

Genetics for the Next Generation



Beef Improvement Federation focuses on reproductive efficiency, selection tools, producer profitability and more.

More than 750 people registered for the Beef Improvement Federation (BIF) 37th Annual Research Symposium and Meeting, July 6-9, 2005, at the Holiday Inn Grand Montana in Billings, Mont. The record number of attendees had the opportunity to visit with industry leaders gathered to discuss advancements in genetic evaluation.

Themed "Genetics for the Next Generation," the meeting's general sessions and committee roundtables focused on reproductive efficiency, cow adaptability, multi-breed evaluation, Web-based decision-support tools, selection indexes and producer profitability.

Influential figures in the beef industry were also honored at the event. Rishel Angus, North Platte, Neb.; Steve Suther, Certified Angus Beef LLC (CAB); Dale Davis, Belgrade, Mont.; and Prather Ranch, Fall River Mills, Calif., were among those honored.

Angus Productions Inc. (API) provided real-time coverage of the event, available at www.bifconference.com. The site, sponsored by Boehringer Ingelheim Vetmedica, Inc., features streaming audio/video of many of the sessions, symposium papers, synopses, PowerPoint® presentations and awards coverage.

A few highlights follow.

Estrus synchronization using GnRH and CIDRs

The beef industry's newest tools for synchronization — CIDR® and gonadotropin-releasing hormone (GnRH) protocols — will yield industry-accepted pregnancy rates among cows and heifers if implemented properly, said University of Minnesota beef reproduction specialist Cliff Lamb. Lamb made his remarks to a full house attending the reproduction symposium hosted by the National Association of Animal Breeders (NAAB) to kick off the BIF conference.

There are four current CIDR protocols being researched, and Lamb said research has shown all of these programs realistically will yield 50%-53% pregnancy rates.

The most recent research shows that the Co-Synch+CIDR protocol yields the most impressive pregnancy rates for a fixed-time artificial insemination (AI) protocol, Lamb said. The Select Synch+CIDR with timed-AI treatment garners the most estrous response and, therefore, yields the most consistent overall pregnancy rates. In an eight-state trial with 14 herd locations, Lamb reported, Select Synch+CIDR and clean-up timed AI at 84 hours yielded an average 58% conception rate.

Among heifers, the Select Synch+CIDR protocol most frequently yields the greatest pregnancy rates, providing a reliable alternative to melengestrol acetate (MGA)/prostaglandin, Lamb added. He said the biggest difference in managing synchronization programs between heifers and cows is timing. The research indicates that for best results, heifers should be time-AIed at 54-60 hours, while cows yield better results if the timed AI is conducted at 60-66 hours.

Additionally, Lamb said research is



PHOTOS BY SHAUNA ROSE HERMEL

► **Cliff Lamb, from the North Central Research and Outreach Center, University of Minnesota-Grand Rapids, focused on how to get cows pregnant using GnRH and CIDRs.**

showing there is little difference in pregnancy rates if GnRH is administered first in the program or after the CIDR is removed. However, he said, research is indicating that timed AI with heat detection will improve pregnancy rates by about 10%.

Most importantly, Lamb said, like any other synchronization program, nutrition, management and weather will affect the response of cows to GnRH and CIDR-based estrus synchronization systems. Specifically, body condition, parity and days since calving need to be monitored to ensure cows breed back. He recommended cows be managed for a body condition score (BCS) of 5.5 to 6 and be more than 50 days postpartum for the best response to synchronization.

Lamb answered some common questions about CIDR-based synchronization systems:

- *Is there a difference in gender ratio with synchronization systems?* He said there is none. In their trials they found 53% bulls and 47% heifers, which was very similar to the ratios in natural-service herds.
- *Is there an optimum herd size that synchronization works best with?* Again, Lamb said there is none. He said with the right facilities and labor there is no limit to how many animals can be synchronized.
- *Are there differences between the CIDRs available in the United States compared to*

those from Canada or Mexico? Lamb said there is no difference; they all release the same amount of progesterone.

- *Can CIDRs be used a second time?* Lamb said this is being done, but he does not recommend it, especially because of the risk of transferring diseases.
- *Will leaving CIDRs in for 14 days vs. the standard 7 days yield better results?* Lamb said new research is being conducted in this area, especially as a tool with heifers, but there are no specific results that can be presented at this time.

Lamb encouraged producers considering a synchronization system to analyze the protocols that are printed inside AI catalogs and use them as guides. He said those are the systems that have been researched and proven to work. He also encouraged producers to work with experts to define and implement reproductive management procedures designed specifically for their herd.

— by Kindra Gordon

Synchronization protocols enhance AI in commercial herds

The NAAB symposium offered a discussion of technologies that facilitate fixed-time AI. Speaker David Patterson, University of Missouri, said that, despite development of multiple protocols for synchronizing estrus among heifers and cows, commercial cow-calf producers have been slow to adopt AI.



► **David Patterson of the University of Missouri-Columbia presented new opportunities to synchronize estrus and ovulation, as well as to facilitate fixed-time AI.**

“Other countries are adopting new technologies for animal production more rapidly than the U.S.,” Patterson said, noting how only 10% of U.S. producers currently use AI.

Patterson said beef producers in Brazil AI nearly five times more cows annually than do U.S. producers. Unless owners of commercial cow herds more aggressively implement proven reproductive technologies, he said he fears the United States will lose its competitive advantage in production of high-quality beef.

“We stand at a unique point in time where we can take advantage of improvements in methods to control the estrous cycle in cattle, as well as a changing market structure where quality is being rewarded,” Patterson said.

The most common reasons that producers shy away from AI include perceptions of high cost and demands on time and labor resources. However, Patterson said a calculated investment in synchronized AI can foster more rapid genetic improvement and better reproductive management.

Currently available procedures involving traditional progestins used sequentially with a GnRH-prostaglandin protocol allow for synchronization of estrus in cycling females, but also allow producers to induce estrus and ovulation in heifers that have not reached puberty or cows that have not returned to estrus after calving. Consequently, females can be bred “by appointment,” through fixed-time AI, rather than through the time-consuming process of heat detection.

Patterson said evidence suggests that protocols for fixed-time AI may result in higher pregnancy rates than use of more traditional synchronization protocols followed by heat detection. But, the real payoff to producers comes from the ability to tighten calving distribution. Later-calving cows can be bred to calve earlier in the next calving season — during the first or second 21-day interval. Profitability may be increased by reducing the amount of labor required during the calving period, while a more concentrated calving distribution results in an increased average age of calves and more pounds at weaning.

“We’re not to the point with heifers that we are with cows,” Patterson admitted. “But, protocols are coming to improve timed AI for heifers. It should further enhance the potential for synchronized AI to improve commercial herds.”

— by Troy Smith

The future: How do we get there from here?

According to University of Missouri Beef Economist Vern Pierce, the future promises to bring more change to the beef industry. However, Pierce said he believes one thing will remain constant: Beef retailers, wholesalers, processors and packers will continue to pay as little as possible for their inputs.

“Some beef producers may not like to hear it, but that is the way it should be,” Pierce stated. “That is how it should be for every business. That is the free-enterprise system.”

The same thing applies to beef producers, he added. They should pay no more than they have to for inputs and try to sell their products for the highest price that buyers are willing to give. However, Pierce said producers must recognize that customers need change. As that happens, it is the producer’s responsibility to adapt.

Pierce said the future of the beef industry is clear. It will be led by different people or, at least, people with different philosophies than are common today. He advised forward-thinking producers to recognize that they enjoy the closest thing there is to a free market. Some producers claim packers have too much power over the marketplace, but those producers might be using fear of market power as an excuse for their lack of entrepreneurship, he noted.

“Entrepreneurial producers have to wear a lot of hats,” Pierce said. “They can’t work in a vacuum. They need to understand all segments [of the beef industry], gather information and figure out how to get a bigger piece of the action.”

Pierce said the traditional commodity cattle business provided processors with a beef animal supply that is cyclical and inconsistent for quality. And, while consumers have varying tastes and preferences, all consumers appreciate consistency. They will pay for it. Consequently, retailers are learning that brand-name beef products offering quality and consistency attract consumers as repeat buyers.

To chart their course for the future, Pierce said, progressive producers are participating in vertically coordinated value-added systems attempting to capitalize on changing consumer demand. To capture their share of “added value,” they are using information gleaned through partnerships to hone their production and marketing skills.



► Beef economist Vern Pierce, University of Missouri, explained opportunities and principles that will help a forward-thinking person or organization be at the forefront of an evolving beef industry.

Pierce urged producers to determine what it will take to keep their cattle operations in business 10 years from now. Some will have to redefine how they do business in a changing market.

— by Troy Smith

Introduction to indexes

Through the years, breed associations have provided cattlemen with a host of expected progeny differences (EPDs) to assist in making targeted genetic selection. However, the industry has lacked a means of tying those genetic prediction tools to economics, said Bob Weaber of the University of Missouri. Selection indexes, he added, are the answer to fill that need.

Selection indexes provide a means to evaluate aggregate merit, Weaber said, explaining further that there are two steps to the calculation of an index: (1) calculating the individual EPDs upon which the index is based; and (2) weighting each EPD used in the index according to its relative economic value.

A selection index provides an objective means of multi-trait selection that is easier to understand and interpret than looking at a host of individual EPDs, Weaber said, explaining the advantages of using indexes. They are economically driven, customizable and combine indicator traits with economically relevant traits.

Selection indexes do have their limitations, Weaber said. Among them:

- EPDs are not available on all economically relevant traits (ERTs) or indicators;

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► Bob Weaber, University of Missouri, described the importance of selection indexes, how they work and where they’re headed in the future.

- ▶ Most indexes available to the industry today are revenue-focused, but cost information is difficult to obtain;
- ▶ General indexes are representative of the industry, but a custom index may be more representative of an individual herd;
- ▶ Relative economic values used in a generalized index may not be reflective of an individual's operation;
- ▶ Indexes may look at traits linearly, whereas there may be diminishing return for added units of a trait after a certain threshold is attained (e.g., mature size or carcass weight); and
- ▶ Managerial differences can cause contraction or expansion of phenotypic variation.

With that, Weaber turned the program over to Mike MacNeil with the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) to discuss terminal indexes in greater detail and Denny Crews of Agriculture and Agri-Food Canada Research Centre, Lethbridge, Alta., to discuss maternal indexes.

— by Shauna Rose Hermel

**Selection indexes:
Making bulls equal profit**

“I salute the board of directors of the associations that have adopted selection indexes,” MacNeil said. “This represents a major change for them from the way they have done genetic evaluations in the past.” MacNeil called selection indexes a valuable tool for the future.

“Sire selection is always about predicting the future,” MacNeil said, adding that part of the process is speculation about economic return. The format of selection indexes — presented as a single dollar figure for an animal — allows for ease of use and more practical comparisons, particularly for commercial producers choosing terminal sires.

Selection indexes provide a more robust means of evaluating sires, MacNeil said, because they allow for multiple factors to be considered. For instance, phenotypic traits such as growth, feed intake and pregnancy rate, as well as economic factors including returns from beef carcasses and costs of production at the feedlot and cow-calf sector, can be included in calculating an index. EPDs allow only single-trait comparisons.

Moreover, each breed association can tailor that index simulation to the ERTs in which they are most interested. And, said MacNeil, the multi-trait approach allows for

more data to be used in indexes.

“There’s a huge amount of data out there that’s not being used that is economically important,” he said. As an example for bulls, breeding soundness exam information could be included in future selection indexes for terminal sires.

There are some complications in the application of indexes, MacNeil admitted. For instance, not all traits of economic relevance — such as calf survival — have EPDs. Though economically important, that data can’t presently be included in index calculations.

While indexes are not perfect, he said, they are a better tool than the industry has ever had for selection.

— by Kindra Gordon

**Multiple-trait selection
for maternal productivity**

Multiple-trait selection for maternal productivity requires a different mind-set than thinking solely about outputs, Crews said. A comprehensive measure of maternal productivity should also consider inputs, or costs.

Maternal productivity is a composite trait influenced by several cost components, and some are hard to measure, he said.

Reproductive rate, for example, is influenced by age at puberty, heifer pregnancy rate, calving ease, the rebreeding rate of 3-year-olds and stayability. Reproductive rate is difficult to evaluate, as are cow maintenance requirements influenced by mature weight and feed intake.

Genetic evaluation and prediction of maternal productivity are difficult because properly designed research data is lacking, Crews said. However, Agriculture and Agri-Food Canada Research Centre has used historical data to develop a maternal productivity index (MPI) in collaboration with the Canadian Hereford Association. The objective was to create a tool for genetic selection of cattle with the ability to consistently wean heavy calves, during a sustained period of time, while maintaining input costs.

Component traits of the MPI include weaning weight, maternal effects on weaning weight (milk), weight of the cow at weaning time, as well as stayability to account for reproductive consistency. The emphasis or economic weighing of each component trait was based on its relative contribution to maternal productivity.

“The Maternal Productivity Index represents a combination of EPDs with relative economic values,” Crews explained.

“There was a definite emphasis on maternal characteristics and stayability, rather than growth.”

Application of this selection tool is expected to result in a positive genetic change for all component traits. It could be used in varying production environments, with economic weighing of component traits adjusted accordingly. However, the MPI requires further validation to build confidence in its value as a selection tool, he said.

— by Troy Smith

Editor’s Note: We will continue our coverage of the 2005 BIF meeting in the October issue. In the meantime, visit www.bifconference.com to review additional highlights of the event.



▶ Barb and Bill Rishel received the Seedstock Producer of the Year Award.

2005 Seedstock Producer of the Year

BIF awarded the 2005 Seedstock Producer of the Year Award to Rishel Angus, North Platte, Neb. Rishel Angus is a family-owned purebred Angus operation that has been in business since 1966.

The Rishel Angus mission statement reads: “To produce superior Angus genetics based on economically important traits that provide profit for our customers, create value for all segments of the beef industry and ensure a satisfying eating experience for the consumer.”

Rishel Angus is known in the seedstock industry as one of the very first breeders of Angus cattle to make a substantial commitment to identifying and improving carcass merit. The belief at Rishel Angus, then and now, is that the real focus should be directed toward the acceptance of the consuming public for beef’s end product. Because of these efforts, Rishel Angus was awarded the Seedstock Commitment to Excellence Award by CAB in 2001.

Rishel Angus has collected and used complete performance records on all cattle since the inception of the herd. These records have allowed them to identify many outstanding sires and to identify and

perpetuate numerous outstanding cow families and individual cows.

The Rishel Angus herd consists of 300 Angus cows and 100 Angus heifers. Rishel Angus operates on a combination of 11,000 deeded and leased acres, with wintering and calving at the headquarters, located 10 miles south of North Platte.

2005 Commercial Producer of the Year

BIF honored Prather Ranch, Fall River Mills, Calif., with the 2005 Commercial Producer of the Year Award.

Prather Ranch is a vertically integrated cattle business that operates in five northern California counties. The ranch headquarters was founded in the 1870s and acquired by Walter Ralphs in 1964. Jim and Mary Rickert formed an association with the ranch in 1979.

The ranch operates a "closed herd" of 1,550 English crossbred cows. About 60% of the cows calve in the spring near Macdoel, Calif., for a natural beef program. The remaining 40% calve in the fall and are certified organic. The organic herd is maintained separately, summering in the Fall River Valley and wintering in the northern Sacramento Valley.

This "closed herd" concept is based on the need to maximize biosecurity. Prather Ranch supplied bovine raw materials to various pharmaceutical companies and, as a requirement, extensive recordkeeping and standard operating procedures are in place. On the cow side, the herd was closed in 1975.

Since 1990, the herd has been bred by AI or ranch-raised bulls. The ranch has implemented and participates in a young sire progeny-testing program, known as Gen-Scan, by working with purebred breeders and the American Hereford and American Angus associations.

In 1995, the ranch built a USDA-inspected, on-site packinghouse and meat processing facility. The ranch direct-markets natural and organic dry-aged beef in southern Oregon and northern California.



► Prather Ranch was named the 2005 BIF Commercial Producer of the Year. Receiving the honor were (from left) Tom and Pat Hill, Philomath, Ore.; Mary and Jim Rickert, Fall River Mills, Calif.; and Daniel Drake, University of California.

Dale Davis receives BIF Pioneer Award

Angus producer Dale Davis, Belgrade, Mont., received a Pioneer Award recognizing lasting contributions to the improvement of beef cattle. Davis was born in North Dakota in 1925 and moved with his family to Montana when he was 11. His first venture with the beef business involved the purchase of Angus heifers as 4-H and FFA projects in the late 1930s.

Davis had to sell his 4-H and FFA project animals prior to entering military service. But, upon completion of his World War II duties, he returned to Montana and began his involvement in the cattle industry in earnest. In 1956 Davis purchased his foundation Angus seedstock and named his herd Rollin' Rock Angus.

Davis became fascinated with growth heritability and how it related to economics.



► Dale Davis received a Pioneer Award. A former American Angus Association director, Davis began his Angus herd in the 1930s

He became an early advocate of performance testing and served multiple terms as director and president of the Montana Beef Performance Association (MBPA).

He served two terms as a director of the American Angus Association, chairing the Association's Breed Improvement Committee during a time of tremendous expansion in performance programs. He was instrumental in establishing the basic structure of Angus Herd Improvement Records (AHIR) and was an avid spokesman for performance evaluation in the beef industry.

Sadly, Dale Davis became ill and passed away soon after the BIF meeting. He will go down in history as an icon in the evolution of the Angus breed. His ideas and concepts were visionary, he was unwavering in his

commitment to the application of scientific principles to beef cattle improvement, and the success he observed in his own program proved he was right.



► Steve Suther (right) received the BIF Ambassador Award from 2005 BIF President Jimmy Holliman.

Steve Suther honored as ambassador

Steve Suther was given the 2005 BIF Ambassador Award, which is presented to a member of the media to recognize their efforts to help cattle producers understand cattle performance testing and genetic prediction tools.

Suther, CAB director of industry information, has almost 30 years of experience as an agricultural journalist and is a regular contributor to numerous beef industry publications. In addition to feature articles on beef producers and production issues, Suther authors a monthly column called "Black Ink" that focuses on profitable cattle production through the use of genetic selection tools, as well as through proper management and marketing. His column is regularly carried by more than 50 publications and reaches approximately 650,000 U.S. beef producers each month.

Suther has long championed the use of performance testing as a means of improving beef cow productivity and efficiency, often practicing what he writes on the farm he and his wife, Anne, own and operate near Onaga, Kan.

A 1976 graduate of Kansas State University (K-State), Suther began his career writing for *Grass & Grain*, a regional publication in Manhattan, Kan. He completed his master's degree in journalism from K-State in 1984 and continued to write about the beef industry for numerous national publications, including *Farm Journal's Beef Today*, of which he became editor in 1996.

Source: BIF.

