

BY THE NUMBERS

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Collaborating to Find Answers: Heart Health Initiative

Updates on bovine congestive heart failure.

The American Angus Association and its members have always been on the forefront of new frontiers, especially when it comes to genetic progress. Whether pioneering the adoption of carcass ultrasound or employing genomic technology, these efforts not only blaze the trail for Angus breeders but also the nation's cow herd. But these types of efforts do not come to fruition overnight — they take years of collaborated efforts from both the research and science communities.

A newly created Angus

collaboration looks to tackle an industry issue that has gained recognition recently. Over the last several years, we have heard reports of cattle dying of congestive heart failure in feedlots. Bovine congestive heart failure (BCHF), also referred to as noninfectious heart disease in scientific literature, affects cattle that have experienced pulmonary hypertension for a long period of time. This chronic hypertension damages the tissues of the heart and lungs, causing the heart to remodel and become ineffective at pumping

blood through the heart and leading to eventual heart failure.

Current knowledge

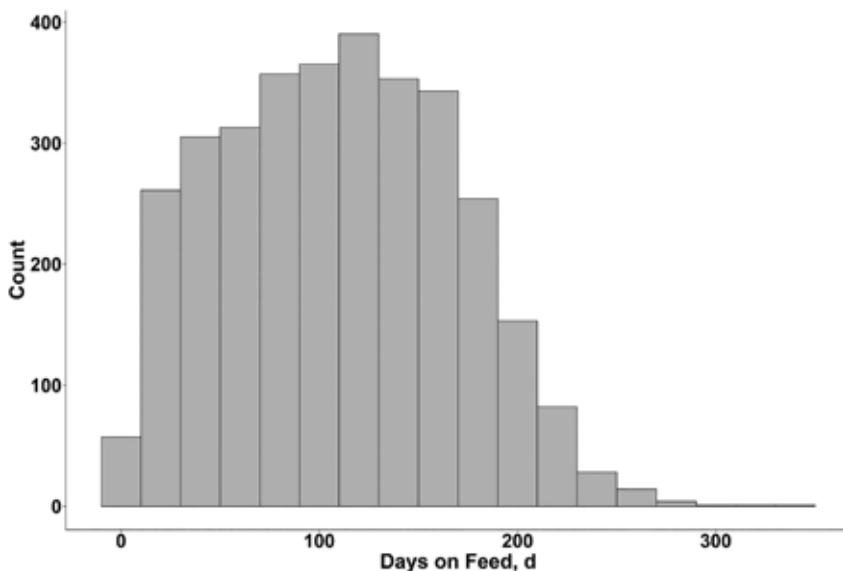
As awareness around BCHF has heightened, the Association, alongside its entities, has been working to gain knowledge around this issue. Our first engagement came in late 2018 when the Angus Foundation supported research at the Beef Cattle Institute (BCI) at Kansas State University. That research was a retrospective study diving into the data BCI had available from a large subset of feedlots across the country.

Overall, the group reported 0.07% of the 4.5 million head placed on feed succumbed to BCHF. Figure 1 depicts the number of deaths due to BCHF by day on feed at the time of death. While in most cases it's thought of as a late-term feeding issue, on average this study found cattle died throughout the feeding period, with an average of about 110 days on feed.

Looking to the future

Across the entire feeding industry, the percentage of cattle being affected is quite small. Still, some yards have experienced a much higher death rate due to this disease. Regardless of incidence rates, losing

Figure 1: Count of BCHF due to noninfectious heart disease by days on feed at the time of death; totaling 3,282 BCHF deaths observed over 3 years from 19 feedyards.



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cattle in yards to a disease for which there is no intervention measure other than early identification and the railing of individuals seems daunting. Early research around the disease suggests there may be some level of genetic control.

For those reasons, Angus Genetics Inc. (AGI) became particularly interested in seeing if there are opportunities to develop genetic selection tools to select against this disease.

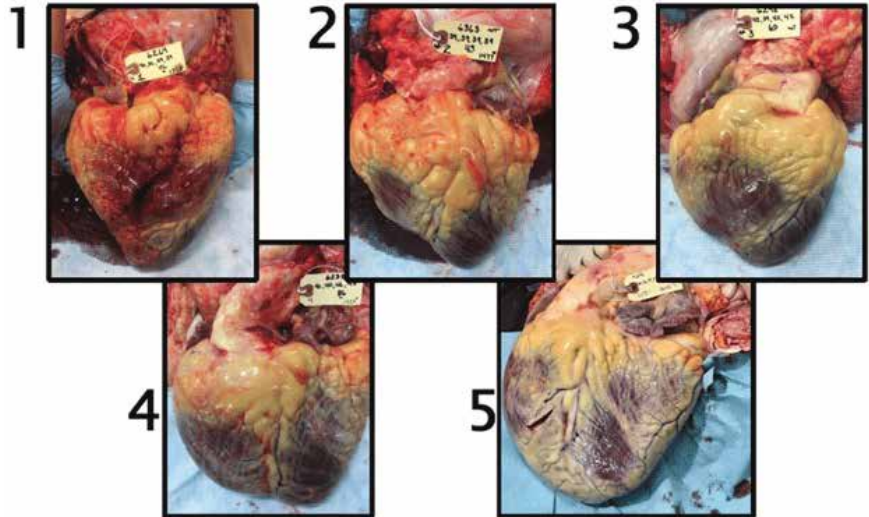
But how do you develop a genetic tool for something with so little prevalence? This is where the collaboration comes in.

Recently, Colorado State University (CSU) created a heart scoring system that measures the level of heart remodeling that has taken place once cattle are hung on the rail.

Figure 2 depicts the heart scoring scale. Hearts with a score of 1 and 2 are considered normal; whereas animals with a 3, 4 or 5 heart score are considered abnormal. Rarely is a heart score of 5 seen at the plant, because in most of those cases the heart is so damaged that those cattle don't make it to harvest.

The Association mostly relies on breeders to collect the phenotypic data to create new genetic tools. In this case, however, not many producers will be standing at


Figure 2: Gross visual of heart score photos. Grade 1 normal heart, Grade 2 mild changes, Grade 3 moderate changes, Grade 4 severe changes, Grade 5 severe changes with flaccid heart (Holt, 2020).



the gut table collecting heart scores. Therefore, AGI has built collaborations to collect large-scale data to further investigate.

Once we collect thousands of heart scores, we will investigate if, first and foremost, heart remodeling is heritable — and if it is, what the correlation between heart remodeling and other performance or carcass traits is. If the trait is heritable, this means we can deliver a tool breeders can use to select animals with lower susceptibility to heart remodeling, and therefore less death due to BCHF.

With many people looking for answers on this topic, we have seen some products — specifically genomic tools — come to market to try and combat this disease. Some of these target selection with just a few markers, while others are target selection with an expected progeny difference (EPD). Regardless, it is important for the Association to have access to its own phenotypic database on heart remodeling that can leverage and connect directly into the Association's genomic and phenotypic data pools.

To collect these data and answer these questions, we will lean on industry collaboration. Current partners in this research include AGI, Angus Foundation, Certified Angus Beef, Fiver Rivers Cattle Feeding, CSU and Cargill. Together we will work toward answers and potential solutions to better select animals for healthier hearts. 

Learn more about BCHF



The Angus Conversation:

"Bovine Congestive Heart Failure: An Angus Issue, an Industry Issue or No Issue At All?"

from *The Angus Conversation* podcast or visit www.theangusconversation.com.



"Healthy Hearts Start with Knowing More"

from the August 2022 *Angus Journal* or visit www.angusjournal.net.

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