sold through Superior Livestock Auction between 1995 and 1997^a.

Year	Differential between no vaccination and			Differential between
	virus vaccination ^b	Vac 34	Vac 45	Vac 34 and Vac 45
1995	.70	1.35	2.47	1.12
1996	.43	.99	3.35	2.36
1997	.72	1.60	3.89	2.29
Average ^c	.62	1.31	3.24	1.92

^a Adapted from data by King et al. (1996, 1997) and King (1997). All comparisons were different ($P < .05$). Please refer to Table 5 for definition of health programs.

^b A vaccination against one or more viral diseases between birth and date of shipment.

^c Unweighted average.

CARCASS CHARACTERISTICS

Traits cattle buyers are seeking in calf lots reflect the needs of their immediate clients—the feedlot operators, and to a lesser extent the demands of packer buyers. For example, unweighted average price differential between English crosses and English-Continental crosses was only \$.67/cwt (Table 3), while that for pre-processed (Vac 34) and not processed calves was \$1.31/cwt (Table 6). Similarly, results from the buyer survey support this observation (Cattle-Fax, 1995). However, as the beef industry continues to react to consumer demand, cow-calf producers need to find out carcass and eating characteristics of the calves they produce.

In the common beef markets, packers and retailers are demanding that beef be a highly yielding, lean, reasonably marbled, and tasty product. Many of the current beef production alliances have established standards for carcass traits that guarantee at least some of the traits listed. For a cow-calf producer, many of these traits are unknown or little understood. Thus, a brief description of each trait and factors that may affect it is provided. Additionally, some observations obtained from the Minnesota Carcass Merit Program are included to aid in describing how these factors affect profitability.

Dressing percentage. A ratio calculated by dividing cold carcass weight by live weight, and multiplying the result by 100. This ratio is likely the most variable index a producer, or packer has to determine yield. Conditions under which live weight is obtained will usually reduce this ratio. Mud, excessive gut fill, and pregnancy reduce this ratio. Fat or degree of finish, and muscling increase it.

Quality grade. Visual appraisal of the degree of marbling (intra-muscular fat) on surface of the loin muscle at the 12th rib will dictate the quality grade a trained USDA inspector gives. There are 9 degrees of marbling in the scale (from no fat specks on the muscle, devoid, to numerous specks on the muscle, which lend it an almost white appearance, moderately abundant or greater). Other requirements must be met for the carcass to be given choice grade; it must be

from a young steer (younger than 30 months), and not fall out of weight range, or be dark-cutting beef. The greater the degree of marbling the better the chance that the carcass will grade choice or prime; these two grades being the highest grades.

It was always thought that marbling was related to both flavor and tenderness; however, recent studies demonstrated that, for the range of marbling degrees, tenderness is weakly associated with marbling (Gibb, 1997). However, within high choice and prime grades, the probabilities of a poor eating experience decrease sharply (Gibb, 1997). This is likely the reason choice beef is in high demand, especially for beef marketed through alliances. Thus, many of these alliances (Schiefelbein, 1998) recommend that 70% of fed cattle lots reach choice. A review of factors that affected price and profit in more than 1,000 calves enrolled in the Minnesota Carcass merit program revealed that for every steer in 100 that reaches choice, profit increases \$1/head.

Yield grade. It is an estimate of the cutability or yield of a carcass (1, high cutability, to 5, low cutability). The formula to calculate yield grade adds value for every fat related measurement that goes into it while it reduces value when ribeye area is entered. Fat depth over the 12th rib, hot carcass weight, and the amount of kidney, pelvic, heart fat relative to carcass weight increase this value. Area of the loin, or rib eye muscle decreases this value. Thus, higher values for yield grade actually mean lower cutability or yield of retail cuts. The industry has received signals from both retailers and consumers that excess trimmable fat should be reduced (National Beef Quality Audit, 1992). Alliances (Schiefelbein, 1998) recommend that 70% or more of the carcass fall within yield grades 1 and 2.

As cattle feeders strive to increase the incidence of choice cattle in their lots, the incidence of yield grade 3 and 4 carcasses also increases. Only through careful observation and selection of sires that produce offspring that can marble easily without excess fat cover will producers overcome this challenge.

Results from the Minnesota Carcass Merit Program indicate that as cow-calf producers shifted from large-frame, late maturing breeds to moderate-frame, earlier maturing breeds in the last 10 years, ribeye area was reduced. Thus, producers are encouraged to select sires that will enhance muscling in their herds while maintaining moderate frame and age at maturity.

Non-conformer carcasses. This is a separate category for carcasses that do not fall into the minimum standards to market beef. Within this definition are carcasses that are heavier than 950 lb, or lighter than 650 lb; dark-cutting carcasses; and carcasses from old cattle (older than 30 months). Although the only way to determine this is from observing the ossification of rib, back, and pelvic bones (no age information is ever available at harvesting).

The standard alliances are attempting to establish is zero non-conformer carcasses (Schiefelbein, 1998). From an age and weight point of view this should be easy to accomplish. Limiting frame size and properly managing calves prior to and after weaning. Large-frame, late maturing cattle should be placed on feed as early after weaning as possible. On the other hand, medium-frame, early maturing cattle can be stockered or backgrounded for a short time to prevent over-fattening in the feedlot.

IMPLEMENTING ADDED-VALUE STRATEGIES

Although the initial process to implement changes to improve marketing is probably long and tedious, the rewards are enhanced profits and greater satisfaction in raising beef. This process is not limited by herd size, calving date, geographical region, accessibility to markets or any other factor. Producers must first be proactive in their desire to increase profits. Then, information should be gathered on how the items addressed in this paper can be implemented on their farms. A list of the factors that add value and what producers need to achieve it is given (Table 7). Once this process is complete, producers can easily make the necessary changes to reap additional \$1.10 to \$4.00/cwt that higher quality, pre-conditioned calves marketed in uniform lots of 50 to 60 head can bring. However, producers must not wait to make these changes. As pressures from other meats affect beef demand, beef supply may continue to surpass it giving way to major discounts if calves are not pre-conditioned and of good quality. If our industry reaches this point, expect no premiums for pre-conditioned, high quality calves—these will become the minimum standard to be bided on.

Table 7. Practices that add value to calf marketing and what is needed to implement them.

What adds value?	What do you need?
Marketing vs selling	Change your attitude, be proactive
Knowledge	Listen to surveys, discover value of cattle
Short-term	
Pre-processed calves	Health program, facilities
Pre-conditioned calves	Feed, feed program, facilities
Unblemished calves	Monitor births, injection sites
Uniform calves	Sort odd, sick calves, shorten breeding season
Mid-term	
Lots of 50 to 60 head	Form marketing groups
Direct, video marketing	Access feeders, video auctions
Long term (but start now!)	
Moderate frame+	Select moderate cow breeds/lines
Heavy muscling	Use muscular sire breeds/lines
Propensity to marble	Use marbling cow breeds/lines
Growth rate	Use fast growing sire breeds/lines

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LITERATURE CITED

- Cattle-Fax, 1995. NCA-IRM Calf Information Task Force Survey. *Cattle Marketing Information Service, Inc.*
- Cattle-Fax, 1998. Cattle Industry Reference Guide. *Cattle Marketing Information Service, Inc.*
- Gibb, J. 1997. Opportunities for enhancing beef palatability. *Minnesota Cattle Feeder Rep.* B-444.
- Hogan, T. and P. Gutierrez. 1997. Pencil It Out: How big a discount can you stand before preconditioning pays for itself. *Beef.* Spring.
- King, M.E., T.E. Wittum, M.D. Salman, and K. G. Odde. 1996. The effect of value added health programs on the price of beef calves sold through seven Superior Livestock video auctions in 1995. *Colorado State University Beef Prog. Rep.* pp. 167-173.
- National Beef Quality Audit Report. 1992, *Published by the National Cattlemen's Association, Englewood, CO.*
- King, M.E., T.E. Wittum, and K.G. Odde. 1997. The effect of value added health programs on the price of beef calves sold through nine Superior Livestock video auctions in 1996. *Colorado State University Beef Prog. Rep.* pp. 159-165.
- King, M.E. 1997. The effect of value added health programs on the price of beef calves sold through 10 Superior Livestock video auctions in 1997. *Final Rep. Submitted to Pfizer Animal Health.*
- Parker, B. 1998. Why the Discount? *Angus J.* October. pp. 246.
- Peterson, E.B., D.R. Strohbehn, G.W. Ladd, and R.L. Willham. 1989. Effects of preconditioning on performance of beef calves before and after entering the feedlot. *J. Anim. Sci.* 67:1678-1686.
- Schiefelbein, D. 1998. Back to the basics: A real-world strategy for improving the quality and consistency of beef. *Minnesota Cattle Feeder Rep.* B-458.
- Schroeder, T., J. Mintert, F. Brazle, and O. Grunwald. 1988. Factors affecting feeder cattle price differentials. *Western J. Ag. Econ.* 13:71-81.