AMERICAN HEREFORD ASSOCIATION

November 21, 2023

To the Membership of the American Hereford Association:

The American Hereford Association (AHA), in collaboration with Dr. David Steffen and Dr. Jessica Petersen at the University of Nebraska-Lincoln (UNL), have discovered a novel defect in Hereford cattle called **Delayed Blindness (DB).** This genetic defect is considered autosomal recessive, meaning an affected calf must have two carrier parents.

The AHA has received information from members over the last few years about cattle that appeared to be blind. Per AHA rules these cases were referred to Dr. Steffen at UNL for diagnosis. In each case, the animal had no apparent deficit in vision as a calf, with indications of vision loss being noted at approximately 9-12 months of age. In a novel setting, the cattle had difficulty navigating their surroundings and would bump into stationary objects. An in-depth ophthalmologic evaluation of suspected to be blind confirmed retinal degeneration, lack of a menace responsive (reaction to something being moved toward the eye), and little to no response to light stimuli as determined by an electroretinogram (ERG). The clinical evaluations confirmed blindness in each case.

Blind animals were reported in several different herds across multiple regions of the U.S. Pedigree records demonstrated a common sire in the pedigree of both the sire and dam of each affected animal, suggesting a new deleterious recessive genetic variant might be to blame for blindness in these cattle. Utilizing whole-genome sequencing, the UNL research team identified a mutation in each blind Hereford consistent with a recessive mode of inheritance. Researchers then developed a single-marker assay to genotype additional animals to validate the result. Genotyping of additional animals identified other Hereford cattle that were homozygous for the variant. Upon investigation, those animals were confirmed to be blind, supporting the identified variant as causative of the condition. The gene in which the mutation was identified is known to be important to retinal health and function. In humans, mutations in the same gene lead to similar clinical observations and progressive blindness.

Importantly, this condition is not associated with the amount of pigment around the eyes; the appearance of the eyes is normal (they do not become cloudy or white). However, researchers believe that the blind animals are at a greater risk of injuring their eyes due to difficulty navigating their environment. Carriers of the mutation appear to be healthy.

AHA and the UNL worked with Neogen® to develop a commercially available test so breeders can submit DNA for testing or test previously submitted samples on file at the AHA. This test is a standalone test. It is not part of any current genotype panels used to test animals. The cost of the DB standalone test is $20. If DB is ordered in conjunction with a genomic profile the add-on charge will be $13.

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The AHA suggests first testing impacted pedigrees in order to help identify breaks in transmission through the pedigree. Currently, breeders should expect typical turnaround time for genotyping when submitting for DB testing.

To aid in determining which animals to test, breeders can utilize the "potential carrier" search tool in MyHerd. It is located under the DNA tab on the MyHerd search platform. Simply login into your MyHerd account and you will have search access to your active registered animals and dams under the owner tab. It is important to realize that the MyHerd search is a real-time platform, therefore, the AHA recommends breeders run the search periodically over the next couple months as pedigree relationships will be broken as more animals are tested and identified as either carriers or free from the condition, which could implicate animals in other herds. Breeders can find animals that have been tested for DB at https://www.myherd.org/web/USHF/AnimalSearch/List.

The AHA is publishing 12 animals that have been identified as affected for DB in the cases submitted to UNL for research. These 12 animals are listed below and will be identified on https://www.myherd.org/web/USHF/AnimalSearch/List as **Delayed Blindness Affected (DBA).**

WERK RACHAEL 784 ET	43846169	DBA
FBF GERTIE 1805 ET	43951256	DBA
FBF GINGER 1807 ET	43951258	DBA
KJ BJ 969A MISTY 429F ET	44004733	DBA
KJ BJ 969A MISTY 419F ET	44004729	DBA
HARKERS GABRIELLA G125	44068700	DBA
BOY HARLEY'S SENSATION 903G	44077548	DBA
MGM FLF MAL 4H ET	44145834	DBA
SLC 7968 ALEXA 14H	44179708	DBA
CFCC POPPY 307J ET	44288133	DBA
HME 2296 175 CAMEY K4 ET	44326749	DBA
HME 2020 175 CAMEY J22 ET	44326796	DBA

In research identifying where the mutation occurred, the six animals listed below have been tested as being a carrier for DB and consequently will be listed as **Delayed Blindness Carrier (DBC)** on https://www.myherd.org/web/USHF/AnimalSearch/List.

MM RSM STOCKMASTER 512	23839472	DBC
JB REMETEE 213	43056323	DBC
UPS SENSATION 2296 ET	43311175	DBC
KJ BJ 274S MISTY 969A ET	43443358	DBC
H MONTGOMERY 7437 ET	43799223	DBC
H JB TWO TIMIN CAMEY 175 ET	43896576	DBC

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In research of identifying where the mutation occurred, the three animals below have been tested as being free for DB and consequently will be listed as **Delayed Blindness Free (DBF)** on https://www.myherd.org/web/USHF/AnimalSearch/List.

CHURCHILL SENSATION 028X	43092364	DBF
R LEADER 6964	43500058	DBF
SHF WONDER M326 W18 ET	42991698	DBF

If you suspect a calf may be affected by DB, please alert the AHA or Dr. Steffen at the Nebraska Veterinary Diagnostic Center. Both parties can assist with proper diagnosis and parentage verification for this or any other abnormalities you may encounter. If you identify suspect calves in your herd, be alert for testing availability as screening at-risk animals in the breeding population is critical to prevent future losses.

The AHA appreciates your cooperation with reporting cases of affected calves in order to identify this novel defect. Truly, it was a team effort between breeders, UNL and AHA staff to address this genetic condition. Fortunately, with new technology and advancements, breeders can work around this defect to continue to breed carrier animals if they choose, as opposed to culling affected genetic lines. We appreciate our strong membership and thank breeders in advance for their patience and cooperation.

Sincerely,

Jack Ward
Executive Vice President
American Hereford Association

Shane Bedwell
COO and Director of Breed Improvement
American Hereford Association