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"Beef Production Strategies" article

Managing and Selecting for Healthy Cattle

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Herd health is widely recognized amongst Mississippi beef cattle producers as crucial part of a profitable cattle enterprise. One of the questions that sometimes arises when working to produce healthy cattle is how much influence cattle genetics has on herd health. Like performance traits, health traits in beef cattle depend upon both environment and genetics. Therefore, proper placement of management and selection emphasis can be effective in developing and maintaining a healthy herd.

What Role Does Genetics Play in Herd Health?

Interestingly, there is currently more published research on the heritability of health traits in dairy cattle than in beef cattle. Heritability estimates are useful in describing the genetic influences on health traits. Heritability estimates express how much genetics influences a trait, with values closer to 1 indicating more genetic control over the trait and less environmental influence. Cornell University researchers reported moderate heritability estimates (.15 to .40) for dystocia, metritis, milk fever, and mastitis and low heritability estimates (less than .12) for retained placenta and cystic ovaries. University of Wisconsin studies with dairy cattle published in 2004 also give support to the concept that genetic selection against common health disorders is possible. Earlier Iowa State University research concluded that selection for reduced health problems was possible in dairy cattle as well. These studies all acknowledge a weak to moderate genetic component of dairy cattle health traits.

While there is still much that is not known about genetics as it relates to herd health in beef cattle, there are an increasing number of research efforts attempting to shed some light on this economically important area of interest. Recent beef cattle studies conducted at the U.S. Meat Animal Research Center in Clay Center, Nebraska have helped clarify the role that genetics plays in specific herd health problems. These research findings indicate that the response to selection for bovine respiratory disease resistance could be large if the phenotype (the observable physical attributes of a trait) for bovine respiratory disease resistance was known. It remains a challenge to be able to accurately identify the phenotype of disease-resistant animals. Crossbreeding was demonstrated to decrease bovine respiratory disease incidence in this study. The study also revealed that dams genetically superior for resisting bovine respiratory disease tended to raise calves that were more susceptible. A possible explanation proposed by the researchers is that maternally superior dams provide passive immunity to their calves, which delays the development of the calves' direct immune system and makes them more prone to bovine respiratory disease.

The Nebraska-based USDA researchers also investigated the genetic component of infectious bovine keratoconjunctivitis, commonly known as pinkeye. They found that

response to selection for decreasing pinkeye incidence is likely to be slow because of low heritability and low incidence in most breeds. However, significant breed differences in pinkeye incidence may be relevant for some producers in certain management systems. Research findings also suggest that there may even be a maternal breed effect on pinkeye incidence in calves. In other words, some breeds and breed combinations are more susceptible to pinkeye, and the breed of the dam may be particularly important.

Florida animal scientists have studied genetic and non-genetic influences on calf health as well. In studies using purebred and high percentage Brahman influence cattle, they found that the following environmental factors increased the odds of poor vigor at birth: calves born to young or very old cows, calves with difficult births, and calves born on days when minimum temperatures were 42 degrees Fahrenheit or less. In addition, purebred Brahman calves had 24.7 times greater odds of poor vigor than 2/3 Brahman calves, illustrating the effectiveness of crossbreeding for improving calf vigor at birth. The researchers concluded that although genetics does play a role in calf health traits, management may yield better results in reducing poor calf vigor and preweaning death rates than genetic selection. Along these same lines, it should be noted that until expected progeny differences for specific cattle health traits are available, producers will have to rely on in-herd observations and performance records to apply selection pressure for improved health.

Management, Management, Management

There is no way around the fact that management largely influences cattle health. Even with good genetics, taking short cuts with a herd health program can be risky and ultimately costly. Brad White, D.V.M with the Mississippi State University College of Veterinary Medicine, recommends that health programs should be generated for farms to address their specific production and management systems. Animal, environmental, and management factors affect the farm’s risk for particular diseases. A complete herd health program is based on identifying and minimizing the risks faced by the farm.

Environmental factors have a large influence on pinkeye incidence, for example. The genetic influence on pinkeye incidence is relatively small. Direct heritability estimates for pinkeye incidence in the Nebraska study were generally low, ranging from 0.00 to 0.28 by breed. This research further shows that the incidence of pinkeye is related to calf age and the seasonal life cycle of the face fly, with peak incidence during the summer months. Dr. White makes the point that since other factors such as pasture conditions, nutrition, and animal health impact pinkeye incidence, simple management techniques to control these risk factors can help reduce the number of cases of pinkeye in a herd.

Because environment and management are key factors influencing cattle health, it is important to develop a herd health program in consultation with a veterinarian that is familiar with the local environment and herd health risk factors in the area and on the specific beef cattle operation. This allows the herd health program to be customized to the specific farm conditions. The Mississippi Agricultural and Forestry Experiment Station South Farm Beef Unit is a good illustration of this. Herd health protocols for the

MSU beef research herds are based on College of Veterinary Medicine recommendations. Veterinarians with the College of Veterinary Medicine work closely with MSU beef herdsmen David Pinkerton and Kyle Morgan to prevent, control, and treat herd health problems. The sharing of information among the herdsmen and veterinarians on management practices, nutritional programs, pasture conditions, and other useful observations enhances the herd health program for the research farm. Dr. White suggests that open communication facilitates more accurate identification of the sources of health problems and allows generation of farm specific preventative programs.

Healthy Herd Essentials

The bottom line is that there is no good substitute for a well-planned and implemented herd health program. Properly managing cattle and reducing disease risk factors based on sound veterinary advice is essential for healthy herds. Genetic selection can then be used to fine tune herd health by slowly increasing disease resistance in the herd as part of a balanced selection approach considering other economically relevant traits. Genetic selection for improved health traits will become more effective with accurate phenotype identification, expected progeny difference development, and marker-assisted selection advances in the future. Given these current challenges though, crossbreeding and responsible culling are two practical, proven approaches that can be used to make progress in this area.

For more information on beef genetics, herd health, or related topics, contact your local county Extension office or veterinarian.