

An Inexpensive but Effective Method for Weaning More Total Pounds

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Since all food production is based on reproduction of the commodity, it stands to reason that a technology which positively impacts reproduction would be widely adopted. One of the major benefits of crossbreeding is realized through improved reproductive function. In fact, nearly all modern plant and livestock commodity production relies on heterosis (trait improvement better than the average of the two parents) from crossbreeding as one of their primary reproductive management technologies. But, for various market and convenience reasons, crossbreeding is not as widely used in commercial cow/calf production.

There seems to be several misconceptions about implementing a crossbreeding system in commercial cow herds. To dispel a couple of the major misconceptions before going further, it is important to note that crossbreeding does not necessarily mean introducing *bos indicus* (“eared”) genetics, although that might be a good option in several scenarios. Predominantly black hided feeder calves can be uniformly maintained in crossbreeding systems.

The “no such thing as a free lunch” principle still applies in this situation and, depending on the starting point, tradeoffs for some individual traits might have to be made when switching from a straightbred to crossbreeding approach. More intensive management of sire selection and/or rotation is necessary. Also, purchasing bulls from breeds with smaller registries can make competition for a smaller population of high-quality sires more intense.

Heterosis can be broken down into three mating situations: individual, maternal and paternal. Individual heterosis is the advantage of the crossbred individual in relationship to the average of the purebred individuals. Maternal heterosis is expressed for traits measured on crossbred cows and is the advantage of the crossbred dam over the average of purebred dams. For example, a two-way-cross dam may wean heavier calves than the average of purebred dams from those two breeds. Paternal heterosis is the advantage of a crossbred sire over the average of the purebred sires; generally as an improvement in bull fertility.

Many studies have shown that traits high in heritability respond well to selection for improvement, but show little response in heterosis. Traits that are lowly heritable show little response to selection for improvement but respond well in heterosis. Fortunately for the commercial cow-calf producer, those traits that respond well to crossbreeding are reproductive traits (fertility, ability to recycle after calving, settling on first service, mothering ability, etc.).

Individual heterosis: Using the results of crossbreeding, the cost of production could be lowered by a simple crossbreeding program of using a bull of a different breed than the cows. If a typical producer in a straightbred operation was producing 408 pounds of calf per cow exposed. An 8.5 percent increase from individual heterosis of crossbred calves over straightbred calves would be worth an extra 34 pounds of calf weaned per cow exposed ($408 \text{ lb.} \times .085 = 34.6 \text{ lb.}$) It is important to remember that indiscriminately selecting a bull based only on color or breed will not guarantee an improvement in production from crossbreeding. Selecting superior bulls in any system is still important.

Maternal Heterosis: Research has shown that crossbred cows have a higher conception rate at first service than straightbreds. All of these traits affect pounds of calf weaned per cow exposed in the herd. In a classic experiment involving three British breeds (Angus, Hereford and Shorthorn) conducted by USDA and Nebraska researchers, crossbred cows were compared to straightbred cows to determine the impact of heterosis on fertility. Crossbred cows were compared to straightbred cows when both were bred to produce crossbred calves by the same bulls of different breeds. Crossbred cows produced three-way-cross calves (no more than 50 percent breed makeup of any breed) and straightbred cows produced two-way-cross calves. The crossbred cows weaned a 6.5 percent larger calf crop that was 4.1 percent heavier than crossbred calves from straightbred cows. Combining these traits gave an advantage of 14.8 percent more pounds of calf weaned per cow exposed from crossbred cows over straightbred cows.

Since both types of cows were producing crossbred calves, this did not include the advantage of individual heterosis. Combining the advantage of crossbred calves (8.5 percent) over straightbred calves and the advantage of crossbred cows over straightbred cows (14.8 percent) would yield a 23.3 percent increase in pounds of calf weaned per cow exposed for crossbred cows producing crossbred calves over straightbred cows producing straightbred calves. More than one half of the advantage in a crossbreeding program is derived from the heterosis in the crossbred cow.

Summary

A well-designed crossbreeding system can result in improved reproductive performance and heavier calves from both improved genetic potential and increased age at weaning. Crossbreeding is not a cure-all for poor management, herd health and nutrition and will not respond to the same degree in all situations at all times. Response is highly dependent on the quality of bulls selected to use in the program and how well a systematic plan is followed. Crossbreeding is a tool that, if properly used under good management with thoughtful sire selection, can significantly increase the efficiency of production in commercial cow herds.