

Carcass 101 Volume 15

Don't Take Your Ultrasound Technician Off Speed-Dial

DNA. DNA. DNA. Everywhere you turn these days talk in the beef industry is about DNA. The Beef Improvement Federation (BIF) centered its annual convention this past summer on the role of genomics in improving selection tools. And even the lowliest cowpoke knows what a SNP, or “snip” is.

It's enough to make one wonder if ultrasound technology is obsolete.

But according to Bill Bowman, Director of Performance Programs for the American Angus Association, which recently began releasing genomic-enhanced EPDs, that won't be the case any time soon.

“Ultrasound has been, and still is, a great tool used as an indicator of carcass merit, and we will continue to utilize this data,” says Bowman. The new genomic-enhanced EPDs are based on DNA profiles, ultrasound carcass data and performance phenotypes, and parental pedigree. “DNA is another step, but the basic phenotypic data provided by ultrasound is still an important part of the genetic selection process.”

According to published work by Sally Northcutt, Director of Genetic Research for the American Angus Association, genomic profiles are “a way to enhance current selection tools to achieve more accuracy on predictions for younger animals and to characterize genetics for traits where it's extremely difficult to measure the phenotype.”

A study by Northcutt and M.D. MacNeil, recently released to the *Journal of Animal Science*, further makes the case for continued ultrasound use by comparing similar carcass and phenotypic traits. For instance, Northcutt and MacNeil found the carcass trait of marbling (MRB) had a marginally greater heritability than ultrasonically measured intramuscular fat (IMF). But previous literature is varied on the subject. Reverter et al. (2000) and Meyer (2007) indicated slightly greater heritability for MRB than for IMF in Australian Angus and Hereford cattle, and Crews et al. (2003) reported similar results for American Simmental. Kemp et al. (2002) reported that the heritability of MRB in American Angus cattle was less than its ultrasonically measured counterpart. Rib eye and fat thickness carcass versus ultrasound measurements also varied in heritability.

The variation between breeds is one of the reasons why the industry will not soon be depending solely on DNA, according to Dr. Dorian Garrick, professor and Jay Lush Endowed Chair in Animal Breeding and Genetics at Iowa State University.

Garrick explains there are two factors limiting widespread use of DNA as the sole genetic predictor. One is the genetic difference between breeds. “Most of the genomic analysis of carcass traits has been done on the Angus breed,” says Garrick, “but genes differ for other breeds and crossbreeds. So DNA predictions that apply to one breed do not necessarily apply to another.”

The other limiting factor is the density of the DNA panel. Comprehensive panels that are predictive of many traits are currently very expensive. Less costly versions have fewer markers and are predictive of fewer traits. For many producers, full DNA profiles are simply not cost effective.

Furthermore, even under the best of circumstances, genomic profiling has limitations as a carcass prediction tool because of the effect of non-inherited factors.

“Even if we could perfectly understand the genetic code, we would still not be able to estimate every regional variance,” says Garrick. Climate, nutrition, health, and a host of other environmental factors, all contribute to an animal's ability to live up to its genetic potential.

According to Garrick, the correlation between predicted genomic merit using dense marker panels and actual performance is at best about .7. “Only about one-half of the variables involved can be explained with DNA,” says Garrick. So, despite the ability of the DNA profile to predict potential at a young age, the carcass data obtained through ultrasound is still invaluable for producers making breeding decisions.

For Kelly Schaff of Schaff Angus Valley in St. Anthony, N.D., that is a very real issue.

“Ultrasound measures what is there, versus what can be,” explains Schaff. A fifth-generation cattle breeder, Schaff has built his herd and his reputation on stock that is bred for muscling, feedlot value and end product merit. “Ultrasound is a visual measurement of what that animal *is*, and from a marketing standpoint that's important.” He says the seedstock customer is keen to know actual data like marbling score in comparison to the group or rib-eye size, rather than what it is predicted to be.



“When you say this animal has a 16 or 17 inch rib eye, they can see that’s four inches above normal,” Schaff explains. “There are too many factors that can influence development – of muscle, of energy efficiency. Ultrasound measures what is there.”

For Schaff and his customers making breeding decisions, these visual signs of an animal’s worth are crucial.

“This information is truly what can make the difference between making a profit or not in the beef business,” adds Mark Gardiner of Gardiner Angus Ranch in Ashland, Kansas, another firm believer in the use of ultrasound. Gardiner refers to the information provided by ultrasound and the CUP Lab® as “powerful, affordable, and accessible data.”

In a competitive world, where time matters almost as much as information; ultrasound data is not only accessible, but timely.

The American Angus Association recently began publishing its EPDs on a weekly basis, information that used to be published twice a year.

“Ultrasound data has become a real-time tool thanks to places like the CUP Lab®,” says Bowman. The Lab is able to interpret images and process data in an average of one to two days. Bowman relates instances where cattle were scanned in the morning, technicians submitted images to the Lab, the Lab in turn submitted data to AAA, and the breeder was in possession of adjusted data and EPDs by the next day. “That’s fast, accurate and reliable data,” adds Bowman.

What that means on the ground is real decisions in real time, and real data on which to base them.

And that’s something Bowman expects to continue. “As DNA technology evolves, DNA panels will improve,” says Bowman, “but we will still need ultrasound and phenotypic data to round out the genetic evaluation process.”