Keeping Things in Balance

Stockmanship is still needed to keep genetic selection on target in selecting for performance and functionality.

Commentary by
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Life is a balancing act, and so is the business of being a successful seedstock breeder. Today's emphasis is on the use of expected progeny differences (EPDs) to make breeding decisions. We also have DNA technology to enhance the accuracy of EPDs. As an animal scientist, no one believes more strongly in EPDs and in the value of DNA technology than I do. If an economically relevant trait can be accurately described with data, we must take advantage of the opportunity and use it.

However, there are a number of physical or type traits that we have not yet described with EPDs. Perhaps in the future we will be able to do so, but for the time being we have to rely on visual calculation. This is why universities offer livestock evaluation courses — to teach our students how to evaluate those traits and balance them with data in making wise selection decisions within a given production and marketing environment.

Need for function

We often refer to these physical traits as "functional" traits, because many of them may affect the animal's function and longevity in the herd. Examples are skeletal structure (feet, legs, shoulder, spine, etc.), mammary structure (udder attachments, teat size), sheath and prepuce structure, disposition/temperament, body capacity, fleshing ability, etc. Other traits include those that are valued in market progeny, such as muscle expression and degree of fatness. EPDs have been developed in recent years that relate to some of these traits, such as docility (disposition), stayability (longevity), ribeye area and fat thickness.

Visual evaluation still has a place and needs to be factored into the balancing act. Astute breeders have the ability to combine EPDs and physical traits into a near-ideal package that can meet the needs of their customers. In doing so, it is imperative to understand the needs of the customer base.

Each breed has only a percentage of breeders who can consistently accomplish this over time. Some may not have a complete grasp of how to use EPDs effectively. Others may not have a full understanding of how to visually evaluate cattle for physical traits.

It has been my observation that seedstock breeders have become much more accomplished at using EPDs in recent years. However, the ability to evaluate physical traits may have declined, especially among new entrants into the business who have had little or no previous experience in live animal evaluation.

If a customer gives you an order for bulls to be used on heifers and you send him bulls that are out of bounds for birth weight (BW) and/or calving ease direct (CED) EPD, resulting in a disastrous calving season, he is not going to be happy. By the same token, if a customer gives you an order for stout, muscular, capacious bulls capable of siring thick, heavy-muscled, high-performing steers for his feedyard customers, he is not going to be happy if you send him frail, light-muscled, hard-doing bulls. No customer would be satisfied if he were sold bulls having structural defects, such as unsound feet and legs, that would impair breeding performance and longevity in the herd.

Montana State University recently conducted a study on the heritability of physical/type traits using data from 21,052 females in ABS Global Inc.'s system for scoring progeny of artificial insemination (AI) sires. They found the following traits were moderately to highly heritable: muscle, frame score, body capacity, femininity, rear leg set, foot and pastern angle, udder depth, udder attachment, and teat size. The results indicate it is possible to change these traits through accurate selection and culling strategies.

They also found that certain correlated changes may occur. For example, selection for females with tighter udders will result in an improvement in udder attachments and a decrease in teat size; conversely, intense selection for femininity may result in cows that lack muscle and capacity.

Previous research has revealed other correlated changes that may occur when selecting for certain traits. Intense selection for increased marbling may be correlated with increased carcass fatness and decreased retail product yield. Intense selection for increased muscling and decreased fatness can negatively affect marbling and increase ribeye area beyond industry specifications. Recent observations would suggest that long-term selection for low birth weight may decrease muscling in cattle and result in increased calving difficulty in replacement heifers due to reduced pelvic area. Some of these antagonistic relationships are not strong, but intense selection over time for certain traits could certainly have a negative effect on other economically important traits.

Science with selection

Throughout my career, I have been actively involved in selecting seedstock for my own herd, for the university herd, and for other breeders. I admire and embrace the breeding philosophy of one of the country's most successful seedstock producers, who I believe is right on target when he says, "My breeding objective is to position my EPDs where I need them to be, and then produce a type of cattle within that EPD framework that fits the needs of my customers."

The breeding of cattle is becoming more and more science-based, which is good. However, there is still a bit of art involved in the breeding of superior cattle. Data is extremely important, but it isn't the total answer. A measure of what the late professor Herman Purdy at Penn State referred to as "stockmanship" is still needed in order to keep things in balance. **AJ**

Editor's Note: *Ritchie is a distinguished professor of animal science at Michigan State University, East Lansing.*