SDSU Extension

BEEF

Chapter 10

Prepping Calves for Success in the Feedyard and Beyond

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Introduction

"The essence of successful cattle production is to create a highly valuable calf crop, and then go tell people about it."

– Tom Brink, 2013 Range Beef Cow Symposium, Rapid City, SD

While the consumer is the final step in the beef supply chain and the person who gives the industry the ultimate pass or fail grade, for a cow-calf producer there are other intermediate customers in the chain that have their own needs and specifications for the calves that they purchase. Although the cow-calf and feedlot segments often appear to be at odds, particularly in the realm of competitive buying and establishment of value in the marketplace, in reality the two segments are dependent upon each other. This chapter will discuss what the feedyard sector needs in the cattle they buy, what cow-calf operations can do to fill those needs, and how to improve communication and feedback so that both sectors can benefit.

Why Worry About the Feedyard?

That is certainly a question asked by many cow-calf operators over the history of the cattle business. After all the feedyard has a vested interest in reducing the price paid for calves; while the rancher wants higher prices for the calves being sold. Historically there were only minor differences in price between superior, average, and below average cattle. Consequently, there has been little incentive for cow-calf producers to invest added resources and management into improving their calf crop, other than to try to make calves heavier. However, that model has been under assault for several reasons in recent years as economic conditions and market signals have changed.

First, there has been a realization that the lack of communication between segments has resulted in missed opportunities and loss of market share compared to competing sources of animal protein. The Strategic Alliances Demonstration Study conducted in 1992 served

Key Points

- Management at the ranch, including genetics, pre-weaning management, nutrition, and preventative vaccinations, affect the profitability of all the segments of the beef industry further along the supply chain.
- Ranchers can influence some of the factors that determine the health status, performance, and carcass merit of the cattle they raise.
- Communication between industry segments is critically important in capturing value.

as a jumping off point for the industry to explore relationships between various industry sectors (Peters, 2001). Since that project, there has been a rapid proliferation of alliances and grid programs with the goal of transferring economic signals that reward the production of cattle that can perform exceptionally well and hit a defined carcass target. According to the 2011 National Beef Quality Audit, lack of trust and transparency between segments is still a significant cause of lost opportunities and inefficiencies in the beef industry today (NCBA, 2011).

Secondly, the differences between pens of cattle and between individuals within a pen have become much more apparent, especially when sold on a grid or value-based system. In such scenarios it is not uncommon to find differences of net return within a pen of $300 or much more per head (Walker and Rusche, 2014). The proportion of slaughter cattle that are sold in some form of value-based systems has increased in the last decade. As shown in Figure 1, nearly three times more cattle in 2012 were sold in a value-based system compared to a traditional cash method. In contrast those two marketing methods accounted for nearly equal percentages of cattle sold as recently as 2006 (Mike Kasten, personal communication). Consequently, carcass merit is a larger driver of value now compared to when cattle all sold for relatively the same price on a live or carcass weight basis.

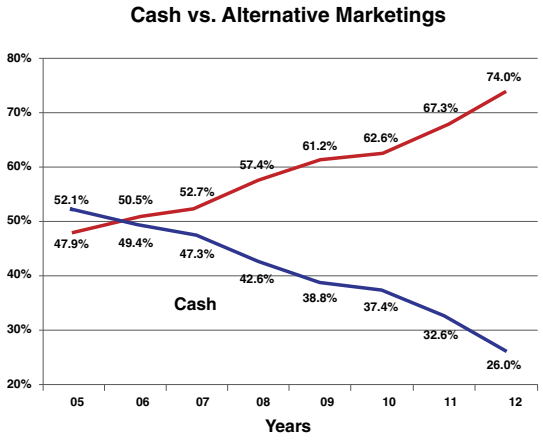

Figure 1: Proportion of slaughter cattle marketed on a cash or alternative basis. *USDA & CattleFax; Courtesy Mike Kasten, Quality Beef by the Numbers.*

Increases in both cattle and feed values have resulted in an increased focus on factors that influence feed efficiency and performance. The impact of changing feed efficiency from 7:1 to 6:1 is much larger in absolute dollar value when corn is $5 per bushel compared to when corn cost $2 or less. Reducing death loss by 0.5% has a considerably greater value when a typical calf entering a feedyard costs more than $1,000 as opposed to when calves could be purchased for $500-$600 per head.

Finally, changes in the ability to manage data in feedyards are leading to changes in how feeder calves are purchased. Close out data can be sorted and analyzed based on cattle source; whether that is by auction market, order buyer, or by the individual ranch. It will be much easier for buyers to use historical data to determine how much to bid on cattle or whether to bid at all. Cow-Calf producers that fail to incorporate these lessons into their management decisions may well find themselves with a smaller number of buyers offering less attractive bids.

What Characteristics are Feedyard Seeking?

While the cattle feeding sector can appear complex and technical in nature, the cattle traits associated with profitability are relatively straightforward. In a presentation at the 2013 Range Beef Cow Symposium in Rapid City, SD, Tom Brink, formerly with Five Rivers Feeders, stated that the following attributes were the most important to the feedyard sector:

- Health status
- Performance as indicated by high ADG and improved feed efficiency combined with the ability to finish at a desirable (higher) weight without incurring discounts for overweight carcasses
- Ability to achieve a high quality grade

Health

Although a number of health conditions can impact feeder cattle such as lameness and digestive disorders, mortality and sickness caused by bovine respiratory disease (BRD) is the most costly health issue facing feedlots, especially in newly weaned/received cattle (Duff and Galyean, 2007). While death loss, and to

a lesser extent treatment costs would appear to be the most obvious sources of monetary losses, BRD also impacts performance and carcass merit. Cattle that were treated more frequently gained more slowly with fewer carcasses grading in the upper two-thirds of the choice grade (Reinhardt et al., 2012). Similar results were reported by Busby et al., (2004) with their work also showing poorer feed efficiency in cattle that required treatment compared to those that did not.

Performance and Carcass Weight

The reasons that faster growth and improved feed efficiency are important components to feedlot cattle profitability are rather obvious; faster gaining cattle that require less feed per pound of gain have a lower cost of gain and better odds of being profitable compared to their slower gaining, less efficient counterparts. As discussed above, health status is an important component, along with genetic growth potential and factors such as condition or fill.

Increased finish weight (and carcass weight) is also a key factor in profitability (Walter and Hale, 2012; Walker and Rusche, 2014), provided that discounts for overweight carcasses can be avoided. By marketing at heavier weights the difference between sale and purchase price is diluted by more pounds. For instance, suppose a 500 pound steer costs $2.80 per pound and slaughter cattle are worth $1.50 per pound on a live weight basis. There would be a $1.30 per pound loss on the purchase price, or $650 per head that would need to be made up on the difference between the selling price and the cost of gain ($2.80-$1.50 times 500 pounds). If that steer were sold at 1400 pounds; then that $650 per head marketing loss would be spread out against 900 pounds of gain, or about $0.72 per pound gained in the feedyard. Applying those same values to a steer marketed at 1,200 pounds results in a marketing loss of about $0.93 per pound of live weight gained. To achieve the same level of profit, the smaller steer would have to be cheaper to feed or less expensive to buy. It is easier for the feedyard to either avoid or bid less aggressively for the calf that will finish at a lighter weight.

Carcass Merit and Quality Grade

As more finished cattle are marketed on a grid basis, the carcass characteristics of cattle on both an individual and pen basis also increase in importance. An example of carcass premiums and discounts for the first week of April, 2014 can be found in Table 1 (USDA, 2014). Premiums and discounts vary during the course of a year depending on beef demand and the relative supply of higher grading cattle, but this table illustrates two general points: 1) the discounts for missing targets are much larger than the potential premiums; and 2) differences in quality grade typically have a larger impact on carcass price compared to differences in yield grade. These differences in premiums and discounts would be consistent with published analysis of closeouts separated into high, medium, and low profit thirds. In those reports the avoidance of discounts and a greater percentage of higher quality carcasses played a larger role in profitability than did improved yield grade (Walter and Hale, 2012; Walker and Rusche, 2014).

Table 1: Average carcass premiums and discounts, April 7, 2014. *Adapted from USDA Market News Service, April 7, 2014.*

Carcass Attribute	Premium or Discount ($ per cwt. HCW)
Quality Grade	
Prime	12.97
CAB	3.78
Choice	0
Select	-7.65
Standard	-22.47
Dark Cutter	-34.75
Yield Grade	
1.0#– 2.0	3.37
2.0 – 2.5	1.83
2.5 – 3.0	1.30
3.0 – 4.0	0
4.0 – 5.0	-11.33
> 5.0	-15.87
Carcass Weight, pounds	
400 – 500	-27.33
500 – 550	-19.63
550 – 600	-7.25
600 – 900	0
900 – 1000	-1.09
1000 – 1050	-6.56
> 1050	-22.50

What Can Cow-Calf Producers Do to Meet Expectations?

There are a number of management decisions that ranchers can implement to better prepare their calves for the next phase in the production cycle. Not all of these practices require additional investments of time or resources; many only require minor adjustments in existing practices and can pay dividends in terms of improved productivity and cost efficiencies in the ranch.

Genetics

Genetics play a major role in how well cattle perform past the ranch gate. Beef cattle genetics and genetic selection tools are already extensively covered in this publication (Chapters 39 to 41) so this discussion will be brief and more general in nature. There are several EPDs and selection tools available that will provide additional information regarding carcass traits (marbling, rib eye, yield grade) and in some cases feed efficiency. Many of the selection indices currently available (i.e. B, CHB, API, TI) incorporate carcass and growth EPDs into those calculations. The advantage of an index is the ability to weight a multitude of traits based on how they affect profitability. That avoids the potential drawbacks of single trait selection or trying to find bulls that meet arbitrary minimums for many traits simultaneously. Tools using DNA marker technology for use in commercial cattle, such as GeneMax (Certified Angus Beef, LLC, Wooster, OH) or other such tools that may become available in the future could help producers make more accurate selection decisions and also serve as a tool to better communicate the genetic merit of their calves to feedlot purchasers.

Disposition

This topic could fit under the genetics category as well, as disposition certainly has a genetic component. The heritability estimates for disposition are roughly the same as those for growth traits, so improvement in cattle temperament through genetic selection is certainly possible. Currently EPDs for docility are published for the Angus, Limousin, and Simmental breeds.

Poor disposition leads to significant problems not only on the ranch but also in the feedyard. The Tri-County Steer Carcass Futurity in Iowa categorized cattle as being either docile, restless, or aggressive (Busby et al., 2006). They found that the docile cattle gained faster and had improved quality grades compared to either of the other two groups. The aggressive cattle in this study were also more likely to die while on feed.

In a case study involving a retained ownership demonstration project, there was a significant difference between herds in the disposition score of their calves (Vann et al., 2008). In fact the impact of ranch of origin was more significant than was the breed of the sire in predicting which cattle had disposition problems. It wouldn't be unreasonable to assume that feedlots may well put certain ranches on "do not buy" lists if their calves are particularly difficult to handle. Any efforts made to improve cattle handling techniques and to better acclimate calves to interacting with people would be well worth the effort to ensure buyer acceptance. A more extensive discussion of low-stress handling techniques can be found in Chapter 6, Low Stress Handling Basics. Cow-Calf producers should strongly consider marketing any exceptionally difficult or "crazy" calves separately so as to not make the entire group worse or to do long-term damage to the reputation of the ranch's calves (Pritchard, 2013).

Pre-Weaning Management and Nutrition

Nutritional factors play an important role in health and performance of cattle, beginning with the first day of life. Colostrum intake and passive immunity transfer are not just important in preventing sickness and death at young ages in calves; failure of passive immunity transfer can affect cattle after weaning in the feedlot. In a study at the U.S. Meat Animal Research Center (USMARC), calves were categorized as having either adequate or inadequate colostrum intake 24-hr after birth based on immunoglobulin and plasma protein levels in the bloodstream (Wittum and Perino, 1995). Those calves deemed to have had inadequate colostrum intake were more likely to get sick from BRD in the feedlot after weaning. Similar observations have been reported in the dairy industry where heifer calves that received greater quantities of colostrum produced more milk in their first lactation (Faber et al., 2005). Those results showing impacts two years

after birth combined with what we know about the effects of sickness on carcass quality support the concept that inadequate passive immunity transfer might negatively impact carcass value as well as cause losses from disease. Just as in the case of disposition problems, producers should consider marketing calves that they know did not receive enough colostrum separately (Pritchard, 2013).

Energy and protein nutrition typically receive the most attention when formulating cattle diets, but meeting mineral and vitamin requirements are critical in supporting proper immunity and vaccine response (Carroll and Forsberg, 2007; Duff and Galyean, 2007). The most extensive (and expensive) vaccine protocols do little good if the cattle are suffering from vitamin and mineral deficiencies. Chapter 20, Mineral Nutrition for Beef Cattle, covers this topic in more detail. The mineral content of forages and water supplies can vary widely by location with many possible interactions and antagonisms; therefore, producers should consult with a local nutritionist to develop a site specific mineral plan for their individual herd.

Timing of castration impacts the ease with which steer calves make the transition to the feedlot. Research has shown that bulls castrated shortly after birth had dramatically less weight loss and a reduced stress response compared to bulls castrated later in life (Bretschneider, 2005). Some cow-calf operators elect to delay castration with the rationale that by leaving bull calves intact longer they will be able to take capture additional weight gains. However, research conducted at Kansas State University contradicts that assumption, based on results that showed calves that were castrated and given an implant approved for suckling calves at about 90 days of age were heavier 30 days after weaning when compared to calves castrated at 225 days of age. In the same study, results showed that although the intact bull calves were heavier at weaning compared to the early castrated calves that were not implanted, those differences disappeared 30 days after weaning (Marston et al., 2003). Reduced marbling scores have also been observed when castration is delayed (Worrell et al., 1987; Heaton et al., 2004). For these reasons producers should strongly consider castrating bull calves as early in life as practical to avoid adding multiple stress factors near weaning, as well as avoiding detrimental impacts on performance and quality.

Preventative Bovine Respiratory Disease (BRD) Vaccination

Aside from dehorning and castration, possibly the management practice most commonly used by cow-calf producers to prepare calves for the feedlot is pre-weaning vaccinations for Bovine Respiratory Disease (BRD). In a recent survey, the majority of beef producers that own more than 50 cows vaccinate calves at least once against BRD causing organisms (NAHMS, 2010). A more extensive review of health management protocols for calves can be found in Chapter 35, Health Considerations: Beef Calves on Pasture. As a general rule, producers should consult with their herd veterinarian for individualized protocols, but there are some guidelines that fit most situations.

Generally speaking the strongest immunity is realized by using modified-live vaccines in calves. Giving calves two doses before feedlot arrival is ideal, although one dose is better than none (Pritchard, 2013). Improper vaccine handling and administration can render the best protocol useless. Some best management practices for storing, handling, and administering vaccines include (Daly and Price, 2010; Pritchard, 2013):

- Keep vaccines refrigerated at 35 to 45°F unless otherwise specified on the label.
- Use ice packs and coolers to keep vaccines at their proper temperatures at chute side during warm weather (containers of warm water may need to be kept in the cooler under extremely cold temperatures to keep vaccine from freezing). This includes loaded syringes if they are not being used.
- Keep vaccines out of direct sunlight, including loaded syringes. Figure 2 shows an example of a home-made syringe cooler/holder.
- Do not mix more vaccine than will be used in 1 to 2 hours. Consider the number of cattle to be worked at a time when ordering vaccine to minimize the amount of unused, mixed vaccine.

- Use clean needles and change them often, but at a minimum they should be changed whenever the syringe is filled or if the needle becomes burred or bent. Follow label instructions for the proper route of administration, with injections given subcutaneously whenever possible. All shots should be given in the appropriate regions of the neck.

Figure 2: Chute side syringe holder/cooler. *Photo courtesy of April Rusche.*

Preconditioning

Preconditioning takes the concept of vaccinating calves pre-weaning plus it should include retaining the calves on the ranch of origin for a period of time (preferably 45 days or more) before being shipped to the feedlot. It is intended to help decrease stress and increase immune function in weaned calves, resulting in decreased respiratory disease. There are well-known benefits to preconditioning in the stocker and feedlot segments of the beef industry as it has been shown to decrease morbidity and mortality, to increase post-weaning gain and to improve carcass quality. Four primary purposes are accomplished through pre-conditioning:

- Bunk breaking calves
- Adapting calves to diets containing harvested feeds or concentrates
- Allowing calves time to adapt to new social structures without the cow
- Reduced stress at feedlot arrival and consequently reduced risk of BRD

Recommended preconditioning practices to accomplish these purposes are outlined in Chapter 9, Weaning Methods to Improve Calf Performance. Vaccination protocols are a key part of reducing stress at feedlot arrival; thus the industry has developed various preconditioning or pre-weaning vaccination protocols such as the two examples shown in Table 2 (Superior Livestock Auction, 2014). Typically these protocols will call for clostridial, viral, and Pasteurella vaccinations. Because internal parasites can negatively affect immunity and vaccine response, deworming is also a common recommendation (Thrift and Thrift, 2011).

Preconditioning single-source calves can result in fewer treatments for BRD, especially when compared to co-mingled calves from multiple sources with unknown health history (Roeber et al., 2001; Step et al., 2008). Reduced sickness risk

Table 2: Example preconditioning and pre-weaning vaccination protocols. *Adapted from Superior Livestock Auction, 2014.*

Vaccination Protocols	VAC 34	VAC 45
Clostridial Vaccination 7-way, 8-way, or 9-way	Two doses • Branding time • 2-4 weeks pre-shipping	Two doses • Branding time • 2-4 weeks pre-shipping
Viral 5-way (IBR, PI3, BRSV, BVD Types I & II)	One dose • 2-4 weeks pre-shipping • IBR and PI3 must be MLV	Two doses • Boosted per label • instruction • IBR and PI3 must be MLV
Pasteurella Haemolytica and/or Pasteurella Multocida	One dose • 2-4 weeks pre-shipping	One dose • Prior to or at weaning • Boosted per label instructions
Parasite Control	Internal & external parasite control recommended	Internal & external parasite control recommended
Weaned	N/A	Yes, must be weaned a minimum of 45 days prior to shipment

combined with lowered labor requirements and the elimination of bunk crawling and pen roaming are reasons why some feedyards prefer to only purchase preconditioned calves (Pritchard, 2013). Evidence of that demand is also demonstrated in price premiums being paid for calves enrolled in more intensive health certification programs compared to calves not certified (King et al., 2006). Over a 25-year period, premiums for preconditioned calves have been shown to be from $1.43 to $6.15/cwt (Thrift and Thrift, 2011).

There is no guarantee that premiums received will be sufficient to justify the added expense of feeding calves for 45 days. Furthermore, not every ranch has the feed, facilities, and available labor and management to precondition calves. However, in a recent review of research studies from the 1980's through 2010, Thrift and Thrift (2011) reported that the range in net profit values for preconditioning ranged from - $89.92 to $53.71 per calf. Thus, it is important to evaluate each situation with differences in calf prices, feed prices, labor and other costs to determine feasibility and profitability.

If calves are not preconditioned does that automatically mean they are destined for sub-par performance? Not necessarily, as the positive responses to preconditioning have not been universally observed. Macek and co-authors (2010) saw no advantages in performance or health status during the receiving phase by weaning ranch-direct calves more than 15 days before shipping. Similarly, when comparing preconditioned and conventionally weaned herd mates from multiple South Dakota ranches that were co-mingled after shipping to the feedyard, there were no improvements observed in either treatment rates or overall performance (Pritchard and Mendez, 1990).

Close out data and carcass information from more than 54,000 head of cattle in the Certified Angus Beef Feedlot Licensing Program database from 2008 to 2012 also suggest that preconditioning may not be necessary for all calves to excel in the feedlot and on the rail. In that data set, calves that were not weaned when they arrived at the feedyard had heavier finished and hot carcass weight (HCW) and a lower cost of gain compared to calves that were weaned for more than 45 days. They also had higher marbling scores resulting in significantly more carcasses grading CAB and Prime (Certified Angus Beef, LLC, unpublished data).

One possible explanation for these results offered by feedyard managers whose cattle were represented in this database was that these feedlots only wean calves in their facilities after extensive communication with the individual ranches regarding prior management and vaccination history. Another factor could be that feedyards are able to focus very intensively on managing and caring for calves during the weaning/receiving phase with specially designed protocols and nutrition programs. In contrast, on a cow-calf operation other activities and enterprises often compete for labor and management, which can lead to less than ideal outcomes from preconditioning (Dunkel, 2013). If cow-calf operators do elect to keep calves on the ranch past weaning, they need to be prepared to provide a high degree of management and attention during the starting phase.

Capturing Value

It could certainly be argued that many of the management factors addressed here, such as early castration, eliminating cattle with poor disposition, and ensuring sufficient colostrum intake should be viewed as standard good animal husbandry practices. However, other practices discussed in this chapter such as preconditioning and improved genetics represent additional investments in resources and management. Cow-Calf producers would be well justified in asking how to make those additional expenses and efforts pay off.

Short of retaining ownership all or part of the way through slaughter, the only other way that cow-calf producers can reap some of the benefits of their extra efforts is to communicate those practices to potential buyers that are seeking value-added calves. That has been a significant stumbling block to the United States beef industry. For example, although pre-weaning vaccinations have become much more common, especially among larger producers, only 35% of all U.S cow-calf producers share that information with buyers (NAHMS, 2008). Furthermore, nearly half, or 43%, of operations that with 100-199 cows and 26% of those with more

than 200 cows do not share that information with buyers (NAHMS, 2008).

For producers to receive any benefit from preconditioning, or any other value-added attributes, details of those practices need to be described to prospective buyers (Thrift and Thrift, 2011). Fortunately there are more avenues available to ranchers to assist in that process. Many of the allied industry companies have partnered with local and national cattle marketing firms to assist producers in promoting the attributes of their cattle. Examples include many programs detailing specific health practices or genetic background (Superior Livestock Auction, 2014). Even with those partners, the day may be approaching when commercial ranchers will need to budget for promotional expenses much like other businesses. The ability to connect with buyers and marketing professionals and build relationships to increase demand for a ranch's calves may become as valuable as cattle management and husbandry skills.

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