Nutrition and Management of Feedlot Cattle on Arrival

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Feed costs represent about 65% of total costs for cattle feeders. Getting cattle adjusted to the feedlot quickly and maximizing efficiency of feed utilization are critical profitability factors. What goes into the bunk and strategies for feed delivery can improve health, performance, and the bottom line.

Weaning, marketing, and starting calves in a feedlot, combine to be the most stressful events in the life of a calf. When these stressors occur in a matter of days, you are asking for trouble. Calves are the most susceptible to shipping fever (Bovine Respiratory Disease) when they are 5-8 months of age. Earlier in life, calves are protected from disease by maternal antibodies from colostrum. When calves are yearlings, they have a fully developed immune system and are better able to respond to a disease challenge.

So what do we typically do as beef producers? We take a 5-8 month old calf when it is most susceptible to disease and we put a whole bunch of stress on it. Weaning, trucking, vaccination, no feed, no water, crowding, co-mingling, new pathogens, new source of feed, and new source of water. This is a wreck waiting to happen and it often does.

The U.S. beef industry is a $44 billion industry. The health problems due to transitioning calves from the farm to the feedlot cost the industry about $700 million annually. Treatment costs, death losses, poor performance, and lower carcass quality grades result when calves get sick. The best way to reduce these costs is to reduce the stress of transition from the home farm to the feedlot or backgrounder. Taking steps to prevent disease is always better than having to treat disease after it occurs. You can't solve the Bovine Respiratory Disease Complex

with just a bottle of antibiotics.

The transition from the farm to the feedlot creates tremendous stress on the calf. When the animal is not capable of coping with these stresses the immune system is compromised and respiratory disease often results. The primary stress for a calf during this time is the stress of weaning. Weaning stress can be reduced by proper nutrition to replace the milk that is no longer available. Proper facilities should be dry, spacious, not dusty, well ventilated, and should provide water on the pen perimeter and feed bunks with at least 40 cm of space per calf. Use of trainer cows, fence-line weaning and 2 stage weaning can all reduce stress at weaning time (Boyles et. al. 2007). Many management strategies can be employed to reduce calf stress at weaning time. Castration and dehorning is best done when calves are young (1-3 months of age). These procedures should not be performed at weaning time. Calves should be weaned at least 30 days prior to shipping. This separates the stress of weaning from all the other stresses associated with marketing and feedlot arrival. Shipping less than 30 days post weaning is not recommended for several reasons. A 30-day period gives plenty of time for calves to learn how to eat from a feed bunk and recoup the post-weaning check in weight gain. Actually weaning 45 days before shipping may be more profitable because the calf producer will have more pounds of beef to sell. Thirty days also gives plenty of time to respond to vaccines and be better protected from disease challenges.

The beef cattle marketing and transportation system results in deprivation of feed and water before feedlot arrival. Before weaning, calves graze and nurse to obtain required nutrients. Water is obtained from a stream or pond. In the feedlot, calves must eat from a bunk and drink from a waterer. Silages and grains may be rejected initially, because calves don't recognize them as a source of food. Feed intake is typically depressed by 50% the first week of arrival and by 25% during the second week (Fig. 1). Recent evidence (Figs. 2 and 3) strongly suggests depressed intake of newly received calves and is not due to a lowered capacity to digest feed or dysfunction of the rumen microbial population (Fluharty et al., 1994; Fluharty et al., 1996). Rather, depressed intakes are due to physiological and psychological stresses associated with weaning, marketing and transportation. Increasing nutrient density of the diet according to expected feed intake would assure that daily nutrient intake meets requirements

for growth and a functional immune system (Fluharty and Loerch, 1995; Loerch and Fluharty, 1999). Calves in positive energy balance and gaining weight will be better equipped to deal with a disease challenge. Modification of the stress-associated behavior by using trainer animals or bunk training prior to feedlot arrival are strategies to improve the feed intake of newly received calves, and may reduce calf morbidity (Loerch and Fluharty, 2000).

An all forage diet on arrival does not provide enough calories to keep calves in a positive energy balance. Receiving diets should be 50-75% concentrate to offset low feed intake. Offer a limited amount of hay the first 3-5 days to achieve a 50-75% concentrate diet. High quality forage is desirable. Transition diets to step-up calves onto grain will be discussed in a later section. The concentration of protein in receiving diets is more important than the source of protein. Due to low feed intake the first 2 weeks, Diets 1 and 2 should be formulated to contain at least 16% crude protein. Urea should be limited to no more than 0.8% of diet DM. Soybean meal works well in receiving diets. Diets should have about 60% ruminal degradable intake protein and 40% undegradable protein. For step-up diets 3 and 4, 13-14% protein should be adequate. There are few dietary concerns regarding mineral nutrition. Ca and P should be slightly elevated in Diets 1 and 2 due to low feed intake. K is very important to maintain water balance in the cell and dietary K should be at least 0.7% to help calves recover from dehydration. If feeds are deficient in Se, then Se supplementation to provide 0.3 ppm will help immunity. Likewise, Zn supplementation to 50 ppm will prevent immune deficiencies. One might think that fat supplementation to increase caloric density of the diet would be beneficial. Our data suggests supplemental fat causes reductions in intake and therefore are of little benefit in receiving rations. The only exception would be if feeds are dusty or if fat helps in maintaining uniformity of feed ingredients (mixing). Generally calves coming from pasture are adequate in vitamins A, D, and E. Standard feed inclusion rates should be adequate (2,200 IU of vitamin A/kg DM, 300 IU of vitamin D/kg DM, and 30 IU of vitamin E/kg DM). B vitamins are synthesized by rumen microbes and I have seen no consistant evidence to suggest supplementation is beneficial. Ionophores are recommended in most cases. They will improve gain and efficiency, will reduce metabolic problems (acidosis and bloat), and will aid in the control of coccidiosis. Inclusions at the upper level of approval may inhibit feed intake on arrival

and concentrations should be lower in step-up Diets 1 and 2. Oral antibiotics may be recommended for highly stressed calves.

Adaptation to high grain diets requires adaptation of the animal (feeding behavior, salivation, rumination, and adjustment to metabolic acidity) as well as adjustment of the rumen microbes to starch fermentation, increased acid production and increased lactic acid. The best way to transition calves onto their high grain finishing diet is to use several Step-up diets and to control intake. This is the most common system recommended by US consulting nutritionists (Vasconcelos and Galyean, 2007) and in a review by Brown et. al. (2006). Diet adaptation should consist of 2-3 transition diets before the final finishing diet is fed. An example is: Diet:1 60 concentrate-40% forage for 5-7 days; Diet: 2 70% concentrate-30% forage for 5-7 days; Diet: 3 80% concentrate-20% forage for 5-7 days; Final finishing diet (usually about 90% concentrate and 10% forage). Intake adjustment should follow some basic principles to avoid over and under eating. Start cattle at a DM intake of 1.5 to 2.0% of their body weight. Sorting calves into pens based on body weight to create more uniformity within the pens is helpful during transition and later in the feeding period. Increase intake if bunks are slick by 250 to 500g/head/d. Never increase intake on the day a diet switch is made. Other transition procedures have been used but are less common in the US. Fewer than 3 Step-up diets can be used but more time between switches and closer control of intake is desired. Some success has been reported when the finishing diet was fed from day 1 and intake was controlled by starting calves at 1.3% of their body weight and increases were limited to 250 g/head/d. In general, this strategy would take very close observations and an experienced crew for identifying problems.

Owning calves prior to feedlot arrival or establishing a relationship with the calf producer allows several management interventions to reduce stress and disease. This actually starts with cow nutrition to insure the calf gets a sufficient amount of high quality colostrum. Pre-weaning and pre-vaccination before trucking to the feedlot will greatly reduce stress and disease problems after feedlot arrival. Several weaning strategies can be successful. Calves can be weaned into drylot pens or remain on their pastures after the cow is removed. Supplementation is needed in both circumstances. Remember, 1 kg of grain is equal to about 2 kg of milk. Your cows are likely producing 4-6 kg of milk at weaning, therefore, 2-3 kg of supplement plus forage

should be provided to a 200 kg calf. Contact or fence-line weaning will also reduce the stress at weaning. This strategy allows calves to be close to their dams, but prevents nursing. Two-stage weaning has also been shown to reduce weaning stress and make feedlot adjustment less stressful (Boyles et. al., 2007).

Conclusions

Newly arrived calves have been exposed to multiple stressors. These include physiological stress, metabolic stress and behavior stress. These stressors impact feed intake, growth, and immune competency. They can overwhelm the animal's ability to fight a disease challenge and morbidity and mortality result. Pre-feedlot management can reduce the stresses of feedlot adaptation. Proper diets and feed delivery improve performance and reduce disease losses. Proper facilities can also reduce adjustment to the feedlot environment. Low stress handling practices should always be used to. These are scared, young, and timid creatures that are facing the most stressful period of their lives. They should be handled like you would treat a child going to school for the first day. A good start in the first 3 weeks in the feedlot will reduce costs, improve the value of the animal, and improve profitability.

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DAILY DRY MATTER INTAKES
AFTER FEEDLOT ARRIVAL

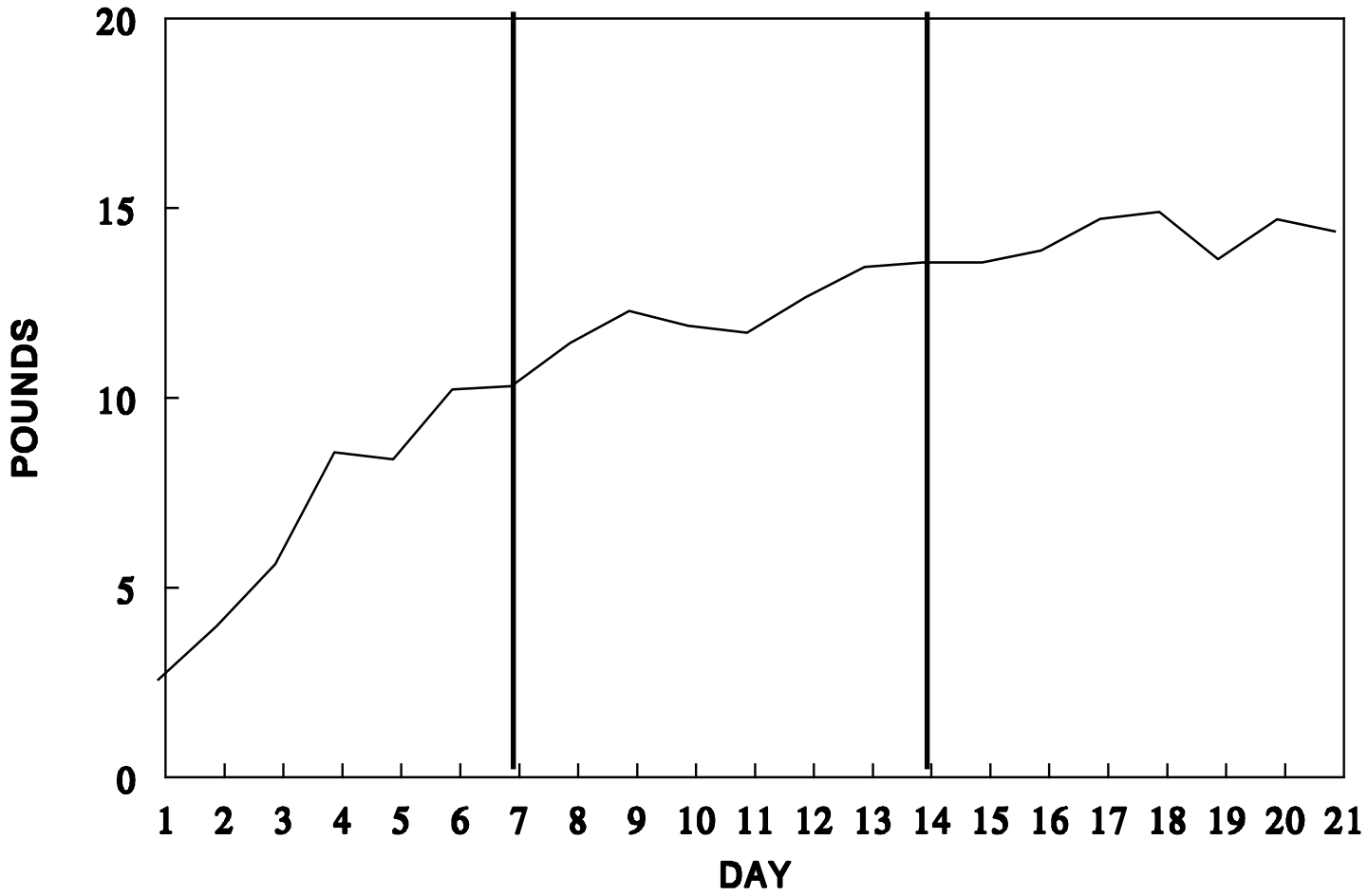

Fig. 1

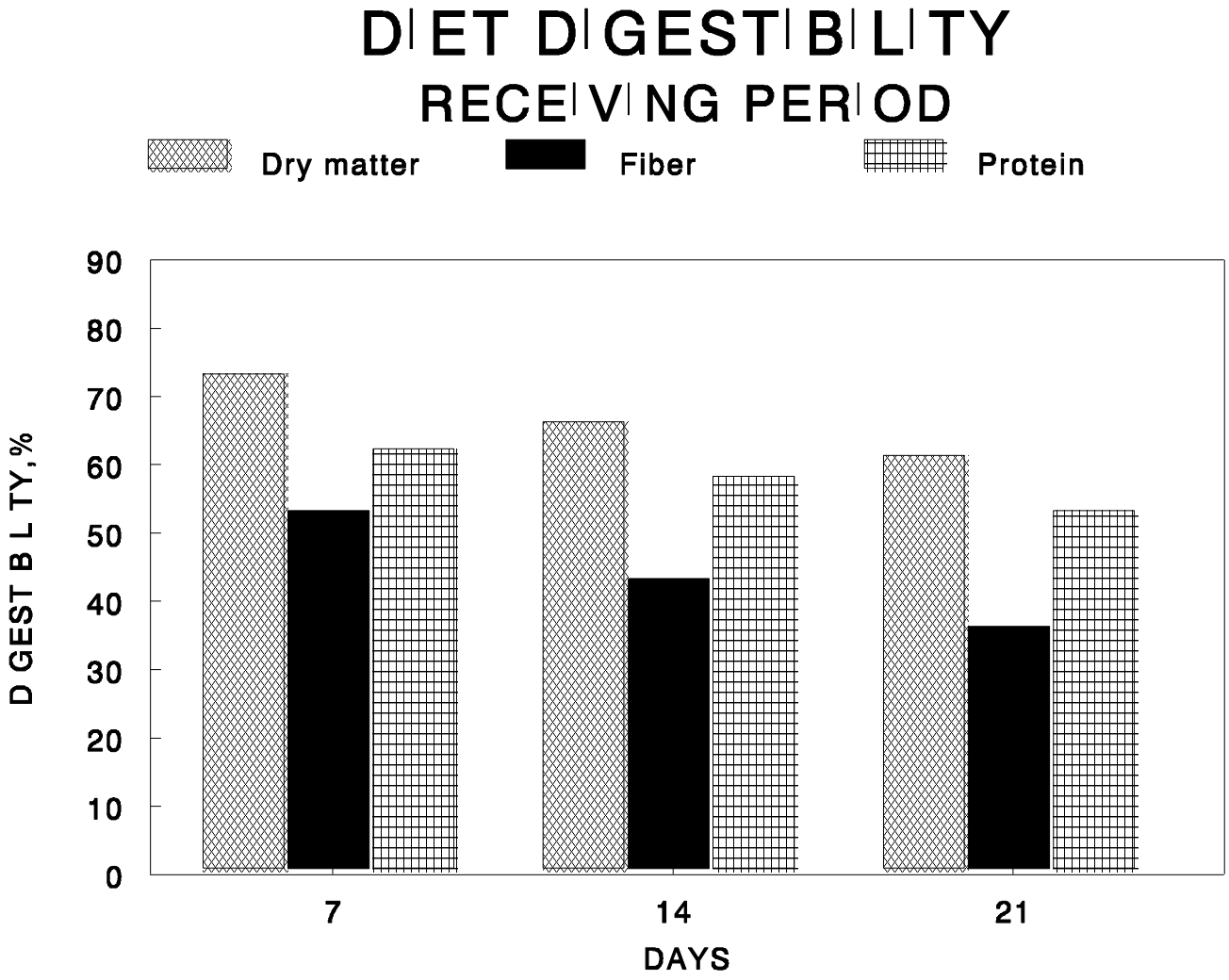
DIET DIGESTIBILITY
RECEIVING PERIOD
Dry matter
Fiber
Protein
DIGESTIBILITY,%
90
80
70
60
50
40
30
20
10
0
7
14
21
DAYS

Fig. 2

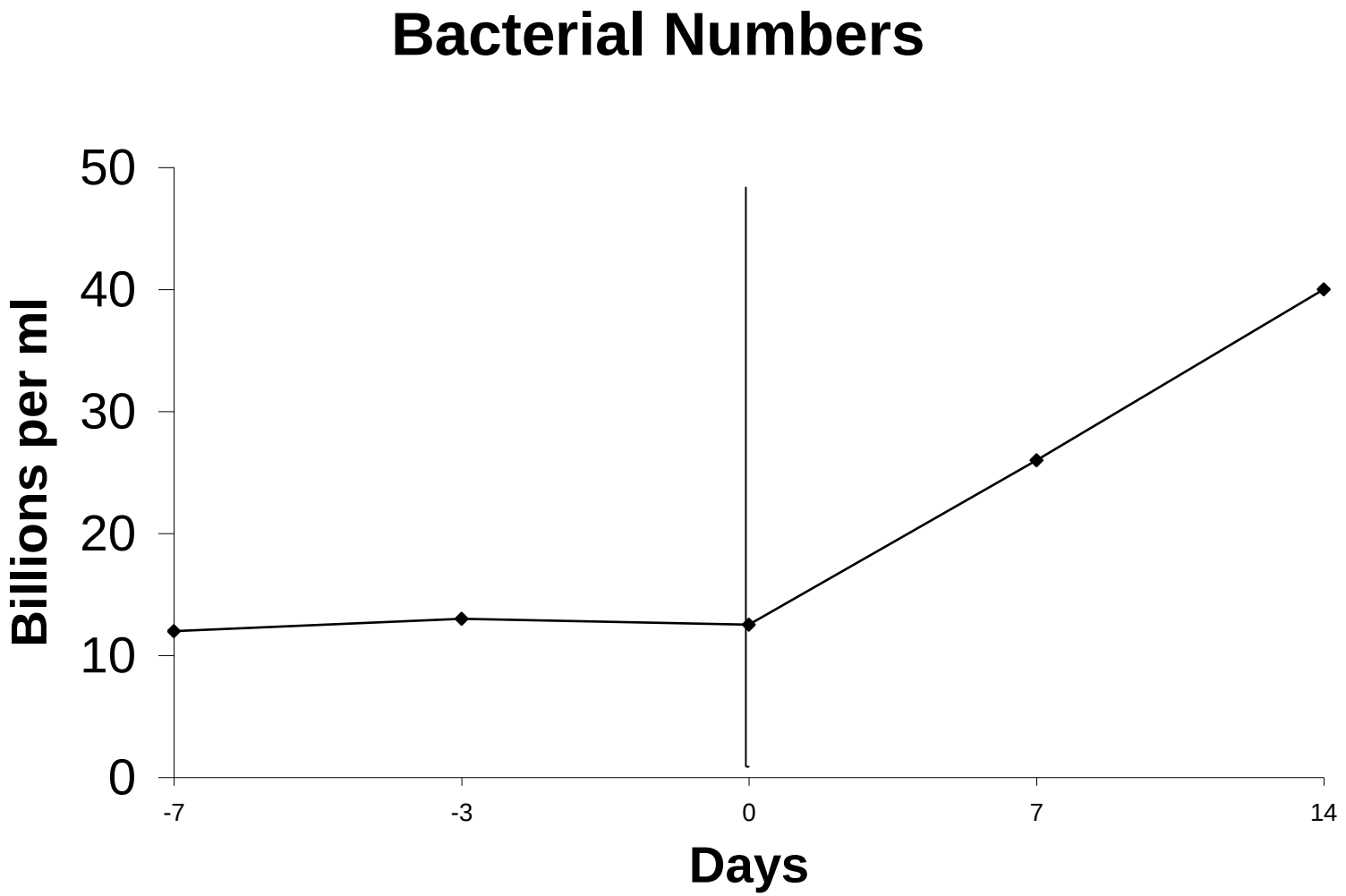
Bacterial Numbers
Billions per ml
50
40
30
20
10
0
-7
-3
0
7
14
Days

Fig. 3