

Elevating the Industry

The Beef Improvement Federation celebrates 50 years at its Annual Meeting and Research Symposium.

by Megan Silveira, editorial intern

The Beef Improvement Federation (BIF) hosted its 50th Annual Research Symposium and Convention June 20-23, 2018, in Loveland, Colo.

The 50th anniversary event, “Elevating the Industry,” continued the event’s tradition of providing cattlemen a place to network and share beef industry knowledge.

The conference kicked off with the Young Producers’ Symposium designed to prepare young cattlemen and women for their role in the beef industry’s future.

Thursday morning featured a general session about what the future could hold for beef producers. The session, entitled “Positioning for the Future of Beef Production,” featured several



key speakers who gave thorough analyses of how a changing planet and growing demands from consumers will affect cattlemen.

“Decision Time: Who will own our industry?” was the second general session hosted on Friday. Presentations centered around how progress in genetics and expected progeny differences (EPDs) are changing the beef industry and how ranchers can use new technology and information to launch themselves and their cow herd into the future.

Both days offered breakout sessions, highlighting a wide range of subjects from utilizing new technology to selecting the best cattle to finding a path to achieve sustainability and efficiency. BIF once again ensured cattlemen attending

the conference were exposed to a variety of hot topics in the industry.

For event coverage, including presentation summaries, slideshows and audio provided by Angus Media, visit the Newsroom at www.bifconference.com.

Like the 49 other conferences before it, this year’s symposium came with a steady supply of productive presentations and thoughtful questions. The future might be unclear, but one thing is certain: the beef industry is in good hands.

As cattlemen gathered for the 50th year, they were united by a passion for cattle and a desire to be a part of industry responsible for feeding the world. After such a successful and monumental conference, cattlemen everywhere are counting down the days until the 51st Annual Research Symposium and Convention June 18-21 in Brookings, S.D.

Indexes with Breeders in Mind

New Zealand company shares a model for building indexes using breeder input to value index components.

by Lindsay King, assistant editor

One barbed-wire fence separates AbacusBio Ltd. from the South Pole, according to Jason Archer, a consultant for the company. The New Zealand-based company is carrying the torch when it comes to incorporating breeder input into developing selection indexes.

“In the last 10 years we started to develop a new technique for

developing a selection index. At our core is the economic model though,” Archer said. “We have started using a survey-based approach.”

Producers are aware that indexes are only useful when actually used. Many breeders choose to avoid them simply because they do not align with the needs of their operation. It seems a valid reason.

“This is the fundamental reason we have tried to listen to people and find out what they want in their selection indexes,” Archer explained. “Opinions are important, and there are a range of reasons for that.”

Those opinions come from both producers and consumers. Cattlemen are looking for traits with no economic factors involved in the

equation. On the other hand, animal welfare concerns are important to the consumer. Selection indexes are looking to address concerns from both parties.

“Docility is another example of a trait that is hard to put a dollar value on. We try and trade off docility with another trait we have a good economic handle on,” Archer said. “Each sector will give their opinion, but at the end of the day we need to balance those opinions to make good selection decisions.”

Since producers come in all shapes and sizes, from all corners of the world, it is important to get a wide kaleidoscope of the industry when developing indexes.

“We use these surveys to target the segments of the market supply chain so we know what each one wants,” Archer added.

AbacusBio Ltd. is working with the American Angus Association on a survey for the development of new selection indexes. It will be a two-



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part survey. The first will address demographics and opinions while the

second half will uncover the traits most important to that producer in his area and segment.

“The survey will select subsequent questions based on how the previous question was answered. This will take about 20-30 minutes to complete,” Archer said. “We hope that a large number of people will complete it because this will be their opportunity to influence how these indexes will look in the near and distant future.”

Archer and the Association staff have visited with producers in various segments of the industry to get their opinions face-to-face. It is an enjoyable experience also proving beneficial for the mind-set of the team ultimately building the index.

“It pays to go talk to people and listen,” Archer said. “There is no one answer that fits all. It is what people want and need. That is why we have worked with the Association and used their guidance.”

Single Step – What Cattlemen Value Most

Single step was created with the goal to improve profitability in the commercial sector.

by Lindsay King, assistant editor

Implementing single-step methodology was a big task, but now the real job is showing the value in the headache of it all. Matt Spangler, associate professor of animal science at the University of Nebraska-Lincoln, discussed the far-reaching influence single step has and will have on selection indexes.

“In a nut shell, they (selection indexes) are a tool to enable informed multiple-trait selection. Every bull buyer does this in some manner already,” Spangler said. “This is a much more comprehensive and informed way to do it.

“Generally, the indexes we have now are static,” he continued. “As we

What affects selection decisions?

- Changes to ...
- goal traits
 - traits with EPD (index traits)
 - genetic co-variances
 - component trait accuracy
 - trait definitions (scaling)
 - economic parameters/assumptions
 - population (assumed) means

—Source: Matt Spangler, BIF 2018

customize these tools, it allows us to take advantage of the phenotypic enterprise means.”

The goal is to improve commercial profitability. The economic models used before are proving correct on average, but the single-step methodology takes what the producers value most into consideration during the development of the index.

While relatively new to the beef industry (rolled out about 10 years ago), selection indexes have been used in other industries since 1942, Spangler said. “It is old hat to other

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industries — the idea of selecting candidates to be parents not just on selection indexes, but exclusively from those.”

Many things have an effect on selection indexes — the goal traits that a producer is looking for in a program is the main factor. However, expected progeny differences (EPDs) are always changing. As more data comes in and new EPDs are developed for a trait that is economically relevant, these selection indexes can be altered continuously over time.

“The selection indexes are fairly robust against genetic variance, but if we happen to use incorrect parameters, then those would need to be updated also,” Spangler explained. “Also, if the inference of a trait changes, then we have to re-evaluate the economic value we originally assigned to it.”

Other factors affecting the index include component trait accuracy, economic parameters and assumptions and assumed population means. Some make the mistake of blaming single step for inaccuracy or unwanted results after changing too many factors at once.

“The accuracy tells me when I make changes in the index how



“Generally, the indexes we have now are static. As we customize these tools, it allows us to take advantage of the phenotypic enterprise means,” said Matt Spangler

much I am improving the things that drive profitability, things in the goal,” Spangler said. “If I have more EPDs for economically relevant traits, that improves the accuracy of the index. When we include more economically relevant traits and increase the accuracy of the EPDs, we increase the accuracy of the index.”

Some traits may have a different scale and inference, examples being marbling and reproductive longevity. The definition for those traits may change, and so the means would need to be re-evaluated because their weight on the index would possibly increase or decrease.

“Sensitivity is determined by weight in the index,” Spangler said. “This single-step process increases accuracy of the selection index. We need to remember that re-ranking is not a bad thing if it moves us closer to the truth. Something we still need to figure out is when reasonableness checks are necessary.”

Some believe a universal index for use across all breeds should be the next step. However, Spangler explained how the variability of reasons for using a certain bull is significant enough to shoot down the idea of a universal index.

“Those phenotypic means of the given traits are inherently different and impact the economic values,” Spangler said. “We really need to think about it hard before we go down that path. Breeds are known for different things for a reason. That may not be quite as straightforward as wanting EPDs comparable across all breeds.”

Single Step in U.S. Beef Cattle Evaluation

Single-step developer explains how the technology improves genetic predictions and what's next.

by Lindsay King, assistant editor

Daniela Lourenco, assistant professor of animal science at the University of Georgia, is the mastermind behind single-step methodology. It is now the standard for genomic evaluation in beef cattle, and the adoption rate is astounding.

“The number of genotyped animals is increasing quickly. It just shows

the commitment of breeders and producers to genetic selection,” Lourenco said. “The American Angus Association does not have the biggest data set in the U.S. Holsteins have that one, but Angus certainly has a massive set also.”

Lourenco’s analogy of the why behind single step comes in the form

of a pickup using fuel, engine oil and additive to perform more efficiently. The truck represents the mixed model equation, fuel represents the phenotype, engine oil is the pedigree and the additive is the genomic information.

“We are just improving the relationships, making them better.

“We would expect full sisters to share 50% of their genotype, but if we run single step, it usually ends up being more or less. The difference is what single step uses to be more accurate.”

— Daniela Lourenco

Just like each component for the truck,” Lourenco explained. “We would expect full sisters to share 50% of their genotype, but if we run single step, it usually ends up being more or less. The difference is what single step uses to be more accurate.”

Validation measures are put in place to quantify how genomic information is doing within a system. Lourenco removed the phenotype from the animals and then ran the single step on the data. This revealed whether the new or old system was doing a better job of predicting future genotypes.

“Since calving ease is recorded in several different categories, we wanted to validate this trait,” Lourenco said. “The increase in accuracy for calving ease with this genomic info was only 1%. We wanted to know why that was, so we needed to validate the maternal traits.”

This forced Lourenco to find a

different system of validation. She stumbled across a linear regression metric to check the consistency between consecutive evaluations. Lots of complicated statistics later, the linear regression method increased in accuracy for validation.

“Sometimes we are not using the right method to compare things, and we blame genomics for it,” Lourenco said. “Not all organizations have a lot of genotypes. There are several methods with the ability to work with multiple methods.”

When first working with Angus’ massive genomic data set, Lourenco was overwhelmed by the number. This led to the development of the truck-and-trailer analogy.

“When we have more genotyped animals than we have SNPs available and there are some linear relationships, that means we cannot invert the matrix,” Lourenco said. “Some think APY does some magic, but it is just an algorithm that

constructs G when inverting G is not computationally feasible.”

Some segments of the matrix are linearly independent, the “non-core animals.” Lourenco defined “core animals” as randomly selected individuals whose genotypes were used in the matrix. Core animals are linearly dependent and a certain percent of the total number of animals genotyped. To carry the load in the equation, core animals are in the hypothetical truck, while the non-core animals are in the stock trailer behind it.

“Single step is under constant improvement at the University of Georgia, other universities and in research groups. Scientists need to keep developing more methods for improved accuracy evaluations, but producers also have to keep collecting data,” Lourenco finished. “The methods and systems we develop are fully dependent upon the data, so keep collecting that.”

Who Owns Your Data, and Where Is It?

Panel discusses changes in the way genetic data is being collected and the access ranchers have to it.

by Julie Mais, editor; Lindsay King, assistant editor; Megan Silveria, editorial intern

As the amount of genetic data steadily grows, ranchers seem to have a lot of questions regarding how data is stored and owned. At a panel discussion at the Beef Improvement Federation Symposium and Convention in Loveland, Colo., five industry leaders gathered to discuss “Who Owns Your Data and Where Is It?”

Dan Moser, president of Angus

Genetics Inc., said when thinking about this subject, the word “stewardship” comes to mind.

“Our grandparents show us the photos on the wall of the river where they moved cattle,” he said. “Then we hop in the truck and see that same river, preserved. That is how we think about databases.”

Moser started working with the American Angus Association and

its database in 1999, signing an extensive agreement pertaining to the ownership and transfer of the data. Now, on the other side of the agreement, Moser stands by the standards set by the Association long ago that remain today.

“Angus members have made a significant investment in data recording. Now our job is to provide

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as much return on investment as we can back to them,” Moser said. “The other part of our job is to preserve that data, as well. We are thinking about today as well as tomorrow.”

Samples used for data collection are sealed tight in a vault at the Association headquarters. Keeping these samples proves more valuable each day.

“By keeping the samples, we are able to conduct further testing at a later time,” Moser added. “We can go back and test an animal for say a genetic disorder instead of sampling all of its progeny. It has worked well for us in the past.”

Not unlike many cattlemen, Wade Shafer, American Simmental Association (ASA) executive vice president, admits he was once one who did not pay attention to the data ownership and intellectual property rights topic.

Until a few years ago, he relied on land-grant university Extension programs, breed associations and the USDA to provide cutting-edge technology in an open-source and free-flowing fashion.

“A few years ago, I became keenly aware of intellectual property rights and patents,” Shafer said. “Today, this is a germane topic and important in our industry.”

Shafer addressed the group representing not only ASA, but also International Genetic Solutions (IGS), a collaboration between breed associations committed to enhancing commercial profitability.

Shafer said the most high-profile collaboration of IGS is the genetic

evaluation powered by the new genetic evaluation software, BOLT (Biometric Open Language Tools, owned by Theta Solutions, LLC).

Speaking to the question, “Who owns your data and where is it?” Shafer said IGS partners handle genotype ownership differently. All Canadian partners “share data,”



When thinking about data ownership and storage, Dan Moser said “stewardship” comes to mind.

meaning the breeder owns their animal genotypes and shares the data with their respective associations. The American partners both share data and a few breed associations own data sent in by breeders.

“As for IGS, all data submitted becomes a permanent record in the IGS genetic evaluation,” Shafer said.

Shafer appreciates the collaboration that built IGS, and said he hopes members of the beef industry can continue to work together like this.

“I would like to see the industry maintain an open and free-flowing type of platform,” Shafer said. “I understand the importance of intellectual property rights and the

need to innovate and continue to make progress, but I hope to find reasonable balance between the two.”

Matt Cleveland, director of global beef product development at Genus ABS, is another cattleman wanting to provide genetic data capable of assisting ranchers to increase their profitability margins.

“We’re in the business of increasing beef,” Cleveland said. “Our goal is to produce a high-quality product that can nourish people.”

Cleveland believes collecting genetic data of economically relevant traits will drive genetic improvement. ABS is currently collecting data in more than 70 countries and has created a full life-cycle data collection process for both beef and dairy cattle.

By using a “tailored and targeted approach” to collecting genetic data, Cleveland said the cattle industry is moving

forward in the way it applies genomics to breeding decisions.

“We have moved into the era of genetic evaluation,” said Larry Benyshek of Benyshek and Hough Consulting Services. “We’ve moved from a way of life to a business. We have become consumer-driven. Consumers reign supreme.”

Benyshek said with this focus on consumers, ranchers need to be consistently improving the way they collect genetic data. While he said it takes time for knowledge to get filtered down to the point where it can be put to use in the beef industry, Benyshek’s Genetic and Economic Management (GEM) program is helping to speed up this process.

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GEM is a web-based data management program with a couple hundred thousand users. Benyshek said his program contains both public and private sectors, but it is helping genetic data flow freely through different aspects of the beef industry. GEM is providing ranchers with a way to gather and archive genetic data and then turn it into productive information.

John Genho, owner and geneticist of Livestock Genetic Services LLC,

evaluates genomic information for commercial ranches as well as 10 different breed associations. He compared data ownership to Google Maps. Everyone is sending data in and benefits from it, but nobody can see individual data and its ownership.

“I started working King Ranch 15 years ago to develop a genetic evaluation program for traits they did not have EPDs (expected progeny differences) for,” Genho said. “They have a whole suite of traits they

are selecting for and now have a symbiotic partnership with Santa Gertrudis Breeders International.”

King Ranch did what was best for their business and are still sharing data. They don’t share all of their data, but the information that is important to the association.

In exchange, the association gives data with the ranch. Nobody wants to share something if they do not also get value from that relationship,” Genho finished.

DNA-Based Calf Registration: Challenges and Opportunities

An inside look at the new registration programs taking Ireland by storm.

by Megan Silveira, editorial intern

Ireland has recently developed a new way to ease the stresses and worries of ranchers during calving season, even simplifying the process of registering calves. Andrew Cromie of the Irish Cattle Breeding Federation (ICBF) explained how DNA-based registration is quickly becoming “the norm” during his presentation at the Emerging Technologies breakout session at the Beef Improvement Federation Research Symposium and Convention held in Loveland, Colo.

Established in 2000, the ICBF created a database Cromie said is now “a cornerstone of the beef industry.” By joining together artificial insemination (AI) companies, milk recordings and herd books, ICBF created a database enabling ranchers to use a DNA-based registration method.

Cromie said with the tissue sample submission from a calf, ranchers



Andrew Cromie said with the tissue sample submission from a calf, ranchers only need to wait 14 days before the database predicts all relevant information on the animal, including its sire, dam and breed.

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“All of this allows us to be in the position to run large-scale programs,” Cromie said. “This program has less paper and more profit.”

Cromie said ICBF’s goal is to generate genetic gain for farmers, a goal they have been steadily moving closer to. Cromie admitted there are some challenges with DNA-based registration, but it offers great opportunities for ranchers.

“Historically, we kept pedigrees to make sure we didn’t have errors,” Cromie explained. “The reality is there’s a lot of data being kept and mistakes being made.”

Cromie said DNA-based registration is “shifting the breeding paradigm” by creating a new normality for the beef industry. With more accurate data, genomic data is essential to improving the way livestock are registered.

Cromie said by genotyping all animals at birth, DNA-based registration has the ability to correct 50% of all sire errors.

Cromie admitted new computer programs and systems are required

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to make this change, but the change is necessary. He claimed the best breeders are responding to the new program and technology. Ranchers working with ICBF's program have been able to reduce both their workload and stress levels.

In addition, Cromie said DNA-based registration is a cost-effective option for ranchers. It currently costs about \$25 per head, but in the future this amount could be lowered to nearly \$15.

While DNA-based registration

has not hit the United States yet, Cromie urged cattlemen to "help create the new norm" in the industry and to be part of a program capable of providing better service to ranchers.

Carcass Ultrasound and Genetic Evaluations

Reports on the Ultrasound Guidelines Council presented at BIF.

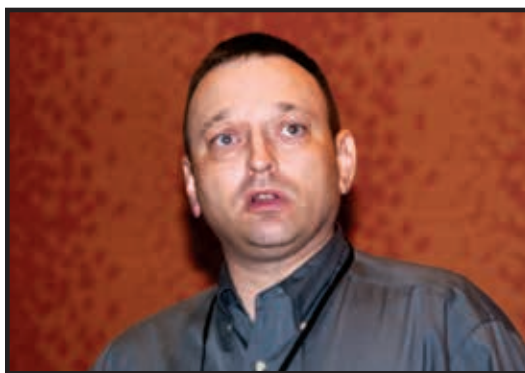
by Troy Smith, field editor

The purpose of the Ultrasound Guidelines Council (UGC) is to ensure the quality of ultrasound data used by the beef industry for the genetic evaluation of carcass traits. UGC is responsible for the certification of the various combinations of ultrasound equipment and software (systems) used to collect and interpret ultrasound images. Additionally, UGC certifies the technicians charged with collection and interpretation.

Reports on UGC certification activities were presented during the 2018 Beef Improvement Federation Convention. Making presentations to BIF's End Product Improvement Subcommittee were J.R. Tait of Neogen GeneSeek and Patrick Wall of The CUP Lab LLC.

Tait, who chairs the UGC Systems Review Committee, explained how new system technologies are evaluated by scanning a minimum of 70 animals. Results are compared to chemically extracted fat data. For an added reference, a different and previously approved system is used to scan the same animals. According to Tait, the committee approved four new ultrasound machines

representative of the trend toward smaller size and increased portability. Additional multiple



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Patrick Wall, who serves as UGC's new executive director, explained that to receive UGC field certification, ultrasound technicians must pass proficiency testing, including a written exam, and the collection of ultrasound images of the rump, rib and intramuscular fat.

hardware components and software packages were approved.

Patrick Wall, who serves as

UGC's new executive director, explained that to receive UGC field certification, ultrasound technicians must pass proficiency testing, including a written exam, and the collection of ultrasound images of the rump, rib and intramuscular fat. Twenty animals, varying in age, gender and condition are scanned. Breeding cattle as well as harvest cattle are represented. A technician must scan the same group of animals twice, in two separate sessions, to demonstrate the ability to collect good-quality images that are easy to interpret in the lab.

According to Wall, lab technicians typically must be proficient with more than one type of system and are always tested accordingly.

"Carcass ultrasound is the most highly vetted set of raw data submitted for use in genetic evaluation, and the only set submitted by an unbiased third-party source," said Wall, adding that the technology used to collect ultrasound images "is getting faster, more accurate and cheaper." **AJ**