

Preparing the Calf for Feedlot: The Role of Nutrition and Management in the Pre-Weaning Period on Future Health and Performance

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Introduction

The feedlot manager simply wants to immediately fill a pen with 9 mo old, 650 lb steers that possess the nutritional wisdom, immunological memory, and environmental experience of a 5 year old cow carrying 4 brands. That is, the calves will walk off the truck with no remorse about being relocated, recognize where to find feed and water and know how to eat whatever is provided today. They will recognize all of the important pathogens and like that cow, they are survivors. The pen mates will achieve market readiness together and will generate minimal out cattle when graded.

We have certainly tried to build the bulletproof calf. In controlled studies we can demonstrate favorable responses to various interventions applied to specific situations. Collectively these interventions should minimize feedlot morbidity and mortality (**M & M**) rates. It is a frustration for everyone that the industry is not realizing reduced M & M rates (Babcock et al., 2006). Several adverse factors/practices could be contributing to the apparent lack of progress. Feeder cattle are entering the feedlot at younger ages. As a consequence of feedlots getting larger there is a greater concentration of more cattle, from more origins, and with potentially more transit distance to the feedlots. Economics have pressed feedlots to feed more aggressively and to use more variable by-product feeds. This constitutes an accumulation of risk factors that could push M & M rates higher. Things may very well be worse but for our broadening use of better pre-feedlot management strategies.

This essay will focus on four areas where cow calf operations can continue to address ways to prepare the feeder calf for the feedlot. These include Behavior, Nutrition, Preventative Health and Uniformity. Genetics is conspicuously absent from the list, simply because it is a standalone topic that couldn't be adequately addressed here.

Behavior

It seems the time is right to move the topic of Behavior to the front of the essay. One behavior trait is unilaterally desirable. That is to eliminate the crazies. Reinhardt et al. (2009) showed that these cattle have poorer performance and produce lower value carcasses. It seems plausible to suspect that they pull down the whole pen with them.

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They get toe abscesses, they cause injuries, they get injured, and they break things. They represent a hazard to the crew. Cost?

There is a major difference between a big flight zone and a psychopath. A big flight zone is manageable. We need to identify the problem calves and find an alternate outlet for them to avoid lowering the value of the balance of the calf crop. Since disposition is moderately heritable it will be necessary to plan to remove the parents. It is a win-win situation since life is improved on the ranch too when the ill-tempered cattle are eliminated.

Vaan et al., (2008) noted that ranch of origin has a significant effect on the excitability of feedlot calves. Genetics probably contribute to this observation but we cannot overlook the effects of cattle handling techniques calves experience at the ranch. This is a touchy subject and it is fraught with nuances. Even so, we all need to be willing to evaluate our facilities and our interactions with the cattle. Nearly all of us can learn better techniques and we need to be much more proactive about training our crews. Undifferentiated “experience” handling cattle is no longer a qualification. It is time for us to leave the excitement of the good ol’ days to the old timers and the rodeo shows.

When we wean and bunk break (**BB**) calves more than anything else we are modifying behavior. Whether you should-or should not do this depends upon your resources and your customer feedlot expectation. Certainly it is quieter and more convenient for feedlots to receive weaned, BB calves. Some feedlots, especially larger ones, must have this behavior modification. System logistics cannot accommodate the behaviors of bunk crawling and pen roaming. These feedlots recognize their circumstances and buy calves accordingly. However, the fact that big yards may operate with these constraints doesn’t mean it is the only way to go. Many ranches will be challenged to be able to afford the feeds, equipment, facilities, labor resources, and cattle feeding experience/technical support of a well-managed feedlot. There is compelling evidence out there that marginal weaning management at the ranch can be a costly practice. A marginal program can cause more harm than good, even if the calves did stay at home. If the feedlot is oriented to handle bawling calves it becomes a question of whether the truck ride is offset by the enhanced capabilities of the feedlot.

The bottom line is that BB should not be considered the production practice standard. Ranches should do a self-analysis of their resources to decide which type of calf production system they can support. Then selling BB or bawling calves is acceptable if management takes steps to find the appropriate feedlot customer. I have no data to support this next comment but my expectation is that if ranches and feedlots have good cattle handling, the bawling calf will be much better at making the ranch to feedlot transition.

Health

Not being a veterinarian, this section is limited to a feedlot manager and nutritionist view of health issues. Vaccines continue to improve; their use on the ranch continues to grow (NAHMS, 2009), and yet we are gaining no ground on feedlot M & M rates (Babcock et al., 2006). A key on the ranch is effective administration of the right vaccines. Review vaccine handling and injection techniques. Evaluate what actually happens, rather than relying upon what was intended. Work with the cow herd veterinarian to develop a herd health program that uses Modified-Live-Virus (**MLV**) vaccines. Use a strategy that will circumvent dominant antigen interactions among vaccines. One round of vaccinations is better than none, but two rounds of vaccinations are much more effective. Feedlots understand that stressed, excited calves, with elevated cortisol levels respond poorly to vaccines. The same rules apply on the ranch. Work them quietly and remember that we all care about injection sites. The cost of trimming blemishes from injection sites can be substantial. Use clean needles, use products that allow subcutaneous injections whenever possible, and keep injections localized to the appropriate region of the neck (www.bqa.org/resources.aspxBQA.org).

Nutrition

Nutrition is extremely important to calf health and vaccine response. To prepare a calf for the feedlot, make sure there is good quality colostrum and that the newborn gets an adequate dosage. Using observations from the dairy industry (Soberon, 2010) failure of adequate passive immunization in neonates likely affects health and productivity for the lifetime of a feeder calf. If you know calves that didn't get the right start, move them to the crazies group to be sold separately. Cow nutrition during gestation, maternal instincts, calf vigor, dystocia, and calving weather all have an impact on achieving effective protection via colostrum. It will be necessary to keep records and to review those records prior to marketing the calf crop.

The feedlot industry is keenly aware, that as part of an effective health program, we must meet the mineral needs of incoming cattle. In part, this is due to the role of several trace minerals in immune function (Underwood and Suttle, 1999). These same trace minerals are necessary to support the immune system on the ranch. Grazing forages across the country are generally poor at providing desired levels of some key minerals. Most fall into the range marginal, or inadequate, or toxic levels (Corah et al. 1996). It is important for ranches to implement an effective, site specific mineral nutrition program. Mineral nutrition needs to be in place to support an effective response to ranch vaccinations and to ensure normal physiological levels are present when calves depart for the feedlot.

Adequate vitamin E pre-shipment could also be beneficial. We know that vitamin E is important in receiving calf health (Duff and Galyean, 2007; Droke and Loerch, 1989). We also know that it takes time for vitamin E to become incorporated into tissues (Arnold et al., 1993). This lag in tissue uptake becomes problematic if calves arrive at the feedlot with depleted tissue Vitamin E levels.

Creep feeding is nutrition at another level. It does provide a mechanism for delivering minerals and vitamins (Moriel and Arthington, 2013). Creep feeding alters behavior by training calves to recognize milled feed and availability of feed from mechanical devices. Supplemental feeding can ameliorate problems of poor quality or limited quantity of forage. Creep feed can fill the nutritional gap for large framed, high growth calves as they reach heavier body weights. In these circumstances creep feeding will probably also aid eventual quality grades (Myers et al., 1999). Conversely, self-feeders can also lead to digestive problems, variability in flesh of calves at weaning, hurt F/G in the feedlot and lead to premature fattening. Like the 45d at home weaning, creep feeding isn't a matter of Yes or No; whether or not creep feeding is beneficial is a matter of managing the circumstances.

Calf Crop Demographics

Usually this section is called uniformity and the discussion centers on the phenotypic uniformity of the calves and the commonality of the health management procedures used. Those aren't the goals; they are only for screening purposes. There are 2 goals. The first is to at once fill a pen with calves that have a common immunological and nutritional history. This allows us to best manage the receiving period. The second is to have a pen that achieves a market ready end point at a common days on feed with minimal outs. This reduces carcass discounts, eliminates labor costs of sorting, and eliminates the cost of ghost yardage.

A consistent finding of Ranch to Rail type project analyses is that ranch of origin explains more variation in profit than can be explained by any other of the management variables they categorize. If biosecurity isn't a compelling enough reason to not co-mingle calves, the variability that exists between ranches should be. This rationale suggests that taking all 90 of the steer calves from Ranch A can be better than taking the 50 hd cut from Ranch A and a matching 40 hd cut from Ranch B. I cannot show you the study that proves this is so, but I offer that this is how we have allocated feeder cattle to studies since 1996, because keeping ranch of origin patent improves sensitivity in our research. We could co-mingle and resort these cattle and reduce the standard deviation of the initial body weight. However like a commercial feedlot, we analyze data at the end using pen as the management unit or experimental unit. Source is consistently a major source of variation (greater than significant treatment effects). By maintaining source we reduce the pen to pen variation compared to co-mingled pen studies. Factors that seem to contribute to the greater variation among co-mingled pens are elevated M & M rates and less consistent physiological end points at close out.

In our research facility, these single source feeders are not progeny of ½ sib bulls or other dramatic, intensive attempts at uniformity. In the calves we feed we do know that they are of similar age (60-70d calving season) and the ranches don't offer us the mistakes. The mistakes we don't receive are the calves born 6 wk before calving season, the failed passive transfers, the orphans, or the August pneumonia. There is a wide spread in WW, but we have found that if ages are similar, the smaller calves

simply beget smaller cattle at harvest. The key is that in similar age, single source calves, the little ones finish at the same time as the bigger calves. The feedlot can manage that, the system is efficient and both rancher and feedlot manager can make more informed decisions in pursuit of improving.

What about the calves from smaller herds? If I was managing a feedlot I would look for a backgrounder that buys the small lots from Preconditioned Calf Sales. After 40 to 50d on a common diet in the backgrounding yard, nutrition, immunology, and behavior are normalized. Differences in growth potential will now be more evident to make an “informed” sort. A pen sized lot of these steers would be the second best option to single source calves.

Implants belong in the discussion of uniformity. Our studies make it clear that suckling phase implants don't adversely affect subsequent production. The real issue for feedlot managers, perceived or not, is that implants cause misunderstanding. Feedlots need to know if implants were used and if so, when and which ones. Reconsider the Ranch A and Ranch B steer calves, both weighing 550 lb. Ranch A calves were not implanted; Ranch B calves were implanted. If these calves are the same age, Ranch A calves are genetically superior for growth. We can draw this conclusion because they achieved 550 lb without a growth promotant. If the feedlot buys both groups, puts them in one pen and implants all of them, the Ranch A calves will respond better. This response is because they were genetically superior, not because they were non-implanted calves. From this point forward the weights of A and B calves will continue to separate. We can anticipate that as this pen approaches market readiness there will be a uniformity problem. This applies within ranch as well. Using varied implant strategies (or creep feed) to help late or light calves catch up may reduce variation in WW, but the original differences will re-emerge in feedlot once all calves are on the same implant strategy and plane of nutrition.

Summary

In the 1970's J. Herrick, DVM at Iowa State University, began to advocate a preconditioning program that included four elements:

1. Castrate, dehorn, healed
2. Dewormed
3. Vaccinated
4. Bunk broke

These 4 elements remain relevant. Nuances have changed. All feedlots are justified in expecting calves to be castrated, dehorned, healed, and vaccinated. We want calves dewormed at the ranch, especially at a time that will support better on-ranch vaccination responses. Finally consider that BB was actually the initial step toward the concept of managing behavior, of cattle and people as a way to lessen stress and subsequently to improve vaccine response.

Perhaps the most important steps you can take to prepare the calf for the feedlot are to document and communicate. Document nutrition, health, and age. Communicating verifiable management is one of the most important management steps a ranch can take to allow the industry to be efficient and to capture as much value as is possible on a set of calves.

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SESSION NOTES