

Preconditioning

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Lesson 1

Introduction

In recent years, the beef industry has focused on improving the quality and consistency of beef products offered to consumers. Emphasis has been placed on improving the quality characteristics of steer and heifer carcasses (Smith et al., 2001). The 2000 National Beef Quality Audit identified inadequate tenderness and inappropriate USDA quality grade mix as two of the top five quality challenges among purveyors, retailers, restaurateurs, and packers involved in the audit. Economic losses were estimated at \$2.39 and \$20.96, respectively for every steer and heifer harvested in the United States in 2000 as a result of inadequate tenderness and inadequate marbling (Smith et al., 2001). It was also documented in the National Beef Quality Audit that one of the top ten changes that producers and feedlot operators have made since the initial NBQA in 1991 is to utilize more preconditioning programs and pay more for preconditioned cattle, respectively. As such, more and more emphasis has been placed on consumer appeal or acceptability of beef products produced under certain management manipulations.

Preconditioning Programs

Preconditioning is a process, which prepares calves for a change that might cause severe stress. The goal of a preconditioning program is to minimize stress and consequently increase performance while preventing and reducing the treatment of health problems. The emphasis is placed on prevention rather than treatment because prevention enhances the profit picture while treatment attempts to minimize economic losses. Cattle in preconditioning programs are typically weaned at least 3 weeks before sale, trained to eat from a bunk, castrated and dehorned, treated for parasites, and properly vaccinated against Clostridial and BRD pathogens (AABP, 1968).

There are many types of stress; stress factors may include fatigue, hunger, thirst, dust, anxiety, ammonia buildup, adverse weather, parasites, weaning, castration, dehorning, shipping, poor sanitation, mixing with other cattle, and unnecessary or abusive handling.

The risk of stress has been evaluated by feeder cattle buyers for year. Several years ago, Cattle-Fax® revealed five items of information most often requested by calf-buyers.

And, when requesting this information, over 70% of buyers wanted this information before negotiating a price with the producer.

These included (ranked in order of importance):

1. Vaccination program
2. Date weaned
3. Breed of sire and/or breed composition of cow herd
4. Have calves been weaned?
5. Weaning ration/nutrition program

This lesson will focus on the importance of the items requested by calf-buyers as well as the importance of facilities and handling and the effects on performance, carcass and palatability attributes.

Vaccination Program (Health Program)

To begin with a strong veterinarian relationship is critical for a successful preconditioning program. This relationship should be established long before calves are weaned and placed into the feedlot. Producers should discuss their operations with their veterinarian in order to develop a herd health program that will work for them, and review and assess the program at least annually.

Cattle have naturally occurring and acquired defense mechanisms which can counter-act most disease organisms. This defense systems begins at birth when the cow's colostrums (first milk), containing antibodies which is absorbed by the calf in the first few hours of life. Calves acquire immunity at birth through colostrums, but this immunity is lost as the animal matures. Calves five to seven months of age (450-650 pounds) have lost most of this immunity and are susceptible to common feedlot diseases. Therefore, a strong vaccination program is crucial prior to calves entering a feedlot. When developing a strong vaccination program it is important to work closely with your veterinarian. For more information on vaccination programs review the Health management lesson of this course or the Health Management Home Study Course which is available on line at <http://www.extension.umn.edu/beef/components/homestudy.htm>.

Dehorning, which can reduce the amount of bruising in transportation and in the feedlot, and castration should be done when the calves are young, preferably 1 to 3 months of age. When calves are not worked earlier, to reduce calf stress, these procedures should be done 2 to 3 weeks before weaning but not at weaning time.

The vaccination program is important, but must be administered correctly to be effective. John Paterson, Montana State University Specialist identified these common reasons why vaccination programs fail at a Montana Beef Quality Assurance Training. These reasons include:

Time (not enough) - at least 2-3 weeks after injection and preferable longer
Malnutrition - low protein or energy diets or low consumption
Immune status - calves not fully developed
Parasites - reduced effectiveness
Vaccine handling - sunlight, heat, freezing
Stress - weaning, shipping

Remember to follow all label directions pertaining to injection site location, amount, and withdrawal times (if necessary). Injections should be given in the neck, in front of the point of the shoulder, to minimize damage due to injection site lesions. Injections should also be given subcutaneous, if possible, to avoid tissue damage due to injection site lesions. For more information on Beef Quality Assurance visit the Herd Health Home study course on line at <http://www.extension.umn.edu/beef/components/homestudy.htm>.

Date Weaned and Have Calves been Weaned (Weaning)

Weaning calves is an essential component in the management of a beef herd. Weaning is a very stressful period for calves, however reducing stress during this time period can lead to increased health status and lifetime feedlot performance. Fence line weaning has been praised to reduce weaning stress.

Fence line weaning is when the cow and calf are separated usually out on pasture by a single fence so that cow and calf contact can still be made. A California study utilized about 100 head of 210 day old heifer calves to evaluate four weaning practices (fence line separation, total separation from dams on pasture, total separation from dams in dry lot and calves not weaned). Calf weight gain two weeks after weaning favored fence line weaning at 47 pounds, while total separation on pasture and dry lot were 29 and 22 pounds, respectively. The non-weaned calves gained 40 pounds during the two week period. The study also showed that at 10 weeks the fence line weaned calves still posted heavier weight gains. Additionally, the fence line weaned calves showed less behavioral distress compared to total separation while minimizing reductions in weight gains often associated with weaning. The separation fence in this study was barbed wire overlaid with woven wire. It was noted that no escape attempts, either under or over were observed during this study. Producers also have had success with barbed wire plus electric wire bordering the calf side.

Breed of sire and/or breed composition of cow herd (Genetics)

The breed composition of the calves is a piece of information that can help calf-buyers estimate performance potential. The preconditioning program is designed to eliminate nutritional, health and environmental stresses so that the true genetics of an individual can be expressed.

Environmental

Provide protection for bad weather. This can be either shade during excessively hot weather or wind protection during extremely cold weather. Each producer needs to evaluate individual facility needs to minimize these types of environmental stresses. For example, producers who are not feeding calves during the hot summer weather do not need to provide shade however, if they have calves on feed during Minnesota winters they probably need to provide some wind protection. This wind protection could be a temporary wind break made out of stacked hay or straw, could be a tree shelter belt, or a permanent wind break fence. Additional information on wind and snow control around the farm can be found at

<http://www.ces.purdue.edu/extmedia/NCR/NCR-191.html>.

Weaning Ration/Nutritional Program

The most important part of a nutrition program at weaning is to get some feed into the calf as soon as possible and stimulate intake of a balanced ration to build immunity and combat illness. Hay isn't enough to provide sufficient nutrients to accomplish this but it is extremely important in achieving initial consumption and introducing feedstuffs in the feedbunk. Hay quality should not be compromised in the starting phase. Form and placement of hay is very important in encouraging maximum intake of feed by new cattle. Free-choice access to hay allows the calves to establish a normal fill prior to grain feed being offered. Loose hay should be fluffed along the entire bunk and scattering some behind the bunk may be useful with very timid calves. Grain mix should be topdressed over fluffed hay so that calves have to dig through the feed to get to the hay. Obviously, you need to provide a very palatable diet balanced for energy, protein, minerals and vitamins. More information on ration formulation will be available in the Nutrition lesson of this course.

Provide plenty of fresh, clean water. Water is usually the least expensive and most overlooked nutrient in starting calves. Many calves will not recognize a water trough or fountain as the place for them to drink so some steps may be needed to help them find the water. Initially when calves are put into a feed yard this might mean to add some additional water tanks in the lot to make sure everything can find water. This is especially important if calves are not use to drinking water out of a fountain. Avoid cup or tank waterers with a small opening for new cattle.

Facilities

Properly designed and maintained facilities may be the second most important factor that influences proper care of newly weaned cattle. If the cattle cannot flow through the facilities with ease, analyze the situation and make changes. Avoid shadows, contrasting colors of paint, long or straight snakes, and small, dusty or poorly ventilated holding areas. In wet weather use bedding to provide a dry clean environment. Further information on handling facilities will be covered in the “Facilities, Equipment, and Labor lesson of this course.

Effects on Performance, Carcass & Palatability Attributes

Health management has always been an issue of risk management. The changing environment of the beef industry, especially in light of the recent FDA initiative regarding potential limitations on use of antibiotics, might force beef producers to redefine risk. Therefore, as value-based marketing is practiced for an increasing share of available fed cattle, health management will become an increasingly important critical management point in beef alliances. The direct impact of health management on palatability attributes of beef steaks does not seem to be significant. The future of the cattle industry depends on its ability to lower costs while increasingly satisfying consumer demands for lean, palatable, and more convenient beef products. Cattle health will play an increasingly critical role in the industry’s ability to lower costs while simultaneously providing higher quality beef products.

Studies have shown a significant negative impact of morbidity on feedlot performance and carcass characteristics. Gardner et al (1999) and Wittum and Perino (1995) both documented that cattle that were untreated during the feedlot production phase had higher ADG than cattle that were treated. Others have shown that there is no difference between cattle treated and untreated, while Roeber et al (2001) documented that cattle visiting the hospital two or more times had a 12% lower average daily gain. The number of hospital visits (treatments) also had a significant effect on hot carcass weights, dressing percentage, and yield grades. Cattle requiring two or more hospital visits had lower hot carcass weights and dressing percentages than untreated cattle. However, cattle receiving two or more hospital visits had more desirable (lower) yield grades (Roeber et al., 2001).

In a study performed by Roeber et al. (2001) health management was an issue of risk management with newly received feeder cattle relative to their performance, carcass characteristics, and palatability. Cattle in the study originated from one of two preconditioned groups of calves or from the auction market. The requirements of each of the preconditioning programs included: Clostridial (7-way) vaccination, IBR vaccination, PI3 vaccination, BRSV vaccination and H. somnus vaccination. In addition, the CPH program required calves to be weaned, bunk and water trough broke, treated for

grubs/lice, dewormed, and received a BVD vaccination; the GT program required an additional pasteurella vaccination. The third group consisted of calves that were purchased through Kentucky auction markets; the herd health and processing history of all calves purchased through the auction markets (AM) was unknown. Preconditioned cattle had significantly higher ADG, were more efficient, and had lower morbidity and mortality rates. While the preconditioned cattle exhibited increased feedlot performance over the auction market calves, no significant differences in hot carcass weight or quality grades were found among the three groups of cattle. After accounting for differences in quality grade, no significant differences in either shear-force values or palatability rankings were found between steaks evaluated from each of the three groups of cattle in the study.

Neither pre-conditioning treatment nor morbidity history affected shear force values, tenderness ratings, or juiciness ratings. Shear force values, as well as ratings for tenderness and juiciness as determined by members of a trained taste panel differed only among steaks cooked to different degrees of doneness and not among steaks from cattle from different VAC (value added calf) programs. Given the results of this study and similar preconditioning trials, preconditioning programs have become more widely used across beef producers and more encouraged by feedlot operators.

Summary

The goal of a successful preconditioning program is to increase feedlot gains and efficiencies as well as increase or maintain meat quality characteristics such as USDA Quality Grade. Additionally, a successful preconditioning program allows superior genetics to be more completely expressed due to enhanced immunity and subsequently healthier calves.

Supplemental Readings and Information

AABP: American Association of Bovine Practitioners. *Report of the panel for the symposium on immunity to the bovine respiratory complex*. J. Amer. Vet. Med. Assoc. 152:713-719.

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Bailey, D and N. Stenquist. *Preconditioning calves for feedlots*. <http://ag.arizona.edu/arec/wemc/cattlemarket/Precond.pdf>

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Lincoln, S. D. and D. D. Hinman, *Preconditioning of Calves*. Accessed at: <http://www.iowabeefcenter.org/pdfs/bch/05475.pdf>

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Roeber, D. L., N. C. Speer, J. G. Gentry, J. D. Tatum, C. D. Smith, J. C. Whittier, G. F. Jones, K. E. Belk, and G. C. Smith. 2001. *Feeder cattle health management: Effects on morbidity rates, feedlot performance, carcass characteristics and beef palatability*. Prof. Ani. Sci. 17:39-44.

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Speer, N. C., C. Young, and D. Roeber. 2001. *The importance of preventing Bovine Respiratory Disease: A Beef Industry Review*. Bovine Prac. 189-196.

Stroltenow, C. and G. Lardy, *Preconditioning Programs: Vaccination, Nutrition and Management*. Accessed at: www.ext.nodak.edu/extpubs/ansci/beef/as1160.htm

Whittum, T. E. and L. J. Perino. 1995. *Passive immune status at postpartum hour 24 and long-term health and performance of calves*. Am. J. Vet. Res. 56:1149.

Other Web Sites

Cow Nutrition/Management/Passive Immunity
<http://www.ansi.okstate.edu/exten/beef/F-3358.PDF>

Feeding Newly Weaned Calves
<http://beef.osu.edu/library/weancalf.html>

Nutrition & Management Considerations for Preconditioning
<http://osuextra.okstate.edu/pdfs/F-3031web.pdf>

Effects of Preconditioning on Health, Performance, and Prices of Weaned Calves:
<http://osuextra.okstate.edu/pdfs/F-3529web.pdf>

Starting Cattle
<http://ianrpubs.unl.edu/beef/g1172.htm>

Notes

Preconditioning Quiz

1. According to the American Association of Bovine Practitioners (AABP), what six things are typically included in a preconditioning program?
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.

2. What are the top five pieces of information buyers would like to have before negotiating a price for calves?
 - a.
 - b.
 - c.
 - d.
 - e.

3. List 10 or more things that may cause stress:
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.
 - h.
 - i.
 - j.

4. Dehorning and castration should be done when calves are young, preferably _____ to _____ months of age. When calves are not worked earlier, to reduce stress, these procedures should be done _____ to _____ weeks before weaning but not at weaning time.

5. If vaccination programs are not administered correctly, they tend to fail. According to John Paterson, Montana State University, what are five common reasons why vaccination programs fail?
 - a.
 - b.
 - c.
 - d.
 - e.

6. Decreasing stress at weaning can lead to increased _____ and _____.

7. _____ is when the cow and calf are separated usually out on pasture by a single fence so that cow and calf contact can still be made.
8. The most important part of the nutrition program at weaning is to _____:
- a. Put weight on the calves before they are sold so that you can get a bigger check from the feeder
 - b. Stimulate intake of a balanced ration to build immunity and combat illness
 - c. Get them to eat enough just to call them 'bunk broke' when describing them to potential buyers
9. _____ is usually the least expensive and most overlooked nutrient in starting calves.
10. List 4 things to avoid in order to ease handling stress.
- a.
 - b.
 - c.
 - d.
11. Typically preconditioned cattle have (circle lower or higher on each line for correct answers)
- a. lower or higher ADG
 - b. lower or higher morbidity rates
 - c. lower or higher mortality rates
12. It has been documented that cattle that require treatment twice or more during the feedlot phase had lower _____, however, had more desirable _____ grades.
13. True/False. In the data presented, preconditioned calves resulted in tougher steaks.

Name _____ Phone _____

Address _____

Fax (Optional) _____ Email _____