Monitoring Feedlot Diseases For Quality Production

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Abstract

Quality of marketed beef is influenced by health programs in the feeding environment. Better overall health results in better carcasses as well as reduced potential for introduction of products that can result in residues or perceptions of residues. Reduced use of pharmaceutical and biological agents can enhance quality programs. General quality assurance concepts can be applied to production with associated reduction in blemishes. Health programs can monitor specific performance of individual feedlots with the purpose of predicting better methods of reducing health problems. Better overall health is an integral component in quality assurance efforts.

Introduction

Current levels of knowledge are inadequate to completely eliminate health problems in the cattle feedlot. Reduction of losses and improved quality can, however, result from maximum utilization of technology and available information with regard to health management as opposed to disease control. A number of factors may be involved and this includes the monitoring of health performance with emphasis on diagnostics. Some specific variables in the feedlot environment need to be addressed so that programs can utilize maximum levels of technology. Quality assurance is becoming an important part of production. Health programs should be viewed as a portion of a total quality program.

Monitoring Health Performance

Specific programs need to be designed for specific types of cattle. This is necessary to prevent inappropriate use of biologics and therapeutic agents. It also contributes to overall performance benefits. Many feeders pay little attention to the often diverse origin of cattle. For instance, cattle from southern states frequently are more heavily parasitized than cattle from northern range country. There may also be differences in previous exposure and developed resistance to certain pathogens. In many cases, the information regarding origin may include previous treatment programs. The industry is moving toward requesting and perhaps ultimately demanding knowledge of the past history of the feeder calf. Programs such as "Ranch To Rail" or "Strategic Alliances" imply the essential requirement for some type of identification.[1] A great deal of effort is consumed by arguments over methods of identification when what is really needed is a workable system whereby the past medical history of groups of animals can be brought to the feeding area with the animals.

Health performance monitoring requires some type of record of treatment which includes number and type of animals pulled for treatment, number of retreats, and products used. Use of prescription products requires special efforts to document a valid prescription plus compliance with directions for use and residue avoidance. These must be correlated with pen or lot performance and presented as an overall summary of animal health as it relates to the total feeding operation.

Necropsy examination of dead animals is an essential part of many feedlot health programs. The advantages of routine post-mortems include an ability to determine where a number of flaws may exist in the health program. Necropsies are too often viewed as tedious and cumbersome. A simplified approach to technique is essential but often is not taught in veterinary schools. The objective is the acquisition of information, not the development of a perfect procedure. A brief look is always preferable to no look at all. The traveling veterinarian soon learns to conduct the necropsy with a minimum of equipment such as knife, knife sharpener, scissors, forceps, pH paper, formalin, suitable specimen bags, and a cooler.[2] A method of breaking ribs and extracting brains such as an axe is another requirement which can often be provided at the feedlot site. Necropsy objectives should not be to make overly specific conclusions and most certainly not to do so from animals that may be relatively poor specimens because of autolysis. The objective is to identify broad areas of concern and change.

Records ultimately become the key to utilization of health monitoring procedures. As time passes, it be-

comes essential that some type of record of trends in animal health procedures and problems must be established if the practitioner is to provide useful information to the client.

Using Diagnostic Laboratories

Diagnostic laboratories should be used to help establish trends rather than to make individual specific diagnoses. It may be beneficial in many instances to submit groups of specimens rather than to submit an individual animal that may or may not represent the group.

Quality of submissions is an on-going and frustrating concern with diagnosticians. The simple use of coolers, adequate packaging, and rapid shipment are essential keys to quality. Quality assurance and worker safety are becoming greater concerns in laboratory environments. Diagnosticians as well as shippers are no longer tolerant of sloppy, poorly-packaged specimens. Some ways to reduce problems are to include double packaging with some absorbent material and to reduce the amount of fluids before shipping if possible. This may mean pouring off some liquid from intestinal samples or reducing the amount of formalin in containers where a significant amount of fixation has already occurred. Packaging materials are often misused. There are some specific containers such as WhirlPaks that will not leak if properly used. If improperly used, they do leak. Many other containers will leak because of pressure changes in modern transportation systems.

There is a tendency to skim over the observations within an individual necropsy. The astute practitioner learns to look at everything that's available and to store some of the observations for future comparison. The most difficult task is to differentiate normal from abnormal. It is also important to select submissions to include those that are useful and representative in regard to health concerns as opposed to "gee whiz" specimens that are individual oddities with no real broad application.

Over-Interpretation of Laboratory Information

Experienced diagnosticians are often concerned with the literal over-interpretation of the information they provide. Communication is often very useful in providing a window into the interpretation of results. A good example is the relative validity of positive or negative fluorescent antibody staining results versus virus isolation results. Either can produce false negatives and fluorescent antibody results frequently produce false positives. These tests are very dependent on laboratory procedures and the judgement of a technician. Results must be interpreted based on the entire clinical and necropsy picture.

Diagnostic samples are often taken far too literally without recognition of the fact that many health problems are a progression of a dynamic and often an advanced process. Sampling is a single point in the progression and may be quite misleading.

Cause and effect are frequently difficult to weight properly. Many organisms found in the diagnostic laboratory are incidental in nature. Finding bovine virus diarrhea virus (BVD) is a good example. It's not unusual to have passenger BVD which is incidental to a health problem. It is also possible to be a very key participant in a health problem. The differentiation may be problematic. Another example is clostridial agents which are frequently present in specimens either because they are normal flora or because of rapid post-mortem proliferation. *Salmonella* spp. are significant bovine pathogens but their presence must be interpreted with regard for the fact that the environment is a continuing source of varied species. Many of the animals that we cannot exclude, such as rodents and birds, easily transmit *Salmonella* spp. to cattle and this only adds to what may be considered a background flora. Other examples include *Pasteurella* spp. and *Haemophilus somnus* which are frequently present in normal animals but which may be very significant in disease if observations are supported by adequate history and necropsy findings.

Bacterial antibiotic sensitivities are often over-interpreted. For example, sensitivity testing may be based on what is actually one individual organism isolated from a massive flora present in the specimen. This individual organism may not represent the population within the animal and, more significantly, within the feedlot. It is also important to recognize that the breakpoint between sensitive and resistant is established by calculation and not by field testing. Performance frequently contradicts laboratory sensitivity testing. **Over-reaction to the frequent finding of organisms that are resistant to most common antibiotics can result in over-use of exotic treatments.**

Some Agents of Concern

Respiratory disease remains the most frequent finding in losses in feedlot animals. Diagnostic findings can be used to establish trends as opposed to developing a narrow view of reaction to identified organisms.[3,4] A good example is the increasing numbers of observations of acute respiratory disease associated with *Haemophilus somnus*. The necropsy of respiratory disease affected animals is also a good teaching tool with opportunities to define why failures occurred as well as to teach the

personnel involved. Results should also help improve quality through reduced need for therapy if preventive measures are made more productive.

Salmonella are widely distributed and diagnostics must be viewed somewhat carefully because of the possibility of isolating Salmonella that are not really significant in the disease process. They can be secondary contributors. It is also important to recognize that Salmonella don't always grow in the laboratory and so false negatives are not uncommon.

Clostridial diagnosis is difficult and animals that die suddenly are often identified as clostridial deaths with little supporting data. Cultures can be misleading because of overgrowth of normal flora and also because of the extreme difficulty in isolating and identifying some clostridia. There is also an unfortunate inability to actually identify clostridial toxins. The old methods of mouse protection tests are extremely unreliable and rarely available at present. **Development of genetic-based diagnostics is on the horizon but these techniques are not currently generally applicable.**

Removal of brains is an enigma. It is often viewed as a difficult and time-consuming process so it may be avoided when it obviously is indicated. A technique for easy brain removal should be developed and some type of monitoring of unusual CNS problems should be a routine. **Among other things, it is important that we continue to monitor for bovine spongiform encephalopathy in the US.**

Quality Assurance

Quality assurance should be part of a complete program that involves overall management philosophy. Record keeping and identification are keys to the program.

Injection site problems are a key concern within the livestock industry.[5] It is important that evaluation of injection site lesions be a routine part of necropsy procedures.[6] It is also important to check tissue reaction to injections given at the feedlot.[7,8,9] This requires some type of a template so that one knows what products were injected at what locations. It is also important to monitor for incoming lesions with the objective of possibly communicating with or changing suppliers.

Intramuscular injection sites in the rear quarters must be abandoned except with products that are known to have little potential for irritation. Most injection site lesions are the result of direct irritation and not infection.[6,7,8,9] This is not to suggest that the potential for infectious processes is not continually present. Dirty technique can certainly produce much more severe responses to injection sites that might have been relatively mild. Some vaccines such as some of the older clostridial products can be quite irritating. These are often overused and many times they are used improperly. Current information suggests that the subcutaneous area of the neck should be the preferred site for clostridial vaccine injections. Recent information from a National Animal Health Monitoring System (NAHMS) survey (1994) indicates that 80% of individual calves coming into the feedlot are already vaccinated with mixed clostridial antigens.[10] There is no reason to believe that there is a genuine need for revaccination. This provides a very large population of animals that could avoid revaccination and the potential for carcass blemishes. In addition, over 80% of the cattle in major feedlots receive multi-valent clostridial vaccines when a more focused approach might be adequate.[10] Twenty-three percent of larger feedlots surveyed indicated that more than one clostridial vaccine administration occurred with each animal.[10] This merely enhances the opportunity for creating blemishes. There is, on the other hand, little evidence that revaccination against clostridia is of any benefit. There is no good documentation that defines the situations in which revaccination against *Clostridium perfringens* types C and D may have an effect on feedlot mortality. Multiple injections may be used to try to compensate for feeding practices or consumption patterns that are the real source of enterotoxemias. There is also a great tendency to over-diagnose enterotoxemia which is practically impossible to differentiate from bloat and/or acidosis in many situations.

Many irritating antibiotics and other injectables such as vitamin products are routinely used. **There has been a misconception that these products are more effective when administered deep in the larger muscle masses.** This is contradictory to published material that suggests that large molecule products are much more readily absorbed from fascia and subcutaneous tissue than from muscle. Large molecular weight products are absorbed by lymphatics which are not found in the muscle tissue.[11] There is often a belief that the subcutaneous site has been avoided on manufacturer's labels because of some specific testing that would indicate that intramuscular is better. This is not necessarily true. Most of the recommendations for intramuscular injections are based on information that does not include comparative work involving subcutaneous sites. Deep intramuscular injections of irritating products has often been used because the resultant tissue damage and swelling are less obvious if buried deep in the muscle.

The neck is a preferred site in most cases based on better likelihood of absorption than from rump or leg muscles.[11] This again is based on the greater prevalence of connective tissue with the potential for vascular absorption. The end result is that the subcutaneous areas should be considered unless there is some specific contraindica-

tion and the neck is the preferred site because of better absorption of most pharmaceuticals as well as less concern for persistent blemishes.

Veterinarian Involvement

The movement to improve quality assurance in the feedlot must involve the veterinarian. To adequately fulfill this role, the veterinarian must be not only well-informed, but also quite ethical. The age of acceptability of backroom formulation of exotic mixtures has passed. The technical training of veterinarians puts them in an excellent position to help lead an overall quality assurance program and this should include a practical tailored methodology for each client. Objectives should include utilization of improved diagnostics, of better preventive practices and of reduced use of injections, especially with regard to irritating products such as clostridial vaccines and some antibiotics. The practice of quality assurance should extend to the mill where obviously the nutritionist is the key participant. The veterinarian, however, can participate in helping to prevent disasters through observation of any practices that may be dangerous or which could result in residue problems. We also need to promote the use of cattle from known sources and if possible, with pre-conditioning. A team effort can result in a much more valuable product.

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Cattle to Get Chemical Shave

Washington — Cattle will get a chemical shave before slaughter under a trial procedure designed to prevent bacterial contamination of meat, the Agriculture Department said Friday.

"This new process has the potential to improve food safety by effectively removing hair, mud, manure and other contamination from cattle prior to slaughter and dressing," said Michael R. Taylor, acting under secretary for food safety.

The chemical hair removal will occur after the animal is rendered unconscious but before it is killed.

The animals will be treated with sodium sulfide and hydrogen peroxide, the same chemicals used in tanneries but even more concentrated, to dissolve the hair in minutes instead of hours, the department said.

The procedure will be tested by Monfort Inc., the Greeley, Colo.-based meat packing division of Con Agra Inc. of Omaha, Neb.