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Pre-Weaning Vaccination of Beef Calves

Quality Beef (Born and Raised in the USA) for the retail meat counter or restaurant begins at the ranch under the care of a good mother cow and with the supervision of a conscientious producer. Maintaining optimal health throughout the growing and feeding periods requires a mix of good genetics, proper nutrition and vaccinations to prime and enhance the immune system. Pre-weaning vaccination at the appropriate age of the calf becomes a valuable tool to help prevent respiratory disease in the feedlot and the resulting decreased feed efficiency, lower weight gains and a lesser quality carcass grade.

The herd health program developed with assistance of the local veterinarian will be designed to minimize the exposure and infection by the viruses and associated bacteria that are involved in BRD (Bovine Respiratory Disease).[1] A healthy, adequately immunized mother cow will provide maternal antibodies (passive immunity) to the calf through the colostrum at birth. The calf's passive immunity gained from the maternal antibodies begins to wane around the age of five to six months. In a healthy closed herd on the range, the calf's exposure to the BRD organisms will be minimal and there will be little opportunity for the calf's immune system to develop an active or acquired long lasting immunity. The result is an increased disease susceptibility (morbidity) and mortality in the feedlot.

Of particular concern is the wide spread exposure to the BVDV. Protection of the developing fetus is not consistently obtained by regular vaccination of the mother cow. Exposure of the fetus during the first 100 days of gestation may result in a BVDV PI (persistently infected) calf. This individual may not always appear as the unthrifty, chronically sick smaller calf, however it will constantly shed BVD virus and be a continual source of virus exposure to the individuals in the herd that do not carry a protective immunity. The BVD virus acts as an immunosuppressive agent. BVDV infection in conjunction with any of the other BRD organisms usually results in increased severity of symptoms, poorer response to therapy and increased mortality. Identification and removal of the BVDV PI individuals is important to the success of the herd's preventive health program.

The combined stresses of fall weather changes, weaning, transportation, drastic changes in diet and confined comingling with animals from a wide geographical area, can easily overwhelm the calf's waning passive immunity. The timing of Pre-Weaning Vaccination is critical in that the vaccine antigens should be administered at an age when the maternal antibodies are low enough to not interfere with the development of an active humoral and cellular immune response. The level of protective immunity may not be adequate until 21 days past the last administered vaccine, so the Pre-Weaning Vaccinations should be administered at least 21 days before the stresses of weaning and shipping begin. Potential post-vaccination reactions and weight loss due to handling are minimized when the calf remains with the dam on pasture. The duration of active immunity stimulated by vaccination at branding may also be short-lived due to the interference by the maternal antibodies. And the four month time span between the vaccine administered at branding and the vaccine administered at pre-weaning, may be too long for an adequate anamnestic response to provide protective antibodies of long duration.

Consideration must be given to the particular vaccine indications and precautions. Manufacturers advise against the administration of modified live viral vaccines to calves nursing pregnant cows. This is due to the concern that potential shedding of the vaccine virus may abnormally affect the developing fetus. Attenuated viral vaccines or killed virus vaccines are recommended for the calf nursing the pregnant cow. However, the killed virus vaccines and most bacterins or toxoids require a second or booster dose administered 2 to 4 weeks after the first vaccination, in order to provide a protective immunity, as indicated by the product label.

Remember to handle the vaccines according to label instructions: administer in the neck region (preferably subcutaneous if allowed according to the label), maintain the products at the proper cool temperature, avoid exposure to bright sunlight and insure that the syringes are free of disinfectant contamination. Good working facilities allow the animals to be processed quietly and efficiently, thereby reducing physiological stress. Adverse handling can result in elevated levels of cortisol (a hormone produced during the 'fight or flight' response to fear), which interferes with the normal function of the immune system. Care in handling the animals and the



vaccine products will help prevent the so-called “vaccine failures”. Consult with and follow the advice of your local veterinarian.

Vaccines can not overcome inappropriate husbandry practices. Vaccines are a preventive tool in a complete management program. The immune system requires a balance of nutrients – energy, protein, water, minerals and vitamins – in order to mount a good protective immune response. Depending upon the geographical area and the severity of drought, supplementation of the trace minerals (copper, zinc, selenium, manganese) and Vitamins A and E may be necessary for the calf to maintain its genetic growth potential and be able to physiologically produce protective antibodies. This supplementation may be required throughout the entire growing season or at a minimum of sixty days prior to weaning, as the forage quality decreases. Realize that with our current genetics, calves have the potential to gain 2.5 to 3.0 pounds of body weight per day from birth to weaning – inhibiting this potential through inadequate nutrition may also limit the potential protective immune response.

[1] IBR (Infectious Bovine Rhinotracheitis virus), PI3 (Para-influenza virus), BRSV (Bovine Respiratory Syncytial virus), BVDV (Bovine Virus Diarrhea virus) and the bacteria organisms; *Mannheimia haemolytica* *Pasteurella multocida*, *Haemophilus somnus*.