Cattle Business in Mississippi – March 2017
"Stocker Cents" article

Vaccination and Immunity

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This time of year many fall calving herds are making plans to wean calves, and many stocker producers have or are preparing to receive cattle onto winter grazing pastures. During this time, which vaccinations and when to give them are often a hot topic of conversation. An important concept to understand related to this discussion is that vaccination is not equal to immunity. It is the ability of an animal to develop immunity that is key to reducing sickness and improving the overall health and well-being of an animal. As producers, we should do our best to ensure we are setting our animals up for vaccination success.

Cattle develop immunity one of two ways: through natural exposure to a disease or through vaccination. Through either exposure, an animal's immune system has memory cells that will develop that will recognize the pathogen that caused the disease in the future if the animal is exposed again, and will attack the pathogen before it can cause illness in the animal. Vaccines work by taking advantage of this system and exposing an animal's immune system to a pathogen before it is encountered, thus when the animal is exposed to this pathogen in its natural environment the memory cells should act to prevent disease. The important thing to remember is that this is the best case scenario. Often an animal's condition at vaccination may alter its ability to properly develop immunity.

Secondary exposure to a pathogen will strengthen the immune response. This is the reason most vaccines require a second or booster dose. This serves to create a stronger immune response with an increased concentration of memory cells. Most protocols recommend a booster 2 to 4 weeks after the initial vaccination and then annually for the life of the animal.

Bovine respiratory disease (BRD) is the leading cause of sickness in stocker and feedlot cattle, and as a result receives the most scrutiny. This disease is complex, and caused by numerous pathogens, and represents a big economic loss. Due to the costly nature of this disease, scientists study what we can do to prevent it quite frequently.

Due to unknown history of many cattle that enter a stocker system, producers often assume the worst case scenario with newly received calves. In this scenario, calves are vaccinated and dewormed immediately after arrival to the producer's farm. However, these calves may be immunocompromised due to the stresses associated with weaning, sale, co-mingling, and transportation, and this may not be the best time period to develop immunity to the pathogens commonly associated with BRD. Stress-induced immunosuppression has been discussed as a possible reason for delaying vaccination from arrival.

Vaccination against BRD agents at arrival, and frequent monitoring to identify cases of BRD quickly, are used to limit the impact of BRD in cattle, but BRD can still cause substantial sickness and death. This is likely at least in part due to the fact that vaccination at arrival does not give adequate time for the calf to develop a protective immune response from the vaccination. In support of this, multiple studies have recently shown that vaccination of high risk cattle at arrival does not significantly improve health outcomes over a 28 to 56 day period (Richeson et al, 2008, Richeson et al, 2009, Bailey et al. 2016). Research is still ongoing to examine the impacts of timing of processing cattle after arrival, with a research trial scheduled to start at Mississippi State University this month.

Vaccination well in advance of shipment as part of a total program intended to prepare calves to

resist BRD after they are shipped from the farm of origin is called “preconditioning”. Preconditioning a group of cattle decreases the likelihood that they will experience significant BRD after shipping (Duff and Galyean, 2007; King et al, 2006); however, preconditioning does not guarantee that cattle will not develop BRD. Ideally though, while still at the farm, calves have not yet been exposed to the stress of weaning, transportation, and co-mingling that often hampers vaccination success. This could be an ideal time to vaccinate calves to allow them to develop immunity.

It is important to remember that vaccines must be given according to the manufacturers’ guidelines, which are described as the way the vaccine will be most effective, and has been tested. Always follow Beef Quality Assurance guidelines when giving injections, and consulting with your veterinarian to determine the best vaccinations to meet your herd’s needs is a vital part of the process.

For more information about beef cattle production, contact an office of the Mississippi State University Extension Service, and visit extension.msstate.edu/beef.

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