Solid Foundation

American Angus Association closer to skeletal EPDs, calls for data submission.

by Kasey Brown, special projects editor

Feet and legs are, quite literally, the foundation of any herd. Turner, Maine, Angus breeder Patrick Bates relies on sound feet and legs for his cattle to thrive in their rocky and timbered terrain. As a small-scale producer, he's always on the watch for additional premiums. He finds them in marketing his cattle through a natural, grass-fed program. For his cattle to graze and perform, they need to be able to walk to grass.

PHOTOS BY SHAUNA ROSE HERMEL

Regional Manager Chris Jeffcoat and AGI President Dan Moser evaluate feet structure among a group of cows at North Carolina State University with former Association President Joe Hampton to establish a foot-scoring system.

The fifth generation on the farm, Bates and his family transitioned the diversified operation to a cow-calf operation with registered Angus in the late 1980s. Once he finished his service in the U.S. Air Force in 1994, he ramped up the registered Angus influence.

To increase the biosecurity of the operation, he closed the herd in 2000. Now, any new genetics come from artificial insemination (AI) sires. Bates says the 54 cows with calves, plus replacements, all trace back to six cows. That's why, he says, he's a big proponent of scoring feet and legs to create an expected progeny difference (EPD) as an additional selection tool.

"If a cow has a hard time walking, then it will affect both her and her calf's health and performance. Bad feet have a negative impact on my bottom line. It costs too much to develop a replacement heifer to have her fall out of the herd at 4 or 5 years of age due to poor feet. I choose to report foot scores since I want the most accurate data possible to base my decision on which animals should contribute to the next generation in my herd and my customers' herds," Bates says.

Reason for data

Stephen Miller, director of genetic research for Angus Genetics Inc. (AGI), says American Angus Association records show that culling for hoof or toe reasons has been increasing since 2010, with a spike in 2012. While this could be because there was simply a way to note feet and leg issues then, it was certainly a cause for concern, and action needed to be taken.

AGI Director of Genetic Service Kelli Retallick says the Association started receiving data points on feet and legs in 2015, and has since collected about 12,000 data points.

The scoring system released has cattlemen judge both foot angle and claw set on a 1-to-9 scale (see Figs. 1 and 2). For foot angle, an animal scoring a 1 would be very steep on its pasterns while a 9 would be very weak. For claw set, 1 represents spread, divergent toes and 9 represents scissor toes.

The data collected so far, Retallick says, indicate foot scores are a heritable trait and at an even higher rate than previous research had suggested. AGI researcher Lizhen Wang reported in summer 2017 that the heritability estimate for foot angle was 0.34, for claw set was 0.21, for spread was 0.16, for scissors was 0.35, for steep pasterns was 0.22 and for weak pasterns was 0.37.

Heritability estimates are important because the numbers indicate what proportion of the trait is genetic vs. environmental. The closer the estimate is to 1, the stronger the heritability. The stronger the heritability, the more change can be made through genetic selection.

Miller adds that the claw set and foot angle have a low, but positive genetic correlation, meaning that selection for one trait will move the other trait in a positive direction.

So, what do these numbers mean?

They mean Angus breeders are one step closer to having an EPD for feet and legs, but we're not there

Fig. 1: ***American Angus Association scoring system to evaluate foot angle, where a 5 is ideal***

1 2 3 4 5 6 7 8 9

Source: *American Angus Association, 2014. Illustrated by Craig Simmons.*

Fig. 2: ***American Angus Association scoring system to evaluate claw set, where a 5 is ideal***

1 2 3 4 5 6 7 8 9

Source: *American Angus Association, 2014. Illustrated by Craig Simmons.*

yet. Retallick says AGI is getting enough data to make research EPDs, a precursor to the numbers that are released from the Association every Friday morning. Established through its national cattle evaluation conducted each week, the EPDs released each Friday are production EPDs meant to be used by producers to make selection decisions.

"The issue (poor feet and legs) was brought to us by breeders, and we want breeders to know that we are very motivated to create a tool to keep making genetic progress," Retallick says.

Creating solutions

To go from research EPDs to production EPDs, the Association needs more data. Miller shared a plan with the Board of Directors in November to put research dollars toward the endeavor. About half of the foot- and leg-scored cattle are also genotyped.

Older cattle tend to show more issues with feet and legs, and there are about 11,000 genotyped females that are older than 5 years old. Miller says there is potential to train one to three graduate students to collect foot scores on those genotyped females.

> *"When we're looking at contemporary groups, we're looking at the variation in ranks, not necessarily the numbers themselves."*
>
> *— Kelli Retallick*

This could be beneficial in many ways, Miller explains. Genotyped animals provide a greater genetic picture, and one scorer scoring many animals would enhance the consistency of scores. The Association could work with breeders at a time when the cows are already being worked, like at preg check.

The addition of tissue sampling units (TSU) for genetic tests also provides potential for gathering selective genotypes on animals with extreme foot or leg scores. Miller gives the example of the scissor trait.

Animals with scissor toes, or toes that curl inward to the point of crossing, generally score 6 through 10 for claw set, while a score of 5 would be ideal. The proportion of animals scoring 7-10 is just over 6%, making these values very powerful in determining an animal's EPD. The impact of a genotype on an animal scoring 7-10 is more powerful than a genotype on a cow scoring 5, because most cows score 5. The TSU provides an easy way to collect DNA and could be used to target these cattle scoring 7-10 selectively for genotyping to increase EPD accuracy.

The Association also has partnerships with judging teams to allow students to score a breeder's cattle

The claw set above is an example of a score of 8 or 9.

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upon request. The list of participating teams is available at *www.angus.org/performance/footscore/footscoreentryhelp.pdf.*

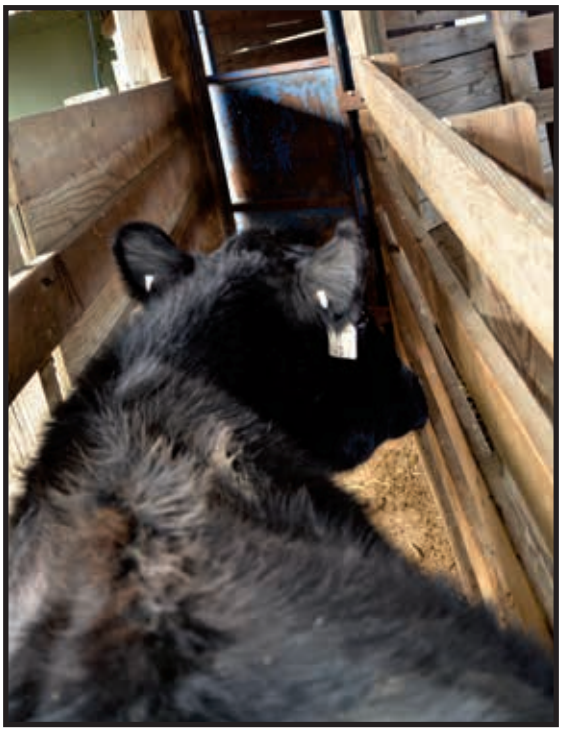
Retallick and Miller both encourage breeders to keep submitting data. Consistency is key when collecting scores. Retallick recommends having the same person score feet and legs each time, or at the very least, start scoring by committee to get on the same page if more than one person will be scoring.

"When producers are scoring things consistently within their herd, that's the key. What you may call a 7 in your herd, I may call an 8," Retallick explains. "The thing we have to remember with these traits is that as long as we're ranking these animals consistently, it's ok. As long we're both calling poor feet and legs poor, even if you called it a 3 and I called it a 4, it's OK. When we're looking at contemporary groups, we're looking at the variation in ranks, not necessarily the numbers themselves."

Miller agrees, saying the difference compared within the contemporary group — the deviation from the average in that group — is what matters on the data analyses.

How does subjective data turn into objective selection tools?

Both scientists point to other successful EPDs in the Angus toolbox. Retallick notes calving ease: "Calving ease is subjective. Just how much did you have to help that female? We've found a lot of success in this subjective score, and we've been able to make a lot of genetic change with it."



Scoring feet and legs can take less time than it takes to get the next animal in the chute.

Practical applications

When should you collect the data? The majority of the data points collected so far are on male and female yearlings, Retallick notes. That helps keep contemporary groups larger. She says to avoid scoring at weaning time because young calves generally do not show feet and leg issues that early.

Miller adds that cull animals are great to score because they show the most issues and are still relevant because they are related to others in your herd.

PHOTO COURTESY OF PATRICK BATES

Maine Angus breeder Patrick Bates is a big proponent of participating in Association data collection.

Retallick offers some tips to score feet and legs successfully:

- Make sure to have one person score the whole group.
- Score cattle on a hard surface with good light.
- Score the worst foot first.
- Score whole groups, and in the largest group possible.
- Be consistent!

Bates has been scoring his cattle for several years now, ever since the Association started collecting the data. He scores his cows every spring at weaning time, when they go through the chute for height, weight, body condition score and pregnancy check. Yearlings are scored in the fall with their yearling vaccinations and Angus Herd Improvement Records (AHIR®) data. He submits his yearling foot scores online through Angus Information Management Software (AIMS).

He explains that Maine has a Department of Conservation agriculture and forestry specialist, Cindy Kilgore, who scores his cattle for him. She has done it each time for him so his scores stay consistent.

"Cindy uses the laminated foot-scoring sheet from the Association. I have a worksheet that includes animal tag, weight, height, body condition score, frame score and notes for each animal. It takes me longer to load the next animal in the chute than it takes Cindy to evaluate and record the data on each animal," Bates says.

Bates says herd size shouldn't stop a producer from taking foot scores, and it doesn't take long to accomplish. The issue is important to all producers.

He emphasizes: "The person who does not submit foot scores has no right to complain about the final results/EPDs. Either you are part of the solution or the problem. It is your choice." AJ