What Is Your Livestock Business’ Breeding Objective?

By Steven D. Lukefahr

KINGSVILLE, Texas: Perhaps more so in the USA cattle industry than in any other livestock industry is there such a multitude of breeding objectives among its producers.

One reason for this dilemma is the vast number of breeds (80 or more) that are in the USA. Second, there are many traits of interest with minor to major economic importance. And third, there are many different environments to consider.

The same can all be said of USA goat and sheep producers who also raise many breed-types on open range across diverse environments. Because there are so many breeds, enterprise types, and unique environments, this explains why indeed there are as many different breeding objectives among ranchers as breeders.

In contrast, commercial broiler chickens are remarkably uniform due largely to a narrow genetic base, a standardized environment, and a focused breeding objective for the industry as a whole. For example: to select for a fast-gaining bird that yields a meaty carcass by market age. In a horse example, the Thoroughbred breed, the breeding objective has largely focused simply on selection for speed performance.

But what really is a breeding objective? Basically, it is a statement about how the business plans to make genetic progress to enhance profits. Traditionally in the cow-calf enterprise the breeding objective for many ranchers has been to increase weaning weights through selection. Of course this focus has been proved to have counterproductive consequences; nonetheless it is still a clear example of a breeding objective.

I will provide better examples

Continued on p. 2

Ayrshire Farms Uses Heritage Breeds Of Cattle And Pigs

By Becky Gillette

UPPERVILLE, Virginia: Ayrshire Farm has roots that go deep into history with the farm established nearly 200 years ago in 1821.

In 1996, Ayrshire Farm began its journey to what it is today when it was purchased by Sandy Lerner, who had a dream to raise humane and organic meat on a sustainable farm.

Ayrshire averages about 900 head of beef cattle and 300 pigs on-site, plus works with other farms to raise their free-range chickens and turkeys. Shire horses are used to chain harrow fields.

“Our pigs are all pasture based. They farrow outdoors on pasture and are raised to finish on pasture. They are also given an organic pig feed,” said Crystal Ritenour, Licensed Veterinary Technician (LVT), who is the large livestock manager for the farm.

They raise Gloucestershire Old Spot pigs primarily, but also do an Old Spot cross with Tamworth pigs.

Ritenour said one of the challenges of raising pigs is understanding the importance of letting the animals on fresh ground regularly. It takes time to learn how to look at the fields and know when it has been grazed enough, but not too much that the ground becomes compacted.

“Ground compacton will bring more weeds,” she said.

“If the grazing is done properly, the fields will improve over time and the animals will benefit.

Continued on p. 4
Breeding Objective

Continued from p. 1

later but at least you now have a clearer idea of what a breeding objective is.

SEEDSTOCK AND COMMERCIAL BREEDERS

Obviously, a breeding objective implies one operates a breeding herd. This is regardless of whether natural matings or artificial inseminations occur.

Next it is appropriate to distinguish between a seedstock versus a commercial business. The latter is more simplified when it comes to the breeding objective because the focus is on producing meat animals. The breeding objective relates to the selection of animals that produce a saleable market product of value.

On the other hand, seedstock breeders usually maintain purebred herds where there are not only many traits but new tools to consider that are of potential economic importance or value.
Moreover, there is much competition among seedstock breeders. The strategy is to "stay ahead of the cutting edge" as stated by Mr. R.A. "Rob" Brown who is a highly respected cattle breeder of quality seedstock whose family ranch is located in Throckmorton, Texas.

Understanding Animal Breeding by R.M. Bourdon is a popular textbook used by animal science students at many agriculture universities. In this book, Bourdon states that seedstock breeders should focus on sound genetic measures that reflect the animal's value as a genetic parent, of course, the animal should also be sound physically and/or physiologically in all aspects.

USE EPDS WITH CAUTION

Typically these genetic measures are in the form of EPDs (expected progeny differences) that mirror the animal's genotype for the trait(s) of interest. However a good deal of caution is advised in using EPDs as the primary or even secondary tool of selection. While no doubt tremendous progress has been achieved through EPD selection, it has sometimes resulted in extreme genotypes that sooner or later decrease rather than increase profits.

The point here is that if EPDs are used to realize the breeding objective they should be used properly and with good caution.

Of relevance, it is Bourdon who is largely credited for the concept of Stayability. A trait defined as the probability of a cow staying in the herd until at least six years of age and having first calved as a two year old, which later resulted in the development of EPDs for this novel trait that was first adopted by the Red Angus Association of America.

This is a good example of proper EPD use because it can result in cows that have genes for longevity, which is a means of reducing herd costs because it is costly to develop heifers.

Bourdon also describes the essence of breeding objective as "a general goal for a breeding program - a notion of what constitutes the best animal." It is appropriate to mention that a breeding objective calls for a long-term commitment on the part of the breeder, requiring
several generations of cumulative results in order to realize genetic progress.

Obviously, if several or many traits are involved then it will take even more generations of selection and more patience to achieve the desired outcome. In addition, once adequate progress for a particular trait is achieved it is appropriate to then no longer select for this trait.

It may also be appropriate here to distinguish between selection and culling as these terms are often confused.

**SELECTION AND CULLING ARE DIFFERENT**

Calves are all selection candidates but only the best ones are selected to become parents in the breeding population to contribute genes to their offspring. Calves not selected are sold or marketed. Instead, culling involves removing animals already in the breeding population. It is selection that directly results in genetic progress, not culling. Of course, the purpose for culling is to keep only the most productive animals in the breeding herd to maintain desired profits.

Another example of use of a breeding objective is at Pharo Cattle Company (PCC) which sells mostly purebred bulls produced by a network of cooperator breeders. As stated at their website: "We have looked into many different breeds in an attempt to find cattle with the right biological type to fit our environment and production goals."

This clear statement puts a good spin on the breeding objective by appropriately emphasizing the need to also address the best genetics for a specific environment. More specifically, PCC places much emphasis on smaller and more efficient cows with low maintenance requirements that have extended longevity, which reflects their breeding objective.

Young bulls are sold that have the genetics especially for such traits of high maternal merit. In addition, other traits that also contribute to maternal success are applied (scores for disposition, fly resistance, low maintenance, and calving ease) as well as certain production traits. EPD information is also used.

Of interest, bulls with five stars for calving ease usually do have negative EPDs for birth weight. At PCC the breeding objective certainly involves many traits of value that are under genetic selection pressure.

**HERITAGE BREEDS**

Yet another application of a breeding objective is for breeders who are mostly interested in maintaining the historic merit or qualities of a heritage breed, such as English Park, Florida Cracker, and Texas Longhorn cattle.

Here, breeders might wish to simply practice pedigree selection in such a way as to minimize inbreeding to conserve existing, albeit limited, genetic variation. In this situation there may not actually be any particular traits that are being subjected to selection. The rationale is that, for example, Texas Longhorns are already highly regarded as hardy animals - having maintained themselves on low quality forage and through droughts for centuries. So here the key word is genetic maintenance by applying no selection, called stabilized selection.

Of relevance, new molecular genetic tools involving DNA data are available that are making an effective impact because they are based on the actual genome of the animal as opposed to estimates such as EPDs. If an animal has desired major genes for economic traits, this information can be incorporated into a suite of trait criteria or even into a selection index.

Another innovation is the development of Genomic-enhanced EPDs, which combines molecular and traditional EPD information into a single EPD value for the animal. These new tools are now being rapidly adopted to assist seedstock breeders to more expeditiously realize their breeding objective. An actual example of such use will be provided in a subsequent article in reference to the breeding objective for my Lukefahr Ranch. Stay tuned.

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