Northwest Veterinary Associates Newsletter

"BVD Re-thought"

July, 2009 by Dr. Kokaram

Here at Northwest Veterinary Associates, we strive to provide our clients with as up-to-date and progressive services as we can, offering such services as embryo transfer, in-house mastitis culturing, transition cow and replacement heifer consultation as well as rectal ultrasound for pregnancy diagnosis. In order to maintain as high a standard of services as possible, we routinely re-assess our protocols and determine whether they reflect currently accepted research in the field. Within the last year, there has been increased interest in the topic of bovine viral diarrhea (BVD) as it pertains to overall herd health and its continued impact on the dairy industry. As such, I felt a brief review was in order.

BVD is a highly contagious viral disease that has been documented in most countries that cattle are raised. As a single viral disease, BVD may be expressed as a variety of clinical outcomes ranging from highly fatal mucosal and diarrheal diseases, to reproductive failures in the form of abortions, early embryonic deaths, persistently infected calves and numerous congenital defects. However, its major impacts on the industry are through its influence on reproductive health of the herd; via exposure of pregnant individuals to persistently infected individuals; the major source of infection for any herd, and through the immune suppressive nature of the disease itself which renders the herd highly susceptible to a variety of other diseases. So what is a PI and how does a PI arise anyways?

PI calves arise from exposure of a pregnant dam (heifer or cow) to the BVD virus during days 45 – 125 of gestation. During this critical period, the immune system is developing and "learning" what is normal and what is not, so to speak. Exposure at this time results in the calf not being able to mount an immune reaction to the virus and in fact, harbours the virus as part of its normal make up, and as such, becoming infected with the virus indefinitely/persistently. Exposure to the virus prior to this point often results in early embryonic death, while exposure after this point will either result in a calf with developmental abnormalities (usually of the brain and/or eyes) or a normal calf. While most PI calves typically do not survive past 2 years, often succumbing to other diseases due to the immune suppressive nature of BVD infection, some have been documented as surviving for up to 5 or more years in the herd; all the while shedding viral particles. So how does one encounter said viral exposure?

Exposure to BVD viral particles may occur through direct contact with the nasal discharges, saliva, semen, feces, urine, tears, or milk of a PI individual, from indirect exposure via airborne transmission (particles being transmitted from 1 calf to another up to 30ft away), being housed in the same pen that a PI was previously housed, coming in contact with objects that have themselves contacted the secretions from a PI, or in some extreme cases, being bitten by blood feeding flies that have previously fed off of a PI or via vertical transmission across the placenta. Looking at this list, it would appear that once it is in a herd, BVD can rapidly and silently spread through the herd, handicapping the dairy; especially since there is no treatment for BVD infection. Thus, prevention and control ought to be the hallmarks of a good herd health program.

While prevention hinges on avoiding introduction of infected animals into the herd together with a sound vaccination program for all female breeding animals on the farm, control is specifically targeted at detection and elimination of PI individuals. In order to most easily monitor for the presence of BVD in a herd, routine sampling of calves has become commonplace since a BVD negative calf can only come from a BVD

negative dam. However, this monitoring strategy is itself dependent upon one consistently sampling all calves (this includes heifers, bulls, still born and aborted calves). Alternatively, one may routinely monitor bulk tank samples for the presence of the virus in the herd. Unfortunately, by the time the virus is detected in the herd, the PI calf has already been born, comingled with the other pregnant animals in the close-up pen and has now infected multiple individuals. Thus, being able to reliably and consistently identify PI's in a timely manner is essential.

The diagnosis of BVD in the field is one area of research that has undergone significant re-thought and reassessment in the last year. It was previously thought that the PCR technique used for identifying the BVD virus in skin samples (ear notches) was sensitive enough to allow pooling of multiple notches, thus reducing the overall cost to producers. In this process, anywhere from 5 to 100 ear notches would be placed into a single container, mixed together, and then the test would be run on this sample. However, while this procedure still remains a very useful screening tool, recent research in this field has demonstrated a certain degree of uncertainty when applying results from pooled samples to individuals. Confusing, I know.

In the simplest of terms, the previous testing protocol could be likened to trying to find a needle in a bale of hay where the needle is our BVD virus, and each individual flake in that bale is an individual calf. The pooling protocol would take anywhere from 5 flakes to 100 (where, any 1 flake could have a needle in it), place it in a mixer wagon, spin for a bit, and then go looking for that needle. The greater the relative prevalence of the virus in that area or herd, the greater the number of needles possible in those flakes, and thus, the greater the likelihood of finding one. However, if the relative incidence is low, which is the case in our area, the fewer the needles present and thus, the less likely you are to find that needle. Current research indicates that mixing 10 flakes together (pooling 10 ear notch samples at a time) reduces our chances of finding the virus by 10%, while mixing 100, reduces our chances to just 50%.

Given the devastating effect that a single PI individual may have on a herd if missed, the ability to identify and eliminate PI's reliably is absolutely essential. In light of these recent developments and strides in current BVD diagnosis protocols, we at Northwest Vets are offering a new testing strategy that would involve testing each individual sample separately (i.e. look at individual flakes instead of whole bales). We feel confident that this protocol (Antigen Capture ELISA) would not only provide us with the most accurate results, but also the most reliable for our producers.