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BEEF QUALITY ASSURANCE: WHAT'S THE WEAKEST LINK?

We have been conducting quite a few Beef Quality Assurance (BQA) programs over the past year in California. These have been put on to certify producers for the first time as well as for re-certification to comply with national guidelines to re-certify on a three year basis. The programs are always a two-way street with many good points and comments brought up by attendees. A number of topics were discussed that warrant emphasis in this column. Therefore, this month we will discuss some factors that affect the immune response of the calves when we vaccinate them as part of the BQA programs we all put in place. A large part of BQA is prevention of disease so the animals do not have to be treated after weaning, shipping, or in the feedlot. Vaccination against the common diseases is an important part of disease prevention. For vaccination and the animal's immune response to work appropriately a number of steps (links in the chain) have to all work together. First we need to present an appropriate antigen (vaccine) to the animal via injection or intra-nasal inoculation. The vaccine antigen has to have been properly stored and mixed before presentation. Secondly, the animal's immune response has to respond to the vaccine to produce protective immunity. Many factors are important in the proper working of the immune response; but, two of the most important are trace mineral nutrition and parasitism. So what are some of the weak links in the chain of protecting cattle from disease and what can we do about them?

Can storage conditions affect vaccines?

Definitely! Most vaccines should be stored at 35-45º F. The recommended storage conditions are on the vaccine label. Vaccines should be stored at the recommended temperatures from the time they are manufactured until the time you use them chute side. Overheating vaccines can cause obvious problems, as the proteins in the vaccine will breakdown (denature) and will not produce the desired immune response. Worse than overheating, freezing vaccines will decrease their effectiveness even faster. So the recommended storage conditions of 35-45º F is a strict range on both ends. Both modified live vaccines and killed vaccines are affected by improper storage temperatures. Almost all killed vaccines contain an adjuvant that aids in the immune response, as do some live vaccines. High or low storage temperatures cause these mixtures to separate and lose their effectiveness to prevent disease.

What about refrigerators and their effectiveness?

It turns out that many of the refrigerators we use for storing cattle vaccines and drugs are cast-offs from some other use and may not be functioning properly. A survey by Dr. David Thain at the University of Nevada, Reno found 25% of ranch refrigerators failed to maintain temperatures to keep vaccines in the safe range and most of the failures had to do with freezing the vaccines (temperatures as low as 10º F for extended periods).

Many of the old refrigerators we use tend to freeze items stored in the back near the coils and overheat items stored near the front or in the door because the rubber seals no longer work. Additionally, some of the older refrigerators cannot insulate well enough when placed outside in the winter and the vaccines simply freeze inside the refrigerator.

How can I tell if my refrigerator is working correctly?

You can buy a thermometer which records minimum and maximum temperatures and place it in your refrigerator for several days. Put it in different locations to be sure you don't have cold spots or hot spots. These thermometers can be purchased for less than $20. They are made in both electronic form and magnetic form (the high/low thermometers we use to record daily temperatures). Simply go on the web and type in recording thermometers and browse the various offerings until you find one that suits your needs. Leave a thermometer in your storage refrigerator and monitor it from time to time.

What affects the immune response of the calves?

Many things will affect the calves' ability to respond to vaccines or disease challenges. These include the presence of the BVD virus in the herd, stress, previous vaccination history, the products used, parasites, nutrition, and vaccine handling. The storage of vaccines was discussed above, as an important part of vaccine handling. Cattle that are parasitized do not respond normally to vaccines. Also, calves deficient in trace minerals such as selenium (Se) or copper (Cu) respond poorly to vaccines and infectious diseases.

Why do parasites affect the immune system?

Most parasites have complex life cycles and depend on evading the host's defenses to be able to survive. Part of this evasion is to affect the host's immune system, so there is not a large reaction against the parasites. Therefore, most parasites make chemicals that decrease the animal's ability to make a full immune response. While this helps the parasite, it harms the host in terms of handling other infections.

How do you minimize the parasites' damage?

Having a good comprehensive parasite control program for the entire herd is the first step. Deworming the cow herd before they enter clean pastures will help keep the parasite load low in the herd and keep the number of parasite eggs on the pastures to a minimum. The use of effective products will also have a positive impact. Your veterinarian can advise you on the use of appropriate products and the timing of use in your herd.

What are the best dewormers to use?

Again, your veterinarian can best advise you on this topic for your herd's particular situation. However, I recommend using the brand name products at this time. There have been a number of situations in the recent past where generic ivermectin products have been associated with significant parasitism, i.e., the generic ivermectin were used and clinical problems remained. If you have any indication that a dewormer did not work have your veterinarian investigate the problem and analyze fecal samples to determine if patent parasitic infections are present.

How do trace minerals affect the animal's immune system?

Many trace minerals and vitamins are now referred to as "antioxidants". As part of their antioxidant function they are very important in the immune system. In California, most of the beef cattle are deficient in either Se or Cu (or often both) unless they are supplemented. These minerals are very important in the calves' immune system for a normal response to vaccines and to ward off diseases such as pneumonia. Also, neither Se nor Cu are well transferred to the calf via milk, so near weaning the calves are often at their lowest level in terms of Se and Cu—at greatest risk for deficiency.

How do I know if my calves are deficient?

A few blood samples taken from your calves at or near weaning will tell the story. They can be analyzed for the trace minerals and will reflect how well your supplementation program is working. There are a number of effective ways to supplement Se and Cu and your veterinarian can help you work through the options that will work best for you.

What's the bottom line?

With regard to handling vaccines—make sure your refrigerator and vaccine storage system is working. Be sure to store your vaccines and other animal health materials according to label instructions. For vaccines this is usually between 35 and 45º F. For parasite control—use brand name products recommended by your veterinarian at an appropriate time to make sure calves to be vaccinated are not heavily parasitized. With regard to trace minerals—have a good supplementation program that includes occasional monitoring of calves' blood levels to be sure the program is working efficiently. Strengthen these weak links and combine them with good BQA practices and your calves will be healthier with minimal disease problems.

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