



BIF Convention Highlights



The Beef Improvement Federation Annual Convention focuses on profitability through genetic improvement.

by **Troy Smith**

Every year, the Beef Improvement Federation (BIF) Annual Convention attracts a large audience from the ranks of commercial cow-calf and seedstock producers, academia and allied industries. More than 350 people attended this year's convention, hosted by the University of Georgia May 31-June 3, in Athens. The agenda featured two and a half days of educational programming, focusing on ways product value can be enhanced across all segments through genetic improvement.

Genomics today and tomorrow

Day-one's general session speakers talked about the current value and future promise of genomics. University of Georgia geneticist Daniela Lourenco reviewed the history of genomics from early investigation of DNA to the

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— Daniela Lourenco

latest method for calculating genomic-enhanced expected progeny difference (GE-EPD) values. Early in the game, Lourenco lamented, marketing hype outpaced the science.

Lourenco said the discovery that much genome sequence variation can be attributed to single-nucleotide polymorphisms, or SNPs, led to their use as markers for genes associated with certain genetic traits. Thus marker-assisted selection was an early DNA-based tool applied for genetic improvement. But selection based on relatively few gene markers was limited at best.

“It did not work really well,” said Lourenco, “because most traits of interest are polygenetic, meaning they are influenced by multiple genes, with each having a small effect.”

Advancement came with the identification of more SNP-trait relationships and the introduction in 2009 of the 50,000 SNP genotyping assay. The dairy industry embraced the technology almost immediately, and the beef industry followed but at a slower pace.

“The availability of more genotyped cattle drove the development of new methods to incorporate genomic information into national cattle evaluations,” explained Lourenco. “The first method was called multi-step and, as the name implied, this method required multiple analyses to have the final genomic-enhanced EPDs. Distinct training and validation populations were needed to develop molecular breeding values which were blended with traditional EPDs or included as correlated traits.”

Lourenco said an alternative single-step method for combining pedigrees, phenotypes and genotypes offers a better estimation of relationships with greater accuracies. GE-EPDs are delivering increased accuracy of prediction on younger animals, allowing for reduced generation interval. Genomics also aid the prediction of genetic merit for animals with no progeny, as well as selection for traits that are difficult to measure or are of low heritability. Lourenco insisted, however, that there remains a need for collection of phenotypic data.



“Keep genotyping and phenotyping if you want more reliable GE-EPDs,” emphasized Lourenco.

Learning from another

Speaking about what the beef industry can learn from another industry’s application of genomics, Tom Lawlor of the Holstein Association USA said dairy cattle breeders shifted from searching the world for the best genetics to using genomics to develop the best genetics in the world. In many instances, the animals in a top Holstein sire’s ancestry were from the same seedstock operation or company. Rather than buying bulls to market semen, many large artificial insemination (AI) companies now have their own breeding programs.

“AI company ownership of female genetics is now common,” said Lawlor. “And they don’t call it a breeding program anymore; it’s a genomics program.”

Noting how application of genomics has heightened competition among entities marketing dairy genetics, Lawlor advised the beef industry to embrace genomics. “If you don’t, and the other guys do, you’re falling farther and farther behind the game,” he warned.

Sophisticated utilization

Discussing where genomic technology is headed, University of Nebraska geneticist Matt

Spangler said the way genomic information is utilized in genetic evaluation is becoming more sophisticated. He expects wide implementation of the “single-step” approach to the incorporation of genomic information into GE-EPDs, rather than the “multi-step” method of blending a genomic-based molecular breeding value with the traditional EPD calculated from pedigree and performance information.

According to Spangler, the single-step approach improves the precision with which GE-EPDs are calculated by better quantifying genetic relationships using both genomic and pedigree information. The significant benefit of single-step is higher accuracy of prediction.

University of California-Davis geneticist Alison Van Eenennaam said the future of genomics includes genome editing — using “molecular scissors” to cut DNA strands at precise points and to delete or to insert alleles associated with specific traits. She cited, as an example, the insertion of a polled gene from one breed into the DNA of an individual from a horned breed.

“It is not a silver bullet, as some have promoted,” warned Van Eenennaam, saying targeted gene



University of Nebraska geneticist Matt Spangler says genomic information is being utilized in a more sophisticated way.



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alterations should be the goal. “I see it as a cherry on top; not the whole ice cream sundae.”

Enhancing profitability

Of particular interest to commercial cow-calf producers, day-two of the Convention featured discussions of existing tools for enhancing profitability. Included were University of Florida animal scientist Todd Thrift’s comments on the power of heterosis or hybrid vigor. Thrift admitted a lack of understanding is why so many cattlemen ignore crossbreeding as a means of achieving optimum, cost-efficient production.

It has been implied that individual breeds have improved significantly through genetic selection to such an extent that crossbreeding is not needed to improve production. However, Thrift said crossbreeding does offer advantages and, most significant, is what crossbreeding does for reproduction. According to Thrift, the crossbred cow has been shown to be superior for aspects including age at puberty, reproduction and longevity. He called heterosis a highly effective means of increasing total pounds of calf weaned per cow exposed.

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Six key messages from the BIF Convention

by **Katy Holdener**

Cattlemen from across the U.S. gathered in Athens, Ga., at the Beef Improvement Federation (BIF) Annual Convention and Research Symposium. This annual gathering of the leading seedstock and commercial beef producers, academics and allied industry partners sets the stage for genetic improvement in the beef cattle industry. Here are six key takeaways from this year's BIF Convention.

1) Data is key.

Not only is data key in genomics, but it's also important in performance information. As cattlemen continue to collect more genomic information, they must also continue to collect performance data such as weight traits and measurements. This data is vital for future genomic values so that genome technology can improve as time progresses.

2) Selection indices contain power.

This simplistic approach allows genetic gain and profit. Utilizing selection indices that fit your operation allows for a balanced approach to improvement.

3) Evaluate all of the tools in the tool box, beyond just DNA testing.

Reproductive technologies, complete performance data reporting, etc. are available for breeders to use to their advantage. What can these technologies do to increase the rate of genetic progress in your herd?

4) Get on the genomics train or get left behind.

Develop a genomics program for your operation utilizing the various reproductive and genomic testing technologies. There is a gap between producers utilizing genomic advancements and those who aren't — the gap will continue to widen over time.

5) Whole herd reporting offers value.

The value of whole herd reporting and the American Hereford Association's (AHA) cow inventory system, Whole Herd Total Performance Records (TPR™) program, have leveraged the development of key economically relevant traits and will continue to provide additional traits for cattlemen to utilize.

6) Keep collecting data!

Just like the fundamentals of whole herd reporting, collecting whole herd genomics is critical to getting the most out of marker selection. Don't let your operation fall behind with industry trends and technology. **HW**

Editor's note: Visit the Hereford Headlines blog at Hereford.org/2017/06/6-key-messages-from-the-bif-convention/ to hear more from industry leaders about these BIF takeaways:

- Darrh Bullock from the University of Kentucky explains the power of selection indices.
- Kansas State University faculty member Bob Weaver gives Hereford breeders reasons to "Mind the Gap" with genetic improvements.
- Bruce Golden, Theta Solutions LLC president, talks about the revision of the Sustained Cow Fertility (SCF) trait.



The crossbred cow has been shown to be superior for aspects including age at puberty, reproduction and longevity.

"Typically, as the production environment worsens, the more hybrid vigor can matter," stated Thrift, citing the popularity of *Bos taurus* – *Bos indicus* crossbred cows (such as the Hereford × Brahman tiger-striped female) among Gulf Coast cow-calf operations. "Many consider the F1 Brahman-cross cow to be the 'Cadillac Cow' for that environment."

Thrift discussed the strengths and weaknesses of terminal, rotational and composite crossbreeding systems, emphasizing that haphazard crossing of breeds is not a crossbreeding system. Long-term success requires a targeted plan. Regardless of the system chosen, Thrift says much of the benefit will result from using a crossbred cow.

Achieving longevity

Also discussed during the BIF Convention were recommendations for replacement heifer development to achieve longevity. University of Tennessee beef cattle specialist Justin Rhinehart said the basic objectives for promoting longevity in the breeding herd include:

- Selecting heifer candidates that reach puberty in advance of the breeding season.
- Retaining heifers that conceived early in the breeding season (preferably in the first 20 days).
- Choosing matings with bulls that minimize calving difficulty.
- Selecting genetics for improved production.

Rhinehart emphasized the need for a sound nutrition program during development, following breeding and also during the post-partum period. Along with implementation of a veterinarian-recommended vaccination and parasite-control program, he advised evaluation of heifers (30 days prebreeding) for pelvic size and a reproductive tract score.

One of the best tools for selecting heifers and bulls is underutilized, according to three BIF Convention presenters. According to Throckmorton, Texas, seedstock producer Donnell Brown; University of Kentucky animal scientist Darrh Bullock; and Red Angus Association of America Director of Breed Improvement Larry Keenan, selection indices allow producers

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— Donnell Brown

to make selection decisions based on the economic impact of several traits simultaneously.

In a tag-team presentation, the speakers explained how an appropriate selection index can help alleviate the challenge of juggling a growing number of individual trait EPDs. In some cases, a selection index allows for the selection of animals based on a single number reflecting the genetic contribution to its offspring's economic potential. In the best-case scenario, all of the EPDs of economic importance to a producer's specific management

and marketing scheme are included in the index.

“To me, selection indices are the best tool we have to make more right decisions and the least mistakes,” stated Brown.

The speakers said improvements are needed, including more indices specifically targeted to commercial cow-calf producers and multi-breed indices incorporating heterosis information and accuracy values like those associated with EPDs.

The 2018 BIF Convention will be held in Loveland, Colo., hosted by Colorado State University. **HW**



BIF Tour includes Hereford herd

The Beef Improvement Federation (BIF) Annual Convention and Research Symposium wrapped up the three-day event with an agricultural tour throughout middle Georgia. The tour concluded with a visit to Innisfail Farm in Madison, Ga. **HW**

