

Angus Talk

Outtakes and interviews from Angus Talk radio



Envisioning the future of genomic prediction

Angus Talk host Doug Medlock recently visited with Dan Moser, president of Angus Genetics Inc., the subsidiary of the American Angus Association that generates the most advanced genetic selection tools in the purebred industry.

Q: As we close out 2015, how did the year end up for AGI and the whole field of genetic evaluations and genomics?

A: We set all kinds of records for genomic testing [and] data submission for the Angus breed. [We had a] tremendous increase in the use of genomics testing — both in commercial herds, as well as our seedstock breeder members. I'm sure we'll set another record next year. The amount of interest in this technology, and the breeders that are benefiting from it — it's something that's been fun to watch.

Q: Could you take us through a little history lesson on how the Association developed its genetic evaluation programs?

A: This whole area of performance testing began back in the late 1950s, early 1960s, and then progressed over time into the EPDs (expected progeny differences) that we have now. My predecessors at the American Angus Association and the leadership that we had back in those days saw the importance of performance



testing and data collection. They employed a program where producers would submit data that was later used for genetic evaluation.

We've had EPDs since the 1970s. Over time more traits have been added, better techniques have been utilized and, really, this DNA step is just the next logical progression in the improvement of accuracy of EPDs.

Q: How does all this genomic information allow for increased accuracy, especially on younger animals?

A: The genomic information is just another piece that we use to calculate EPDs. We've always used the animal's pedigree, as well as their own performance data. When an animal is old enough, then the progeny data ... are submitted to the database. Now

we have an opportunity to use DNA to better characterize young animals. We can figure out from a blood sample or a hair sample exactly what was inherited from the parents to determine which young animal has got the best draw of genetics and which one is the most promising. In the end, we basically have more-accurate EPDs on younger animals.

Q: I know the dairy industry has made inroads in the use of genomics technology. How would you compare the progress of beef vs. that in the dairy industry?

A: We follow the dairy industry in a lot of ways. They were ahead of us in terms of EPDs and a lot of the data collection. In many ways ... we follow their leadership and their example and learn from their experiences. I'd say that's true in genomics. A few years ago the genomics testing really took off in Holstein [and] other dairy breeds. Now we are seeing that in Angus, as well. Holstein and Angus are probably the two leading breeds of cattle for genomic testing, and we are seeing that very much follow the path of what we saw in the dairy industry just a year or two ago.

Q: Can you give us a sense of how much testing is being done in the Angus seedstock sector?

A: In late 2014, we hit a threshold with more than 100,000 animals with genomic profiles used in the genetic evaluation. Thirteen months later, we are over 200,000, so we've doubled the number of genomic tests submitted for genetic evaluation in a little over a year.

Q: It sounds like people are catching on.

A: Absolutely. It's something that they're seeing the benefit of it; they're seeing the increased accuracy. There are customers who are seeing the benefit of it. They're seeing that it's very much a worthwhile investment.

Q: How about commercial producers, are they using the technology?

A: Yes, I think that it's a lot of times commercial producers who have seen success from purchasing genomically tested Angus bulls. Based on that, they



► Kent Andersen of Zoetis and Dan Moser of Angus Genetics Inc. join host Crystal Albers to discuss applications for genomic technologies in the commercial cow-calf business for the Jan. 18 episode of *The Angus Report*. You can also access the video interview by directing your web browser to <https://www.youtube.com/watch?v=LEfBs95cGuQ>.

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want to incorporate this technology into their own replacement female selection. There are products like GeneMax® Focus™ or GeneMax Advantage™ that allow commercial producers to harness the power of the Angus database, both the production data as well as the genomics database, so that they have those products to help them pick which Angus commercial replacements have the greatest profit potential.

Q: With all these advancements during the past 10 years or so with genomics, how do you see this actually shaping how producers breed cattle?

A: I think it really has allowed producers to more accurately select on a number of different traits that were difficult or expensive to measure — traits like feed intake in beef cattle. That's an expensive measurement to take. Not a lot of cattle get measured for individual animal feed intake. We have enough animals measured with it now that also have genomic tests on file. Now we have accurate predictions for feed intake based strictly on genomics. That producer that can't collect that feed-intake data can still make some selection progress by using the EPDs that result from genomic testing.

There are other traits — like cow longevity, fertility, mature cow weight — for which it takes a long time before a bull has daughters that are old enough to measure for those traits. With a very young animal, we can get a genomic prediction.

There are some traits that are easily measured in the animal. We can take the animal's own birth weight, its own weaning weight. The genomics help a little bit with accuracy there, but the real impact is for some of these traits that are a little more unique — things like heifer pregnancy rate. That's something that, to really evaluate a bull accurately with progeny data, he has to be old enough to have daughters of breeding age.

Through genomics, we can evaluate a very young bull before he's even had any calves born, let alone daughters in production, and get an idea of what his genetics are for that trait. A commercial producer can improve that trait through selection without having to wait for the bulls' daughters to be in production.

In the end, Angus breeders will be able to make more-accurate selection decisions and ultimately better fit the needs of their commercial customers.

Q: People's livelihoods really depend on the accuracy of the information that AGI and the America Angus Association share with the industry. If you make one mistake — using the wrong bull for instance — it can have impacts for a long time, can't it?

A: Absolutely, Doug. If you think about a commercial producer who's going to be buying some Angus bulls this upcoming spring, they're going to be using those bulls perhaps for four or five years, and they're going to be keeping daughters out of those bulls that may be around for 10 years or longer. Each one of those purchase decisions and how those bulls are used will impact the profitability of an individual farm or ranch for a long, long time.

That's one of the reasons that we take this process of genetic evaluation very seriously, because we know it really does impact our customers' livelihoods and that they need the most accurate information possible.

Q: Is there any third-party validation of Angus genetic evaluation tools or programs?

A: This whole process of genetic evaluation isn't something that we do on our own. It started back with university research many years ago. The very first Angus genetic evaluations that were done in the 1970s were actually conducted by Iowa State University. Later on the University of Georgia was the research partner that conducted the evaluation. The Association collected the data and then submitted it to those research universities. They ran the analysis and submitted it back to the Association to disseminate the results.

Over time, that process became somewhat routine, and so it just made sense for the Association to take over the responsibility. Even though we run genetic evaluation in-house right now, the software we use was developed by research universities, based on procedures published in scientific journals. Everything that we do does have third-party validations through the scientific review process and through the collaborations we have with research universities.

Q: When did the third-party validation start? It sounds like it started before.

A: Yes, it's been something that's always been a key feature of Angus genetic evaluation.



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— Dan Moser

Long before we brought the evaluation in-house, we had that collaboration and validation, if you will, from those partners. It's important for breeders to understand that it continues today. That every process we use, every technique we use, every statistical methodology is something that was developed jointly with the research community, peer-reviewed by other scientists who don't have any vested interest in the outcome. It truly is an unbiased process that gets the most accurate and most reliable results possible.

Q: A lot of private companies are entering the field of genomics technology. How do the American Angus Association and AGI stay competitive and relevant in the years ahead when it comes to the whole field of genomics?

A: It's been important for us to develop strategic partnerships with genomic companies that can best serve the interest of Angus breeders and their customers. We have relationships now with companies like Zoetis and GeneSeek. They compete with each other to make sure that genomic testing is affordable and it's as accurate as it can possibly be. By having two partners that are both committed to advancing the science

and in the end lowering the cost of this technology, we've been able to position Angus breeders to take advantage of this new technology and be on the cutting edge of all the new discoveries that come down the line.

Q: I would assume there's a checks-and-balances system with more than one entity being involved, right?

A: That's right. Even the works of the genomics companies, we provide a check on it as well. The first step in developing the genomic procedures, or the genomic calibration as we call them, is primarily some research work that is done by scientists at Zoetis. They go through the data and they select the markers that have the biggest impact on traits, and they estimate what the effects of those markers might be.

Then that information comes back to AGI scientists, and we calculate correlations, the weighting factors that actually determine how much emphasis their genomics get in the genetic evaluation. If the Zoetis scientists don't provide the most precise estimates, we get lower weighting factors, and as a result the genomics don't have as much impact in the evaluation. In the end, we get a check on each other's work and are assured that Angus breeders get the most accurate information possible.

We determine those weighting factors. So, the better the DNA technology works, the more emphasis they can get in the evaluation. That's something the AGI scientists developed, not the genomic companies. We don't have any incentive to weight genomics more or less.

Q: In 2015 we had the emergence of a low-density test. What implications does this have for the breed?

A: The low-density genomic test that was first offered last summer really has been one of the drivers of increased genomic testing. By using the lower-density test, the cost of testing has been reduced significantly, from \$75 to the \$45-\$47 price range. It makes the technology much more affordable, much more accessible to members of the American Angus Association.

In that way, they're able to test more cattle, more bulls are getting tested, there will be more genomically tested bulls available for sale in the upcoming spring. They're also using the technology to test their replacement heifers, and in the end they'll be able to use that information to make better mating decisions.

Q: As more information becomes available on individual animals, how will this potentially change how cattlemen both market and purchase animals?

A: It definitely enhances the accuracy of the EPDs by adding the genomic piece to the information that we already had from their pedigree and the animal's own performance. That more accurately describes the value differences between bulls and helps producers identify the ones that fit their operations the best. It also changes some of their criteria for a trait, like calving ease, for example, because with the increased accuracy, the risk for a bad outcome goes down. Producers may be able to adjust their criteria a little bit, not demand quite as an extreme value for calving ease, because they know the risk of possible changes [are] lower than it was before.

Q: We continue to improve the speed and reliability in which genomic data is received and computed into usable tools at the producer level. Is there room for this to continue? How fast can you get?

A: Well, that's one of the challenges logistically is getting the sample here to Saint Joe to the lab and getting the results back. We've made some strides there and [are] making more rapid turnaround times. The genomic companies realize how important Angus business is to their bottom line, so they've increased capacity. They were well-prepared for the big surge in genomic testing that happened this past summer and fall.

Even though the volume of testing that we are doing has increased dramatically from what it was a year or two ago, we are still seeing the same kind of reliable turnaround times of about three weeks. We are optimistic that over time, those turnaround times will get even shorter so producers will have access to information even more quickly than they had in the past.

Q: Are there new tools we can expect down the road?

A: There will be a number of tools developed that help producers make use of this technology — all kinds of computer software, web pages that help them make better decisions. We have more and more traits evaluated and provide more and more information. It does get a little bit more challenging for a commercial producer to put all that together.

One of the things we see down the road in some of these decision-support tools that let producers input to a website a little bit about their operation and what affects their profitability, and it will help them pick the bulls that provide the best combination of traits.



Editor's Note: Hosted by Doug Medlock, the American Angus Association's Angus Talk radio show features conversations with industry personalities from across the country. The program is broadcast each Saturday at 10 a.m. CT on Sirius XM's Rural Radio, Channel 147. Outtakes featured here are edited.