



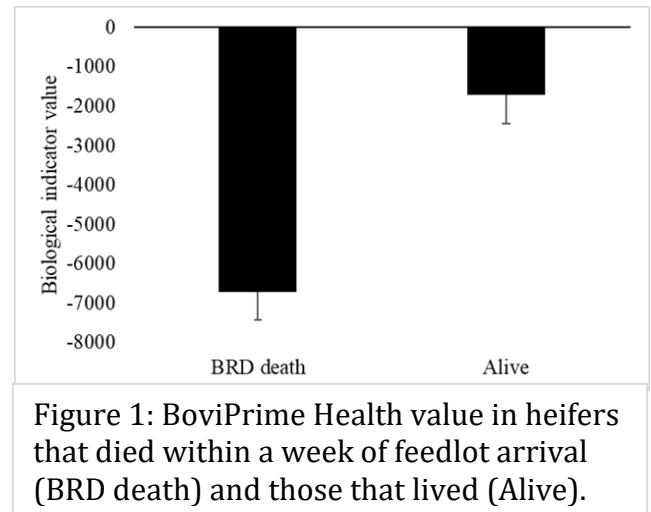
NMSU EASNR and Tucumcari Bull Test Launching BoviPrime Health Test

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Bovine respiratory disease (BRD) continues to be the largest challenge facing the US beef industry with annual economic losses of nearly one billion dollars. BRD is perhaps one of the most extensively studied diseases, and, despite improved vaccine development and use, BRD rates and mortality are increasing. BRD is typically caused by both a viral and bacterial component after the animal is stressed or comingled. Symptoms of BRD usually include high fever, depression, decreased appetite, nasal and ocular discharge, and coughing. Varying degrees of permanent lung damage can occur depending on the pathogen and pneumonia type. In severe cases, lung damage resulting from BRD can contribute to mortality.

Several studies have attempted to identify genetic markers of susceptibility to BRD in an effort to select animals that are more resistant to the disease. Heritability of BRD has been estimated in a range of 0.07-0.29 indicating that there is an opportunity to select animals for resistance but there is variability in our ability to predict sires or dams that are resistant to the disease. Indeed, several markers for disease susceptibility have been postulated, but the diverse immune response likely involves several physiological pathways further complicating identification of underlying genetic marker(s). Undoubtedly, there are physiological differences in cattle's resistance to BRD; this phenomenon is highlighted when evaluating a pen of cattle arriving at a feedlot. Some of the calves will display clinical symptoms of respiratory disease or die while others never appear to have health issues even within the same pen of calves. Identification of phenotypic markers for animals resistant to severe cases of respiratory disease could be used in combination with genetic markers to help identify and select animals resistant to respiratory disease.

Immune responses to any disease are complex networks of innate immune system components (antimicrobial proteins, mucus, skin, etc.), immune cells, cytokines, and other physiological responses. When the immune system responds correctly, it can clear pathogens and restore health to the animal. The fundamental basis for utilizing vaccines is helping prime the immune system to respond appropriately to a given pathogen. Occasionally the immune response can also be detrimental to the animal and in some cases cause more damage than the pathogen. Histones are proteins that are found in the nucleus of the cell and wrap DNA to form chromosomes. When histones are outside of the cell, they are extremely toxic to other cells, and extracellular histones have been implicated in death associated with sepsis in humans and rodents. Work in the Gifford lab at NMSU speculated that uncontrolled histone toxicity could be contributing to lung damage during BRD. A novel assay was developed to determine an animal's ability to protect against histone toxicity and was used to evaluate how the ability to protect against histone toxicity related to susceptibility of severe cases of BRD. Cutter bulls that suffered severe cases of respiratory disease after arriving at the feedlot had reduced ability to protect against histone toxicity. A subsequent study was conducted in heifers and combined a measurement of another immune pathway, the complement system. Utilizing a ratio of both assays generated a value that was predictive of which heifers would suffer mortality in response to BRD; this novel marker was named BoviPrime Health. Figure 1 shows BoviPrime Health value in heifers that died from BRD within a week of arrival (BRD death) to the feedlot versus those that lived (Alive). It is important to note that the test was conducted at arrival to the feedlot and prior to clinical symptoms.



NMSU EASNR worked with producers from the Tucumcari Bull Test to collect samples from bulls consigned to the Bull Test. Bulls will be evaluated using the BoviPrime Health test to determine which bulls may be more likely to produce calves with increased resistance to severe cases of BRD. It is critically important to understand that the test is intended to support existing genetic markers for health as well as good management practices to reduce BRD. Additionally, the test is only suited to help identify bulls that will help address this specific production trait. The bulls that are not BoviPrime Health certified will still sire healthy calves consistent with industry standards. However, if you are currently having problems with respiratory disease in your calves, you might consider evaluating some of the bulls in the Tucumcari Bull Test. **First**, identify a group of bulls that meet your ranch's production goals (the bulls must first match your major needs on the ranch); **then**, look at the bulls that are BoviPrime Health certified within that group. The Tucumcari Bull Test will be held Saturday, March 9th at Rex Kirksey Ag Science Center, Tucumcari, NM. For more information please see: <https://tucbulltest.nmsu.edu/>

Note: Traits that are measurable in a population are theoretically heritable. However, the level of heritability is not established for all traits or tests. BoviPrime Health Test is intended to facilitate heritability estimates and is a phenotypic marker that is used in conjunction with good management practices as well as genetic information to reduce BRD. Examples of other phenotypic markers used in combination with genetic markers include rib eye area and pulmonary arterial pressure testing (high altitude test). Prevention of BRD requires a multifaceted approach including a biosecurity plan, a good vaccine program designed in collaboration with your Veterinarian, proper nutrition and mineral program, proper weaning management, and overall good herd health program.

Department Announcements

We would like to welcome Bethany King to our department as our new Admin Assistant. Her phone is (575)646-2514 and email is kingb@nmsu.edu.

The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and Extension programs. New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating.