Keeping Cows in the Herd

Research reveals management practices that affect lifetime productivity in heifers, heritability of udder quality.

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

It is incredibly important to develop heifers into productive cows for your herd, said beef specialist Jack Whittier, Colorado State University. Research has shown that specific management practices can "program" heifers into productive cows, he told attendees of the Producer Application Committee breakout during the 45th Annual Beef Improvement Federation (BIF) Research Symposium and Convention in Oklahoma City June 12-15.

"My dad always said, 'Once an early calver, always an early calver.' This was based on observations, but there was some truth to it," Whittier began. He presented three case studies of research that proved this correct, and added seven principles to managing heifers. His three case studies cited Lesmeister, Funston and French.

Principle 1: Heifers that conceive early as yearlings during their first breeding season appear to be "programmed" for productive lives.

Principle 2: Early-born calves perform better than late-born calves.

Principle 3: Release of dominance expressed as heterosis in reproductive traits is real.

Principle 4: Heifers born early in relation to herdmates have a higher likelihood of conceiving early in the breeding season.

Principle 5: Early-born heifers tend to calve early.

Principle 6: Steer progeny from early-calving cows produce higher-value carcasses (heavier and higher quality) than late-calving cows.

Principle 7: Yearling heifers that respond to estrous synchronization and conceive early to artificial insemination (AI) produce higher lifetime revenue than those that conceive later to natural services.

These principles "program" heifers for a productive life with older, heavier calves and more calves in the long run.

Estrous synchronization is a tool to produce early-calving heifers. He added that heifers born to AI are more valuable, as much as $922, than cows sired by cleanup bulls.

Whittier suggested that, when resources allow, producers retain a higher percentage of heifer calves and develop them on a modest (adequate), less-expensive rate of gain. Synchronize and AI the heifers without using cleanup bulls. Preg-check early, which lends to selection for fertility and leaves stocker options available for open heifers. This "programs" productive and profitable cows for your operation.

Genetic parameters for udder quality

Udder quality is more than a convenience trait. Cows with acceptable udder suspension and teat size stay longer in the herd, reducing replacement rates and the associated costs. Poor udders are often associated with higher calf mortality or poor calf performance, when newborns have trouble nursing and may not receive timely or adequate colostrum. Weak udder suspension and large teat size can also lead to higher incidence of mastitis.

▶ Udder quality can serve as an indicator trait of cow longevity, plus calf survivability and performance, said K-State graduate student and former AGI intern Heather Bradford.

At the BIF symposium, graduate student Heather Bradford reviewed reasons why poor udder quality can be costly to producers in a report to the Live Animal, Carcass and End Product Committee. She also reported on recent work to assign heritability values to udder-quality traits.

Bradford reviewed the BIF guidelines for evaluating udder suspension according to the recommended numerical scoring system. For her evaluation, the American Hereford Association provided scores representing more than 300 contemporary groups of 2- to 15-year-old females. Analysis indicated that udder quality is moderately heritable in beef cattle, and producers can select for it.

Results also showed a high genetic correlation between udder suspension and teat size (0.83), between overall udder score and udder suspension (0.70) and between overall udder score and teat size (0.72).

"So selection for one trait should result in improvement to the others, as well," explained Bradford. "The American Hereford Association says the genetic trend indicates steady improvement (in udder quality) since 1989, based on phenotypic selection, but the Association hopes to make further improvement by including udder quality in their National Cattle Evaluation and publishing EPDs (expected progeny differences) and a selection index."

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Apps to assist in cow management

More people are accessing data via a mobile smartphone than a desktop computer. That includes beef producers, Rick Rasby, beef specialist for the University of Nebraska–Lincoln (NU) told the Producer Application Committee. The beef industry needs to develop ways to get information to producers via smartphones, he said, illustrating three apps designed by the NU Beef Cattle Production program to help producers with body condition scoring (BCS), udder and teat scoring, and calculating costs.

The NUBeef-BCS app (available at *http://beef.unl.edu/web/cattleproduction/nubeef-bcs-app*) has three components: written, learning and scoring. The written component shares an Extension circular explaining body condition scoring and its importance.

The learning component is interactive. It has photo examples, sketches and explanations for each condition score. Producers can swipe through the whole scale (1-9) and see examples of what each score looks like, and they can test their skills with a scoring game. Tap the "label," and it will show you the areas to look at when scoring cows.

The third component is scoring your own animals. You can take two pictures of a cow (side view and rear view), then assign an identification number to her and the time of year you are scoring. The assigned body condition score is saved, and you can add information to that cow later.

"This is a much better way to evaluate your nutrition program than body weight," said Rasby.

NUBeef-UTS (udder and teat scoring; available at *http://beef.unl.edu/ learningmodules.shtml*) is set up much like the NUBeef BSC, though without the written component.

"The older you get, convenience traits like

► Nebraska's NUBeef-UTS app assists producers in scoring their cows for udder suspension and teat size, explained Rick Rasby. AJ Digital readers can click on the photo above for a 4-minute video by *Market Journal* explaining udder and teat scoring. The video is available at *www.youtube.com/watch?v=NpnlGTWPMng.*

PHOTOS BY KASEY BROWN

udder and teats become more important," he explained. In its learning component, the app explains udder suspension and teat scores that go along with BIF guidelines. It also allows you to score your females much like the previous app.

Both apps are available for Apple and Android phones. They also can fully function once downloaded onto your phone, though the learning component does require Internet.

The third app he mentioned was still being tested, but **NUBeef Cow-Q-Lations** will help producers calculate feed cost, dry-matter conversions, cornstalk use and gestation. It should be available soon.

For access to the PowerPoints and proceedings papers these speakers presented and/or to listen to their presentations firsthand, visit the newsroom at *www.bifconference.com*. Coverage of the event is made possible through collaboration with BIF and sponsorship of *LiveAuctions.tv.*

Selection for traits without EPDs

Not all traits have measurements in a national cattle evaluation (NCE) that results in expected progeny differences (EPDs). Yet those traits may still be important to your operation's selection strategy, said Dan Moser, Kansas State University. Moser addressed the Producer Application Committee breakout session.

There are a few reasons why a relevant trait isn't included in NCE, Moser explained. Some traits have to be subjectively measured, and breed associations may not collect data for certain traits. For instance, he said, docility isn't measured by every association, and it's a trait that has to be measured subjectively.

Moser noted that niche traits aren't included in NCE, nor are those with questionable indicators. Traits not related to profitability also are not included.

"Any time you make a selection decision, you are basing that on your estimation of the individual's progeny difference," Moser said. When making selection decisions based on traits for which there are no EPDs, it is important to consider what goes into calculating an EPD.

For instance, EPD selection starts with accurate, objective measurement of the phenotype. Measurement error lowers the accuracy of selection.

EPD selection compares animals' phenotypes to those of other animals in the same contemporary group and accounts for environmental differences between groups.

EPDs account for heritability of a trait. Highly heritable traits, like carcass traits and mature size, respond well to phenotypic

► Kansas State's Dan Moser said it's important to understand the relationship between your trait of interest and profit.

selection. Conversely, female reproductive rate and survival are low in heritability and are thus difficult to change without progeny testing. Rate of growth is moderately heritable, he added.

EPDs combine data from the animal, its ancestors and its progeny. They account for the level of genetic competition and for non-random mating. Some EPDs incorporate genomic information.

Moser said it's important to understand the relationship between your trait of interest and profit.

EPD selection starts with accurate, objective measurement of the phenotype, but when EPDs are available, they are the most powerful tool available for selection, said Moser. "Mental adjustment" of EPDs, which are used when EPDs aren't available, for visual characteristics and actual data introduces bias and lowers the rate of genetic progress.

Ultimately, traits without EPDs can be selected for, but selection is more difficult and genetic change is slower. Traits without EPDs are more difficult to improve through this method of selection, though the good news is that it is also more difficult to bring in problems.

To access Moser's PowerPoint and/ or to listen to his presentation firsthand, visit the newsroom at *www.bifconference.com*. Coverage of the event is made possible through collaboration with BIF and sponsorship of *LiveAuctions.tv.*

— by Kasey Brown, associate editor