

Performance at a Crossroads

As the Beef Improvement Federation celebrated the 40th anniversary of its formation, the organization reflected on its storied history and looked to the future.



Approximately 570 cattlemen and academia gathered in Fort Collins, Colo., June 6-9 for the 39th Beef Improvement Federation (BIF) Annual Research Symposium and Annual Meeting. The group returned to the state where the organization was founded to celebrate its 40th anniversary.

A.L. (Ike) Eller Jr. began Thursday's session, themed "Performance at a Crossroads" by taking a poll of the audience to determine the age demographics of the room. After the quick poll, Eller made the point that there were several attendees who were not born when BIF was organized 40 years ago.

To help celebrate its ruby anniversary, Eller reflected on the history of genetic evaluation, as well as BIF's formation and growth as an organization.

"Any look back at BIF's 40-year history has to be about three things — people, leadership and technology," Eller said.

When he was judging, cattle were evaluated by eyeball appraisal, Eller commented. Most of the scientific information is fairly recent.

"It was Frank Baker who formulated a plan to achieve some standardization and coordination of beef performance programs," Eller said, referring to a committee report of the U.S. Beef Cattle Records Committee subtitled *Recommended Procedures for Measurement of Traits of Economic Value in Beef Cattle*. "It was the first time that someone got

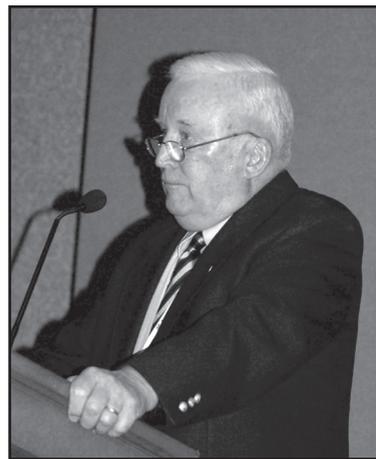
the breeders from various breeds, Extension members and others together to put something together."

Performance Registry International (PRI), breed associations and state beef cattle improvement associations were all making efforts at performance evaluation. Concerns mounted about who would harness technology into a system for evaluating beef cattle improvement and profitability, Eller noted. The need for standard guidelines for performance evaluation grew.

Baker and Ferry Carpenter conferred to organize an industry-wide performance meeting. The International Conference of Cattle Performance Testing Associations took place in Denver, Colo., at the National Western Stock Show (NWSS) Jan. 14, 1967.

A volunteer committee was formed and met at the meeting. Committee members voted unanimously that it was necessary to correlate the present performance testing organization and agencies into a national organization.

The BIF organizational meeting was conducted in Denver Jan. 12, 1968. The fledgling organization was on its way. More details are spelled out in the proceedings paper accompanying Eller's presentation, available at www.bifconference.com/bif2007/newsroom.html, and in "A History of Gaining Value from Genetics," a special DVD created to commemorate BIF's 40th anniversary.



"Any look back at BIF's 40-year history has to be about three things — people, leadership and technology," said Ike Eller as he reflected on the organization's formation and growth. [PHOTO BY MATHEW ELLIOTT]

Eller said many young researchers "have earned their spurs" by contributing new information and becoming active in BIF. The synergism between researchers, breeders and their associations through BIF has been truly amazing, he added.

"Is all the work done?," Eller asked. "Surely not, but stay tuned and stay involved!"

Look for the audio and symposium paper that accompanied this presentation at www.bifconference.com. The DVDs are available for \$10 each, including postage and handling, from Susan Willmon, American Gelbvieh Association, 10900 Dover St., Westminster, CO 80021.

—by Mathew Elliott

"You can vote as many times as you want," Field said, "but the last thing you put in before the 10 seconds is up is what is recorded. All you have to do is match the number with the corresponding answer on the screen."

The technology allowed audience members to input whether they were a seedstock or commercial producer, what the ideal weight for a mature cow should be, and how many BIF conferences they had attended, as well as answers to many other questions.

"This allows us the opportunity to show results as we go along," Field said.

As an example, when the audience was asked what their affiliation with the beef industry was, 31.1% responded they were seedstock producers; 9.8% commercial producers; 28.9% university, Extension or government; 15.6% affiliated industry; 9.2% students; and 5.4% other.

The keypads also kept track of what answers an individual had input in the past, allowing results to be broken down by certain audience characteristics. As an example, answers from commercial producers could be compared to the answers of seedstock breeders to see how they differed.

After some demographic questions early in the morning, Field came back later and asked questions dealing with "Defining the Ideal Beef Animal." Due to a lack of time, all answers were recorded but not shown at the time. A quick overview of the results was presented during Friday's morning session (see "Can We Build the Ideal Beef Animal?").

Audience Presents View

An audience input system provided a way for all attendees at the BIF conference to share their backgrounds and opinions by voting on a keypad. As Colorado State University's Tom Field explained, the keypad wirelessly collected the information to a central database, where it computed a summary. The results were almost instantaneously shown on the screen for meeting participants to view.

Attendees were given 10 seconds to answer each question once it was read to the audience.



Colorado State University's Tom Field light-heartedly reminded producers the audience input device was not a remote control to take home with them, as he introduced the system. [PHOTO BY MATHEW ELLIOTT]

Celebrating 40 years since the inception of BIF

BIF DVD and History Room
Sponsored by

June, 2007
Fort Collins, Colorado

2007 BIF History DVD

2007 **Beef Improvement Federation**

A History of Gaining Value from Genetics

The DVD "A History of Gaining Value from Genetics" features the history of the BIF organization.

Speakers throughout the conference also posed questions to the audience. The complete data set was to be analyzed and summarized for distribution following the BIF meeting. Results will be posted to www.bifconference.com as soon as they are available.

The American Angus Association sponsored the technology.

Look for the audio file for this presentation in the newsroom at www.bifconference.com. A summation of the results of the survey will be posted to the newsroom as soon as it is available.

— by *Mathew Elliott*

Genetic Improvement: Who Benefits? Who Pays?

The need for transition looms large for the seedstock industry, said Kent Andersen, executive vice president of the North American Limousin Foundation. Speaking during the opening general session, Andersen said advancing technology and ever-expanding data collection call for an aggressive approach to genetic improvement through performance program services.

At stake, he said, are the futures of some 750,000 U.S. cow-calf producers and, ultimately, 300 million U.S. consumers.

Breed associations collectively invest \$3 billion annually to further genetic improvement, Andersen said. However, six times more money is spent on data entry than is devoted to analyses that turn data into information useful to decision-making.

The seedstock industry is coming to a crossroads, he added, and must prioritize programs that will provide their customers with further improved tools for genetic selection.

Andersen said he foresees the transfer of computation of genetic

evaluation programs from the public sector to the private sector. Improved genetic evaluation services also must include increased evaluation of hybrid seedstock so all animals may be fairly compared, regardless of breed composition, he said.

Andersen cited the need for more investment in research, development and validation of DNA diagnostics

for more genetic traits. Such selection tools currently exist for marbling and tenderness, but many producers remain uncomfortable with their application. Consequently, there is cause to shift from passive to assertive producer education in the practical use of existing and new tools, including customized decision support aids that address complex interactions between genetics and management.

According to Andersen, most producers would pay at least a little more money for seedstock that are thoroughly evaluated with advanced selection tools, but breed associations must decide whether they will step up and provide needed performance programs and services. The industry, he said, stands at the crossroads in need of leadership.

(Continued on page 26)



The Australians have calculated return on investment (ROI) for genetic improvement at 28-to-1, while the Canadians estimate the ROI for genetic improvement to be 3-to-1, Kent Andersen, executive vice president of the North American Limousin Foundation, said in Thursday's opening general session. [PHOTO BY MATHEW ELLIOTT]

Performance at a Crossroads *(from page 25)*

“The big question,” Andersen stated, “is how do we position the BIF to better serve the industry for the next 40 years? What is our progressive vision for beef improvement?”

The PowerPoint and audio for this presentation are available in the newsroom.
— *by Troy Smith*

Critical Junctures

Are beef genetics research, education and Extension relevant? Two speakers — one scientist, one producer — presented

their responses to attendees of the BIF annual meeting.

Advances in molecular biology mean the beef industry should aggressively embrace the emerging technology — and find ways to fund its research — to remain economically viable in the future. That was the message of Ronnie Green, national program leader of food animal production

for the U.S. Department of Agriculture’s (USDA’s) Agricultural Research Service (ARS). Green said genome-enabled selection could help producers improve a number of important traits in the near future. Ultimately, this will enable them to make precise breeding decisions to improve bovine disease and stress resistance, adaptability and functionality.

“But if we don’t invest in that infrastructure, we’ll pay a significant price,” Green said. “One of the questions we need to be asking is where are the scientists and educators going to come from who have a knowledge of the industry and its problems to address them. You can create a lot of molecular biologists, but not many of them know one end of a cow from the other.”

Green said the beef industry is at a critical juncture, facing a multitude of challenges — everything from food safety to international trade to consolidation.

Consumers, too, are demanding a reduced “environmental footprint from livestock production,” and increasing their demand for nontraditional beef products, he said.

“We are seeing profound societal and industry shifts,” he said. “There is a push to narrow the gene pool, but concerns about the loss of heterosis. There is a need for information to accelerate, and a strong desire to move from a breed world to a gene pool world.”

“We need to be studying these trends and understand what’s happening in other industries, particularly within the dairy industry,” Green continued. “Could our industry eventually be shipped offshore? There are some who believe animal ag doesn’t belong in the United States anymore, and they would just as soon choose that we no longer exist.”



Producers need to revisit the concept of producer networks to remain competitive, seedstock producer Brian McCulloh told attendees. [PHOTO BY SHAUNA ROSE HERMEL]

Producer perspective

To remain economically viable in the future, the industry should build interdependent relationships among themselves and government to find viable methods of remaining sustainable in the future, seedstock producer Brian McCulloh added.

“It’s time that we do a better job of re-engaging in and working on

(Continued on page 28)

Performance at a Crossroads *(from page 26)*

interdependent relationships,” the manager of Woodhill Farms, Viroqua, Wis., said. “You can still maintain your independence, but let’s come back to the table so we can be reassured that our kids will continue.

“U.S. agriculture is the envy of the world because we have independent business producers who care about their

livelihood,” he added. “But it requires cooperation, and it takes working together.”

Look for the PowerPoints and audio files for these presentations in the newsroom. A proceedings paper for Green’s presentation is available on the “Symposium Papers” page.

— *by Eric Grant*



A panel of producers discussed how seedstock providers are addressing the needs of commercial cow-calf producers. Panelists included (from left) Steve Radakovich, Earlham, Iowa; Mike Kasten, Millersville, Mo.; Mark Gardiner, Ashland, Kan.; and Chip Ramsey, Ashby, Neb. [PHOTO BY TROY SMITH]

Are Customers the Focus?

“Successful purebred breeders have always focused on the needs of commercial producers, but the needs of commercial cattlemen have changed over time,” said Ashland, Kan., seedstock breeder Mark Gardiner, leading off Thursday’s roundtable.

For years, Gardiner said, his customers sought maternal ability along with growth. Maternal ability remains important, but more recent concerns include moderating cow size, improving efficiency and increasing end-product value. Customers seek genetics that better enable the capture of added value through value-based marketing programs. They also expect more service after the sale, so Gardiner increasingly wears the hat of a customer-service representative.

Buyers expect bulls to be guaranteed and increasingly rely on seedstock suppliers for help in marketing cattle. By sponsoring feeder calf and replacement heifer sales, offering buy-back programs and fostering retained ownership arrangements with feedlots, many seedstock suppliers are helping their customers be more profitable, Gardiner explained.

According to seedstock producer Steve Radakovich, Earlham, Iowa, the seedstock industry has usually given the commercial industry what it wanted — often in excess. However, what producers want may not be what they really need.

“The one big injustice of the seedstock industry is evaluating and supplying over-managed, overfed, fossil-fuel-dependent bulls to cow-calf producers forced to survive on solar energy and low-cost production,” Radakovich stated.

Commercial producer Mike Kasten, Millersville, Mo., said he believes seedstock suppliers have strived to produce high-quality genetics that fit varying environments and serve the wants of beef consumers. The latest challenge they face is helping their commercial customers adapt genetics to production systems that must change due to higher feed costs.

“The commercial cow-calf producer needs the truth,” said Chip Ramsey of the Rex Ranch, Ashby, Neb. “We need accurate whole-herd reporting in the seedstock industry, accurate across-breed EPDs (expected progeny differences) and accurate estimates of heterosis benefits. We need these services for as low a cost as possible, which means less overhead costs.

“Those forward-thinking people in the seedstock industry that try to do the right thing and are willing to take the risk in the near term are usually rewarded with long-term success rather than a short-term opportunistic profit,” he added.

The PowerPoint for Gardiner’s presentation and the audio for the panel discussion are available in the newsroom at www.bifconference.com. Visit the “Symposium Papers” page for proceedings to these presentations.

— Troy Smith



UK animal scientist Darrh Bullock considered audience members’ answers to questions about animal type and production priorities. [PHOTO BY TROY SMITH]

The Ideal Animal

Before cattle breeders can build the ideal beef animal, they must decide what “ideal” is. However, according to University of Kentucky (UK) animal scientist Darrh Bullock, settling on a definition is difficult because there is no consensus. That fact was clearly illustrated June 8 as Bullock summarized audience members’ answers to questions related to animal type and production priorities during the 2007 BIF annual meeting.

Bullock’s presentation kicked off the second full day, themed “Challenges to Conventional Wisdom.”

Producers’ opinions varied with regard to breed preference, optimum animal size and the importance of traits relative to the production environment. Bullock said response suggested a majority of producers agreed that nutrition was a limiting factor in their operations, and that their cows were too big. They generally agreed that input

costs were too high to maintain acceptable reproductive performance.

“That tells me,” Bullock stated, “that we’re not doing a good job of fitting cows to the environment.”

According to Bullock, identification of a production target also depends on what kind of beef product consumers will want in the future. Will they prefer high-quality or lean beef? Will consumers want all-natural

or organically grown beef? It is likely, he said, that varying consumer preferences will create demand for all of the above.

“Can we build an ideal beef animal? Absolutely. We have the ability to build ideal animals that fit different production systems and serve different markets,” Bullock offered.

However, the concept of “ideal” will be regionally dependent, varying according to

the environment. It will be management-dependent as producers use different selection criteria and management practices to meet their production goals. It will be market-dependent as product specifications influence those goals.

“And it will be technology-dependent,” Bullock added, “with new technologies

(Continued on page 30)

Performance at a Crossroads *(from page 29)*

helping us manage the things we can't select for."

Look for the PowerPoint and audio file for this presentation in the newsroom at www.bifconference.com.

— by *Troy Smith*

Why Hasn't QG Improved?

Considering the perceived emphasis on genetic selection for carcass merit, why hasn't the U.S. beef industry seen a

dramatic increase in the percentage of carcasses grading USDA Choice or better? It's a perplexing question.

Dan Moser, associate professor of animal sciences and industry at Kansas State University (K-State), advised breeders to consider four factors affecting the rate of genetic change and how those factors might be manipulated to hasten genetic improvement of beef quality.

Genetic variation. Moser noted how, except Angus, most breeds show a relatively flat genetic trend for marbling score for the last 20 years. Greater change would be possible, he suggested, if these breeds would aggressively develop superior meat quality lines, enabling commercial producers to emphasize quality when selecting sires for crossbreeding systems.

Selection intensity. Moser cited reasons why producers differ in the emphasis placed upon selection for improved marbling. Producer opinions vary as to the true economic reward of increased marbling. And while grid marketing does reward sellers of high-marbling cattle, retained ownership is practiced by a relatively small proportion of cow-calf producers.

Additionally, Moser said, the feeder-cattle marketing system insufficiently values calves with superior genetic potential for quality grade.

"If market signals more clearly indicated significant increases in profit associated with higher marbling scores, more intense selection would likely occur," he said.

Accuracy of selection and generation interval. Moser sees great opportunity to enhance the rate of genetic improvement for marbling through technologies providing more accurate information on sires at an earlier age. He called ultrasound estimation of marbling score a great example, but lamented its too frequent misuse.

"One misuse of ultrasound information that limits genetic progress is the use of actual or adjusted scan data in selection and marketing, rather than EPDs," Moser stated. "Producers can make more-informed and correct selection decisions when carcass and ultrasound data are combined into a single set of EPDs, with the EPDs and accuracy values published for the carcass traits."

Moser called DNA tests another category of tools that aims to provide accurate information to aid selection early in an animal's lifetime. And while these tests have great potential for identifying certain genes associated with marbling, Moser advised producers to remember that marbling is influenced by a large number of genes.

Time. Finally, Moser urged producers to practice patience. Cattle breeding is a long-term proposition, so patience coupled with critical evaluation of technologies, old and new, should result in improved beef quality.

Look for the PowerPoint, audio file and proceedings for this presentation on www.bifconference.com.

— by *Troy Smith*

Quality Factors

Ensuring your cattle marble well — and reach desirable USDA Choice or Prime quality grades — is a commitment that begins when a calf is born and continues from the ranch to the feedyard.

“Marbling deposition is a lifetime event, not something that takes place during late stages of feeding,” said Pete Anderson of VetLife Technical Services. The VetLife Benchmark Performance Program gathers performance, carcass and financial data on approximately 40% of all fed cattle.

Research shows that “marbling is different from subcutaneous fat. They are different tissues with different regulatory pathways, he said. “Marbling results from a different embryonic tissue layer than subcutaneous fat. At birth, cattle have nondifferentiated cells within their muscles that have at least three choices: turn into muscle cell nuclei, turn into fat cells, or do nothing.”

“Any nutritional insult — at any time in the life of an animal — will reduce marbling. That’s why it’s critical for cattle producers to keep a close eye on health and vaccination programs and other factors,” he said.

Stressors that cause reductions in marbling include drought, poor-milking cows or health.

“Cattle that go off feed expend more energy fighting the negative effects of the disease” rather than depositing fat, Anderson said. “It stands to reason that those cattle that suffer disease at any time in their lifetime could have an impaired ability to deposit marbling regardless of how fat they ultimately get.”

Look for the PowerPoint, audio file and proceedings for this presentation on www.bifconference.com.

— by Eric Grant

What Do You Give Up?

Bob Weaber, assistant professor of beef cattle genetics at the University of Missouri (MU), tackled the question “Are There Sacrifices in the Chase for Carcass Merit?” during Friday’s morning session. Weaber first looked at some of the motivators to improve carcass merit in beef cattle, the first among them being



Selection pressure for marbling within breed can be made with little effect on other traits, said MU’s Bob Weaber. The tradeoff lies in giving up heterosis to capitalize on the quality grade attributes of a single breed in a straightbreeding system. [PHOTO BY MATHEW ELLIOTT]

Table 1: Heterosis lost per generation

Generation	Breed A fraction	Breed B fraction	Individual heterosis
1	1/2	1/2	100%
2	3/4	1/4	50%
3	7/8	1/8	25%
4	15/16	1/16	12.5%
5	31/32	1/32	6.25%

the value-based marketing systems that financially reward yield grade, quality grade, conformance and weight.

“Even in a wide Choice-Select spread, about two-thirds of the value difference from carcass to carcass in a grid-marketing system still comes from weight,” he noted. “So we can’t ignore that in either our production or selection strategies.”

The top 10 challenges posed in the National Beef Quality audits (NBQAs) haven’t changed significantly since the first audit, Weaber noted.

“We still face challenges with inappropriate carcass size and weight, inadequate tenderness, excessive external fat cover, and an inappropriate mix of USDA quality grade,” he said, noting “some challenges relative to the mix we provide our downstream partners — feeders and packers — in terms of end product quality and merit.”

While breeders have applied some selection pressure for greater marbling, the mix of quality grades hasn’t changed significantly, he pointed out. He walked producers through what pen average marbling scores were needed for a pen to be 50%, 60%, 70%, 80% and 90% Choice, then estimated the needed standard deviations of genetic improvement that it would require to reach the next level.

What are the tradeoffs?

Weaber used research he is currently working on with the American Simmental Association to look at the correlation between marbling and other selection criteria [traits for which there are expected progeny differences (EPDs)] and breeding objectives (traits for which there is an economic value in selection models). Correlations with various individual traits are displayed in a corresponding PowerPoint available in the newsroom at www.bifconference.com.

The projections indicated selecting for big changes in marbling would not, on the average, cause a lot of change in other selection criteria and breeding objectives, Weaber said.

“These predicted responses to selection for marbling are not equivalents to the traditional computation of correlated response to selection,” he added. “They have not been scaled by either the accuracy of prediction, selection intensity or generation interval.”

All-in-all, Weaber said, there seems to be little risk in selecting for increased marbling score relative to changes in other traits from the perspective of additive trait selection within a breed.

Heterosis

The \$64,000 question, Weaber said, is do the benefits of selection for carcass traits within breed (straightbreeding) outweigh the heterosis improvements of lowly heritable traits (especially maternal) garnered via crossbreeding?

“We’ve got to be careful and think about our total production system and, especially if we’re commercial cow-calf producers, about where our revenue comes from,” Weaber said. Producers have an obligation to pay attention to end product merit, but they also have an obligation to pay the bills.

“Our selection strategies should really focus on both additive and nonadditive, using EPDs and crossbreeding systems appropriately to achieve the genetic levels and genetic potentials that we want,” Weaber said. “We can’t overlook either one.”

Crossbreeding systems that maximize heterosis in an F₁ terminal-sire system are worth about \$100 per cow per year above a straightbreeding program, he said, basing the numbers on literature values that are available.

“Those are big dollars and those are real dollars,” he said. “If we’re going to make tradeoffs in our selection systems away from a system that effectively uses heterosis, we need to know how many dollars we need to offset in terms of additive selection.”

That noted, Weaber explained that heterosis can be lost pretty quickly once you move away from the F₁ cross (cross of two pure breeds).

Look for the PowerPoint, audio file and proceedings for this presentation on www.bifconference.com.

— by Mathew Elliott & Shauna Rose Hermel

Using DNA Markers

Luke Lind, vice president of marketing for Five Rivers Cattle Feeding, advised cow-calf producers to consider the limitations of DNA markers when applying them to genetic selection to improve carcass quality grade.

Each of the currently available DNA tests include markers for a single gene associated with marbling, Lind said, but many other genes and environmental factors also influence expression of the trait. He called EPDs more reliable tools on which to base selection decisions.

Furthermore, Lind said he believes most producers better understand how to use EPDs effectively, but they have limited understanding of DNA test rankings.

“What does ‘five stars’ mean? I don’t think many producers really know,” he said. “If you coupled the two (selection tools) together, to make marker-assisted EPDs, that would be much better.”

For use in the feedlot, Lind called DNA tests based on two or three markers for tenderness and marbling “not good enough.” For successful application, tests need to be simple, comprehensive and cost-effective. For Five Rivers to seriously

entertain any new practice, he said, there must be potential for a 3-to-1 return on cost.

Look for the PowerPoint and audio file for this presentation in the newsroom at www.bifconference.com.

— by Troy Smith

Whole-Genome Approach

A new technology, called the “Illumina iSelect Infinium Custom Beadchip,” could potentially revolutionize the way cattle producers identify economically important genes and allow them a “whole genome” approach to determining the genetic merit of cattle without dependence on phenotypic measurements.

The beadchip, developed with help from researchers at the University of Missouri (MU), provides for “whole genome” investigations of the bovine genome. Expected to be commercially available this fall, the technology could accelerate the ability of researchers to cost-effectively unlock the genetic basis of dozens of traits, and allow the industry a greater breadth of understanding of the range of genes that affect specific traits, said Jerry Taylor, professor and Wurdack chair for animal genomics at MU.

“We’ve taken 5,000 DNA samples from bulls at Circle A Angus and 1,800 samples from AI bulls,” Taylor said. “We’ve genotyped 4,000 animals and identified 422 markers. From this research, we’ve found evidence for 59 individual marbling genes. If there are 59 genes in Angus that are responsible for the genetic differences in marbling and marbling scores, then we need to test for all 59 genes. If we’re going to do that, you need a test that encompasses the entire genome, not just parts of it.”

“The test could also help producers accurately predict the EPDs for all traits — without having to take measurements or weights,” he said. “It will also provide for parentage verification and traceability. There is an enormous range of applications.”

Cost of the test is currently at \$208 per sample, for research purposes. Taylor expects the costs to drop in the future to make it more economically feasible for producers and breed associations to use.

A potential downside of the technology is that each test is breed-specific. In other words, “the test we develop for Angus won’t work for Salers,” Taylor said. Each breed will have to make some investment to develop their own, breed-specific test in the future.

“If this proves to be effective, we will have to repeat the analysis for all breeds — and all the breeds that want to use it will have to pony up,” he said.

Look for the PowerPoint and audio file for this presentation in the newsroom at www.bifconference.com.

— by Eric Grant

