

Feedlot Session I

“The Interaction of Nutrition and Animal Health”

Moderator: Timothy Jordan

Nutritional Management of the Sick Animal

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Proper nutritional management of the sick animal is a complex subject that demands cooperation between the disciplines of animal nutrition and animal health. In fact, animal feedlot nutrition and feedlot performance and animal disease prevention and health are 2 sciences that cannot be separated since they are so interrelated. I feel it is important at this point to emphasize the need for this cooperation. Just as improper bunk management techniques cause concerns for both professionals (displayed as overeating, overloading, bullying, and bloats) affecting the performance and health, sick cattle nutrition and management will reflect on the performance of both disciplines. Cooperation and communication between the veterinarian and nutritionist helps minimize problems and aid in efficient approaches to problems when they do arise.

Proper nutrition for the situation can help overcome disease and prevent secondary infection. Recovery from the disease challenge is dependent on the animal's own immune and physiological function. The functions are supported by and cannot be divided from a strong nutritional status. The combined expertise of the veterinarian and nutritionist is a valuable asset to the feedlot manager, therefore this relationship should be nurtured and encouraged.

Starter and hospital pen rations that are formulated for health rather than performance generally have favorable results. This allows the animal to reach a physiological state at which performance can be maximized.

The desired characteristics and general goals for the hospital or sick pen ration are that it be palatable, high in available energy and protein and concentrated enough to provide these nutrients in the small amounts normally consumed by the sick animal.

A recent popular press article (*Feeder Performance, Summer, 1990*) by Dr. Bruce Johnson, PhD, nutritionist and Dr. Bob Messersmith, DVM does an excellent job of relating the importance of nutrition in a sound animal health program. Some of our best information can be found in the practical experience of professionals serving

in technical service roles with commercial companies. Regardless of their product biases due to employment, their input and observations are valuable to those of us working daily with feedlot decisions and programs.

There is a strong relationship between a strong immune response and sound nutrition. Cattle require a functioning immune system to ward off disease. However, cattle rarely die from the primary viral infection but more often from secondary bacterial infections. The situation is complicated by the fact that most programs are not preventative of bacterial infections but rather reactive. Bacterial challenges can be treated by medication through injection, feed or bolus.

Vaccination stimulates the immune response mechanism of the body to act against the invading virus. This is where sound nutrition can play a positive role. Vitamins A and E as well as trace minerals are catalysts in cell reactions that alter chemistry to destroy the invaders. Protein also plays a key function in the production of antibodies that ward off invading microorganisms.

Low levels of protein, energy, minerals and vitamins leave the immune system vulnerable to viral infections. This also lowers the ability of the defense mechanism to build resistance to secondary bacterial infection. However, regardless of nutrient levels in the diet, the animal must consume feed to arm themselves to fight infection. It has often been said that “sick animals don't eat and animals that don't eat get sick”. Just when they need defense the most, they eat the least.

Physical aspects of the hospital pen and ration fed are of utmost importance in getting cattle to eat and providing a place for rest and recuperation. The pen should be placed and arranged to minimize stress. Pens that are clean, dry and allow for easy observation and easy movement to and from handling facilities are most desirable. Shade is particularly desirable for those handling cattle that have come from fescue grazing. We recommend at least 100 square feet per head of pen space and try to mini-

mize mixing of extreme sizes of cattle.

From a nutrition and feed delivery point of view, it should be obvious that clean, fresh water (our least expensive and most often overlooked nutrient) should be continuously available. Ample water space should be provided, probably enough for one-half of the cattle in the pen to drink at one time. Similarly, feed bunk space should be ample, in the range of 15-24 inches per head. This allows all animals the opportunity to eat without competition. As was stated earlier, getting sick cattle to eat at all may be our biggest challenge.

Since getting cattle to the feed bunk to consume nutrients is the goal, bedding should be kept to a minimum. We want cattle to eat from the bunk, not the ground and we want to control what they eat. Bedding should be used only sparingly and when weather is cold and wet.

Fresh hay, preferably native grass or grass-mix (oat or other small grain hay may be best) should be used to attract cattle to the bunk. Hay is the natural diet and therefore cattle are attracted to it in unfamiliar or other uncomfortable surroundings. Hay is also an excellent substrate to re-establish a desirable rumen microbial population. It also stimulates saliva flow which buffers the rumen, reducing potential for digestive disturbances.

Generally the sick pen ration, as stated earlier, should be fresh, highly palatable, medium to high in energy (57-58 Mcal) and also highly available energy. Protein levels should be high (13-15%) from natural, highly digestible sources such as soybean meal, brewers grains, and distillers grains. Rumen population is stressed due to the lack of consumption and imbalance and can be further negatively impacted by therapy. Therefore, microbial activity to digest energy and assimilate nitrogen into protein is depressed. Thus the form of energy and protein should be directly available to the animal without dependence on rumen degradation. Of course, the ultimate goal should be to re-establish a thrifty population along with the health of the animal.

Many sick cattle are dehydrated due to diarrhea and/or lack of water and feed consumption. This loss of water causes a rapid depletion of water soluble vitamins and electrolyte imbalance. Since the body generally has relatively low storage levels of the water soluble B-complex vitamins such as thiamine, B-12, folic acid, and niacin it is good supportive nutrition to add these to the sick animal's diet. The B vitamins are normally produced by the rumen micro-organisms and are not necessary as routine diet additions in healthy animal diets. Since rumen activity is likely slowed, these additions are justified to help stimulate appetite and replenish losses.

The use of antibiotic therapy is usual in the sick pen. Since these antibiotics are also stressful to the microbial system, supportive measures are also taken to stabilize adverse changes that occur secondary to treatment. The B vitamins are critical since they function in most biochemi-

cal systems necessary for energy or ATP production.

A relatively new approach to replenishing microbial and thus normal ruminant body function is the use of Lactobacillus and other "pro-biotic" cultures. This field is an exciting area in which hope emerges that such products can replace and/or supplement traditional antibiotic therapy. The cultures currently available serve primarily to replenish bacterial loss from the intestinal tract of stressed or sick animals. These micro-organisms also have been demonstrated to have the ability to retard or prevent growth and infection from some pathogenic organisms such as Salmonella.

HOSPITAL PEN RATION SPECS.

Protein	15.00 %
NPN	0.00
Ca	0.70
P	0.40
Salt	0.35
K	1.25
Mg	0.25
NEM	90.00 Mcal
NEg	57.00
Vit A	25000.00 IU/lb
Vit D	5000.00
Vit E	20.00
Fe	400.00 ppm
Zn	400.00
Mn	175.00
Cu	85.00
I	5.00
Co	4.00
Se	2.00
Thiamine	100.00 mg/lb
B-12	65.00
Niacin	60.00
Biotin	100.00
Riboflavin	10.00
Pantothenic A	40.00
Vit K	10.00

Many body functions are altered in response to disease and the alterations must be counteracted by compounds other than antibiotics. In addition to B-vitamins, vitamin A, D and E should be supplied in sufficient quantities to permit body function in low levels of intake. Therefore, it is a good idea to increase the concentration of the vitamins in hospital diets. Vitamin A functions in sight and respiratory systems as well as in maintenance of integrity of mucus membranes throughout the body such as the gastrointestinal tract. Vitamin D is involved in bone formation and metabolism of several major minerals. Vitamin E is important in muscle function and is also related to mineral metabolism, specifically selenium.

Mineral levels should also not be overlooked when considering the needs of the sick animal. Minerals not only serve as structural components of the skeleton but are important in osmotic balance and cellular fluid levels and are involved as catalysts in many biochemical reactions and are necessary for oxygen transportation in the blood. As much as absolute levels, the balance of macro and micro minerals is critical. It has been repeatedly demonstrated that abnormally high levels of one mineral can adversely affect metabolism of other minerals as well as other nutrients. Therefore, it is a good idea to avoid excessive additions of one mineral to the diet at the expense of other, interrelated nutrients.

Adequate levels of electrolytes should be included to insure tissue repletion after dehydration. The minerals, sodium, potassium and chlorine are the electrolytes of prima-

ry consideration since they are depleted in the normal loss of body water during sickness.

Several trace minerals are important to the ruminant, but the ones considered necessary for supplementation are copper, cobalt, iodine, manganese, selenium, iron and zinc. The two elements most commonly deficient are copper and selenium. Dietary supplementation is necessary to raise tissue and blood levels to desirable levels. Injections will simply give short term fix. This probably has more usefulness in receiving rations than hospital rations.

The people portion of hospital pen management should not be overlooked. Additional stress is not needed at this time and care should be taken to assure that good animal husbandry hospital pen is important to document and study success and failures in hospital pen management.

