Genomics Continue to Advance Our Understanding of Calf Diseases

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Modest cost sequencing, the ability to cheaply and rapidly genotype tens of thousands of markers, and large genomic databases available to researchers have advanced industry approaches to investigating potentially heritable diseases. Decades ago, investigation was long, costly and often uncertain — breeders may have been reluctant to report problems, and breed groups considered risk and cost when confronted with abnormal calves.

Current technology allows modest investments to enlighten producers' understanding of diseases and can rapidly place tools in the hands of breeders to mitigate impacts and losses associated with deleterious genotypes. Cost benefit analysis is still prudent in prioritizing projects for funding, but benefits and cost reductions allow for affordable investigation of more cases.

Investigation

Current investigations into several diseases at the University of Nebraska-Lincoln (UNL) are being slowed by incomplete reporting and inadequate sampling of affected calves and related individuals. Vigilance in investigating neonatal calf problems is paramount.

The first step to investigate calf problems is to establish a clear phenotype definition of the condition. Your local veterinarian can often assist and will accurately diagnose well-known and common calf conditions. Veterinarians are also helpful in accurately communicating phenotypic features of uncommon or emerging diseases, as well as collecting and properly shipping diagnostic or research samples.

Breed association field officers also have knowledge of disorders in the breed and can be a conduit to further diagnostic assistance. The cell phone camera is a huge asset to facilitate disease reporting — often those images and a brief description of interpretation from the ranch serve as a valuable starting point. These images and initial reports help determine sampling needs. Samples used to diagnose and to evaluate environmental or infectious disease vary by the condition presented.

When calves are reported with a phenotypic or epidemiologic feature suggesting a genetic component may be present, we add sampling to enable harvest and banking of DNA for research. Blood preserved in an EDTA (purple top) blood tube is the easiest sample for scientists to work with as a DNA source.

When affected animals are deceased, an ear may be used to extract DNA for research. The ear cools rapidly at death and is an easy sample to collect. It is important to report disorders when samples are still available. For research, the affected calf, dam, a few half siblings and the sire are sampled for DNA harvest. Samples are saved, and when the analysis suggests further research is justified, genotypic or sequencing studies are pursued.

The diagnostic program at the UNL accepts referrals from breed associations and veterinarians. I encourage breeders to contact their breed associations to report concerns and to access assistance. A local veterinarian, a local diagnostic facility or the UNL program can all initiate investigations when congenital calf disease concerns arise, and they will work together as a team with breed associations to solve these industry-wide problems. HW