

Production Enhancement – Cross breeding Advantage

**Mel Pence DVM, MS, PAS, Diplomate ABVP (beef cattle)
University of Georgia, College of Veterinary Medicine**

Crossbreeding is the mating of two individuals with different breed types and is widely used in commercial beef production. A dramatic improvement in efficiency is a huge potential economic benefit to cow/calf producers utilizing appropriately planned crossbreeding programs. Crossbreeding is beneficial for two primary reasons. First, a well-designed crossbreeding system allows the producer to combine the desirable characteristics of the breed types involved in the cross while masking some of the disadvantages of the breed types. The second benefit is heterosis or hybrid vigor. In addition to these primary benefits, crossbreeding also enables a producer to change a herd rapidly with the introduction of new breed types.

Cross breeding is not a rainbow cowherd with each cow having a different genetic background. This makes it impossible to select a terminal cross bull that will produce a uniform calf crop.

Crossbreeding programs are not limited to purebred cattle. Breeding two diverse lines of cattle will yield the same hybrid vigor results as breeding purebred cattle but as an industry, we have very few cattle lines that bred true. A lesson could be learned from the swine industry. In the swine industry non-purebred lines of swine that breed true have been developed. These lines produce positive economic traits that result in specific outcomes. One elementary example of the swine industry's breeding program involves two basic lines of swine; one line that is bred for maternal traits and a second line that bred for terminal traits. Only gilts from the maternal line are kept for breeding purposes. The terminal line is crossed on the maternal line and all of these progeny are sold to terminal markets. By using two diverse lines that bred true as the terminal cross, the swine industry maximizes hybrid vigor of each litter.

Each of the breeds in our cattle industry have attempted to produce the perfect bull that will provide both maternal and terminal traits in his progeny. The result of this practice is a dilution of heterosis (hybrid vigor). Since there is an extraordinary amount of variation in maternal and terminal traits each breed, it is extremely difficult for commercial cow/calf producers to buy a bull that will breed true for the desired production and economic outcome. The best tool available is the use of estimated progeny differences (EPD's). Most breeders are willing to help you through the EPD selection process to find a bull to match your goals. If we select crossbred females (based on high maternal EPD's from each breed in the cross) that match the environment in which they are managed and mate them to a terminal bull with high EPD's for economically significant terminal traits, we might have a combination that comes close to the swine industry's model. One point to notice is that we do not save heifers from the terminal cross. This makes it difficult for smaller producers to save their own heifers. The purchase of crossbred heifers is often recommended for producers with small cow numbers. The cowherd should be as uniform in size and genetics as possible so when we breed them to a terminal bull we get a uniform calf crop.

What are the specific advantages for a cow/calf producer to use crossbreeding? If we have females that are $\frac{1}{2}$ breed type A and $\frac{1}{2}$ breed type B and cross them with a bull of breed type C, our progeny will be 15% heavier at weaning than purebred cattle. That is with the same feed resources. Breed types A and B should be selected based on high

maternal EPD's and the cows should match the environment and feed resources available. This usually means moderate frame size and moderate milking ability. One measure of matching cows to their environment is selecting cows that maintain good body condition and breed back every 12 months or less without any excessive supplemental feed. The bull should be slightly larger frame than the cowherd and selected based on economically significant EPD's for marketing of the calves. Heterosis has the advantages of increasing the ability of cattle to resist disease and stress, to gain weight faster, hide any poor traits yet enhance positive traits. Heterosis probably results from combining of genes from different breed types and concealing the effects of inferior genes. Heterosis may result in the crossbred being better than either parental breed type or at least better than the average of the two breed types.

The following is a quote from the Beef Cattle Handbook: "Effective crossbreeding systems will be those that take best advantage of available breed resources and maintain high levels of heterosis. Producers should choose breed types for the cowherd that match the environment and sire breed types that will produce the most marketable offspring from the cows while minimizing dystocia. The choice of breed types and proper use of heterosis are critical issues as programs are developed. Experimental evidence indicates that total pounds of calf produced per cow in the breeding herd can be increased by 20 –25 percent with effective crossing systems. The cost of a good breeding program is not that different than that of a poor breeding program. Producers should choose breeds wisely, maximize use of heterosis, and follow organized crossbreeding systems if they wish to remain competitive."