EPD School

ANGUS CONVENTION

From basics to advanced concepts to application, Angus genetics team shares how to use tools for herd improvement.

Story & photos by
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The cost of buying a good bull sure doesn't seem to get any cheaper, and feeder-cattle buyers are getting more selective all the time. You know there are premiums in marketing calves that have the genetics to perform in the feedlot and on the rail. You also know how important it is to maintain the productivity of your cow herd. Expected progeny difference (EPD) values and dollar value indexes ($Values) are touted as tools to use to ensure you buy the bull with the genetic package to build your cow herd and to add value to your calf crop, but how do you make sense of them?

The Angus Genetics Inc. (AGI) team shared insight on how to do just that during an Angus University "Genetic Selection" track at the 2017 Angus Convention in Fort Worth, Texas, last fall.

EPDs 101: The basics

Dan Moser gave cattlemen an introduction to EPDs. Moser serves as director of performance programs for the American Angus Association and president of Angus Genetics Inc. (AGI).

EPDs have been around since the 1970s, Moser explained, with the first fetal data from members submitted in 1980. In the past 37 years, the American Angus Association's genetic database, used to generate EPDs, has continued to grow.

Moser began by explaining each EPD individually, and then broke down the Association's $Value indexes.

"EPDs in general were designed to put information together in a useful form," he said. Records are available on animals in a variety of forms, including pedigrees, actual weights, weights of sires and dams, data on siblings, the animal's own performance, and progeny data. "The idea of the EPD is to weigh all those pieces appropriately to give us an accurate prediction on [the performance of] that animal."

The weighting of different information used in calculating EPDs is different for each animal, he pointed out. The performance of a proven sire is determined by his progeny; whereas, a

"EPDs in general were designed to put information together in a useful form," Dan Moser, president of AGI, explained to the crowd at the 2017 Angus Convention.

calf's performance is determined by its pedigree.

Some producers are interested in actual numbers, but the problem with those is that there are a number of things that separate that value from the animal's actual genetics, Moser said. You're not trying to predict what the bull weighs, he explained, you're trying to predict what his calves will weigh in a different environment.

"The population changes over time," Moser said. "Angus cattle are changing because of your decisions."

"The bottom line is EPDs are the most effective selection criteria," he added.

Contemporary groups

Moser also introduced the concept of contemporary grouping.

"Probably the most important concept for Angus breeders to know is to understand contemporary grouping," Moser advised.

When breeders submit a group of records, they're asked to assign a group code. Animals in the same contemporary group have the same ability and opportunity to perform from an environmental standpoint.

A fairly new aspect of contemporary grouping is the ability to define a birth contemporary group, Moser added. Cattle managed significantly differently in the 60 days prior to calving should be in a different contemporary group, he explained.

Moser said the Association's *Sire*

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Evaluation Report is a great resource for learning more about EPDs. The Spring 2018 report, one of two printed reports provided each year, was published in January. Its forward section containing the explanation of the information, along with tables characterizing the data within, is published in the February issue of the *Angus Journal* and is available under the Management tab at *www.angus.org.*

EPDs 401: Redefining the pedigree

The pedigree file.

"That's what I think of as the magic behind EPDs," said AGI Director of Genetic Research Stephen Miller, who gave an advanced follow-up to Moser's "EPDs 101" session.

The American Angus Association's database contains more than 22 million animals, he pointed out. Those pedigrees determine how animals compare across herds, how the Association accounts for genetic trends, what bull is bred to what

Today, the Association's relationship matrix is a staggering 10 million animals by 10 million animals. It's vast, and it's dense, but it's based on averages, Stephen Miller explained.

cow — the list goes on.

Plus, those pedigrees are closely related. One bull, QAS Traveler 23-4, accounts for 10% of the genetics of calves born in the last decade.

"The pedigree file is really dense," Miller said. "There are a lot of relationships across herds. That gives us more powerful EPDs."

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It's assumed that a sire passes half his genetics to his calf, and another half is passed on to the next generation. Thus, a calf is assumed to acquire one-fourth of its genetics from its maternal grandsire, for example. However, genomics may prove that the one-fourth rule isn't exact.

"It's true on average," Miller said, "but there's variation there."

Genomics allows for identification of that variation, and creates a more accurate relationship matrix and a more accurate pedigree.

"Including that information into that matrix was kind of the magic behind EPDs," he added. "It's what makes genomic selection work."

An animal's genotype is influencing the relationship matrix, and that different relationship matrix is influencing EPDs, Miller said. Launched in July of this year, single-step methodology accounts for that variation and what's inherited from all grandparents.

"That's the power behind genomics," Miller said.

Additional changes

Recently, AGI added weaning weight (WW) and fat traits into the carcass model, Miller said. Why is this important? It accounts for preselection bias.

"You don't typically take your light calves at weaning and keep those for bulls, then cull your heaviest ones. You might do it the other way around," he said. "If you don't fit weaning weight into the same model, you don't account for that."

Including this accounts for a better relationship between growth rate and carcass weight, Miller said. "The Angus data says the correlation between carcass weight and yearling weight is 0.75," he said. "It's not from some university study or what we think it should be. When we analyze all the records, that's the relationship."

Simplify bull selection

It is crucial to evaluate the needs of your ranch before making bull selections, advised Oklahoma State University's Mark Johnson. The associate professor of animal science presented ideas for simplifying bull selection on sale day.

The genotype of an animal is just one part of a much larger system. Factors included in bull selection process should be the genetics of your animals, the physical production environment, fixed resources, management, production inputs and marketing end points.

Select the traits and performance levels that make sense for your ranch and profits will increase, he said.

> **Selecting the best animal in a sale depends on what traits are economically relevant and what genotypes result in phenotypes leading to the most profitable level of performance.**

Johnson explained that a ranch's breeding objective should depend on the system and the interactions of the environment, management, and economic components, as well as understanding how they interact with genotype to affect profitability. For example, a ranch with lush forage and adequate rainfall can support bigger cows with higher milk production, whereas one with limited resources in a dry environment might not be as profitable with big, heavy-milking cows.

"If you look to identify the type of cattle that work for you, the genetics that have value, the things that result in a level of performance in traits that you get paid for, and the interaction between how all those things work, it leads you to what you want to select for in order to maximize profit and try to arrive at a type of genetics that are going to make you the most money," Johnson explained.

Selecting the best animal in a sale depends on what traits are economically relevant and what genotypes result in phenotypes leading to the most profitable level of performance, he noted. The bull that brings the most money at a sale is not necessarily the one that could go into your operation and transmit the genetics into your herd that result in the most value in your next calf crop.

The process of producing a steer starts with selecting a sire for a cow-calf operation, weaning the calf, managing him in a stocker program, going through the finishing process and then seeing the result, Johnson said. There is a time lag between genetic selection and when the economic effect of that selection is seen, making bull selection a critical decision for an operation.

Customers in search of Angus bulls are very diverse and should be strategic in their selections. Balancing nutrition and forage base to mature cow size and milk is essential to optimizing reproductive efficiency and maternal performance, he emphasized. Commercial cattlemen should take the time to evaluate the programs they are interested in purchasing bulls from to make sure their objectives align.

Seedstock producers have a huge responsibility to breed cattle that work in their environment and that will work for those around them, Johnson said. Typically, producers share the same basic needs and resources as commercial cattlemen within a 100-mile radius.

Knowing the goals of their customers' operations can assist seedstock producers in making bull selections. While growth

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PEARCY ANGUS CATTLE

Production Sale

Monday March 5, 2018

At the Pearcy Angus Cattle Sale Facility
Eakly, Oklahoma

Selling 40 yearling Bulls, 20 Two-year-Old Bulls, 20 18-Month-Old Bulls

Also Selling Registered Yearling Heifers, Spring and Fall Bred Females and Commercial Yearling Heifers

A sampling of the offering:

+*18740544

PAC Journey D025
Sire: +*WR Journey-1X74
MGS: Basin Payweight 5097

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+10	-.9	+53	+110	+26	+49	+.61	+48.13	+173.80

Top 15% of breed for Yearling Weight; Top 2% $B

+*18740538

PAC Journey D191
WR Journey x Midland

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+9	+1.7	+66	+111	+27	+43	+.94	+71.10	+151.63

Top 4% of Breed for $W; Top 10% for WW; Top 15% for YW

+*18740541

PAC Journey D035
WR Journey x Midland

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+3	+3.4	+65	+111	+17	+45	+.69	+51.20	+161.08

Top 5% of Breed for $B; Top 10% for WW and Daily Gain; Top 15% for YW and Marbling

+*18709548

PAC Upshot D333
EXAR Upshot x SS Objective

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+13	+1.1	+52	+97	+30	+37	+.35	+58.67	+106.35

Top 5% of the Breed for CED; Top 10% for CE Maternal

+*18740554

PAC Ten X D196
Ten X 7008 SA x JDD Prime Performance

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+4	+3.2	+63	+106	+19	+33	+.69	+50.36	+109.82

Top 20% of the Breed for WW; Top 25% for YW

+*18740539

PAC Journey D188
WR Journey x Midland

CED	BW	WW	YW	MILK	CW	RE	$W	$B
+3	+2.1	+56	+106	+26	+38	+.62	+53.89	+144.39

Top 20% of the Breed for YW; Top 15% for $B

Selling sons of: WR Journey -1X74 • AAR Ten X 7008 SA • EXAR Upshot 0562B EXAR Denver • GAR Prophet • KCF Bennett Absolute • AAR Ten X 7008 GAR 100X • Quakerhill Rampage • KCF Bennett Fortress

We, as a family, invite you to our sale!

Gale & Donna Pearcy
Kevin & Lori Pearcy
Terry & Denise Pearcy
Trey, Bree-Ann & Joplin Pearcy
Trenton, Carly, Trotter & Briggs Pearcy
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William Bell
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EPDs as of 12/29/17

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traits and health are important for stockers, finishing operations want efficient gain in cattle that will grade Choice or higher and be at least a Yield Grade 3, Johnson shared. Terminal programs looking to retain calves through feeding may use the $B $Value to help determine the right bull for their goals.

Maintain a relationship with your customers to ensure the genetics you're supplying will help them be profitable with their marketing end point, Johnson concluded.

Editor's Note: *Formerly an assistant editor, Shelby Mettlen is a communications and marketing specialist for Kansas State University's College of Veterinary Medicine and Beef Cattle Institute. Tierra Kessler is a freelance writer and Angus producer from Milton-Freewater, Ore. This article is part of Angus Media's coverage of the 2017 Angus Convention available online at www.angus.org/Media/News/ AngusConvention.aspx.*

ROSSOW ANGUS RANCH

27TH ANNUAL BULL & FEMALE SALE

MARCH 28, 2018 AT 1:00 PM

AT THE RANCH – 4 MI. SOUTH OF HERREID, SD

SELLING 50 ANGUS BULLS / 50 REG. ANGUS HEIFERS

Sires represented: SAV Sensation 5610, Connealy Big Money, Baldridge Compass C041, Ellingson Ribeye, SAC Messenger, Coleman Charlo 0256, Sandpoint Butkus

Auctioneer: Seth Weishaar

DVAuction
Broadcasting Real-Time Auctions

Baldridge Compass C041

SAV Sensation 5615

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Connealy Big Money

Coleman Charlo 0256

Sandpoint Butkus X797

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Frequently asked questions

During his EPD 401 presentation at the 2017 Angus Convention, Stephen Miller, director of genetic research for the American Angus Association, entertained a few frequently asked questions from the switch to single-step methodology.

How much range should you see in full siblings?
Due to genomics and the resulting increased accuracy, breeders can expect to see more range between full sibs than they did before.

Where does this variation come from?
One-quarter of it is just variation in the sires used, Miller said. One-quarter is due to variation in the cow herd. Half is due to Mendelian sampling — random sampling of chromosomes between the sire and dam.
"That amount of variation is big," he said.

Why is it called single step?
The technology, developed at the University of Georgia, combines all the genotyped animals and all the other non-genotyped animals. That equates to a grand total of more than 400,000 genotyped animals currently within the Angus evaluation.
"But we realize that matrix [includes] 10 million animals. Percentage-wise, we don't have a lot of genotyped animals, but we have to fit all those into the same model at the same time," Miller explained. "Single step allows the equations to put those things together."
The Association has been utilizing genomic selection since 2010, but genetic trends are moving more quickly as more animals are genotyped. It has increased the rate of genetic progress within the breed, he said.
"EPDs were powerful because that pedigree tied all those animals together," Miller said, "Genomics is basically just an enhanced pedigree."