A Genomic Era

USMARC celebrates its 50th anniversary and explains its role in the Beef Improvement Federation.

*by **Kasey Brown**, associate editor, & **Troy Smith**, field editor*

Most would not think of a meat animal research center spawning from a naval ammunitions depot, but it is indeed the history of one of the largest research projects evaluating breed characteristics — the Germplasm Evaluation (GPE) Program. Research geneticists Larry Cundiff and Mark Thallman of the Roman L. Hruska U.S. Meat Animal Research Center (USMARC), Clay Center, Neb., shared the history and current emphases of the center during the opening session of the 2014 Beef Improvement Federation (BIF) Annual Meeting & Research Symposium in Lincoln, Neb., June 18-21.

The USMARC is celebrating 50 years and, of those, 45 of them have been involved with the GPE, said Cundiff. He credited Keith Gregory, the center's first director, with having the vision for the impact livestock research would have and for setting up USMARC for success by seeding 30,000 acres to grass and establishing such large research herds. Additionally, he credited Bob Koch, Gordon Dickerson and Dale Van Vleck for the success of the germplasm project.

The Germplasm Evaluation Program, while intimidating in name and scope, provides practical information by determining breed differences and the optimization of characteristics in heterosis. The project used 37 breeds, including widely divergent biological types, in eight cycles.

The germplasm project is also the source of the across-breed expected progeny differences (AB-EPDs), which use adjustment factors to put noncomparable within-breed EPDs on a comparable basis. Angus was used as the base because it was the most popular breed, Cundiff noted.

Cundiff highlighted the genetic trends for

► Larry Cundiff, research scientist for the USMARC, Clay Center, Neb., high-lighted the genetic trends for yearling weights for many of the breeds, noting their change over time.

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"British breeds have closed the gap on Continental breeds for yearling growth," Cundiff said.

Timely release of progress reports and scientific publications has affected the choice of breeds used in beef production, Cundiff said. "Beef registrations tend to reflect germplasm project findings. Decisions can be made easier with the data, and this project will be even more critical in the future."

Thallman explained the new structure of the project, which is being implemented to effectively use tax dollars. The philosophy is that it is more efficient to concentrate the collection of extensive and expensive phenotypes on populations that can be used for multiple objectives. USMARC has moved beyond cycles into continuous evaluation.

The project concentrates more on breeds that are used in the industry; this develops a population that is representative of the industry.

Among the many traits being studied, Thallman said research is moving toward developing EPDs on novel traits, including disease resistance, meat quality, feed utilization and many others.

Additionally, Thallman emphasized the multi-breed and novel trait nature of USMARC's genomics research. Sequencing influential bulls has begun. At the time of the

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meeting, 180 purebred bulls and 81 F_1 bulls had been sequenced.

To learn more about the germplasm project, Thallman encouraged attendees to visit *www.ars.usda.gov/Main/docs.htm?docid=6238.*

— by Kasey Brown

On the shoulders of giants

It is said the beef cattle industry is in the "genomics era." The ability of cattle breeders to utilize DNA technology to enhance animal selection decisions is owed, in no small part, to the work of geneticists and biochemists at USMARC, said Steve Kappes, deputy administrator for USDA's Agricultural Research Service (ARS).

"We are standing on the shoulders of giants," said Kappes, during the session celebrating the center's 50th anniversary.

Kappes recounted the development of genomic research, from early gene mapping to the sequencing of the bovine genome. He talked about the discovery of gene markers linked to

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economically relevant traits, first in dairy cattle, and how development of physical and genetic linkage maps spurred interest and funding for beef cattle genomics research and the development of genomic-enhanced EPD values for a growing number of traits.

"Here's the kicker," said Kappes. "The greatest gains are achieved from applying the technology to selection for lowly heritable traits."

Kappes said advancements in technology have allowed for genotyping of animals at dramatically reduced costs — currently less than 10¢ per genotype.

Even with the rapid advancements gained, Kappes said research has revealed only the tip of the genomics iceberg. He predicted discovery of gene markers to aid selection for a host of hard-to-measure traits related to animal health, reproduction and cow longevity.

"One of the things we need to come back to is fitting animals to their environment," added Kappes. "Genomics will help us design a cow that better fits the resources available in her production environment."

— by Troy Smith

Editor's Note: *The* Angus Journal *and* LiveAuctions.tv *provided comprehensive online coverage of the event at* www.BIFconference.com. *Visit the Newsroom for summaries, proceedings, PowerPoints and audio of the sessions; the Awards page for announcements of award winners; and the Photos page for galleries of photos from the meeting and the tours.*