UF-Gainesville Beef Cattle News Corner

Breed selection for use in crossbreeding systems

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The choice of breeds to include in a crossbreeding system is critical because, for many traits, there are large differences in the average performance of different breeds. The specific breeds and breed crosses that are most appropriate for one particular ranch, with its particular management and nutritional conditions, may not - and likely *will* not - be the most appropriate combination for another ranch, operating under different conditions. Breeds differ in growth rate, milk production, carcass traits, age at puberty, fertility, and - as previously discussed in this journal - adaptation to Florida's climate. These differences between breeds, as well as variability in the level of heterosis expected from various crosses, need to be considered when planning a crossbreeding program. To make informed decisions regarding choice of breeds to use in a crossbreeding program, it is important to understand what level of performance can be expected of the different breeds - in terms of growth rate, milking ability, carcass traits, and other economically important traits - when they are used in a crossbreeding system.

Individual heterosis values are very high for F_1 crosses of Angus or Hereford with Brahman, and only slightly lower for crosses of Simmental or Charolais with Brahman. Crosses between the different *Bos taurus* breeds, however, yield much less heterosis. In the Southeast, crossing two large *Bos taurus* breeds (such as Simmental and Charolais) generally yields ***no*** heterosis for calf growth-to-weaning. Likewise, increase in calf growth attributable to the crossbred dam (maternal heterosis), is very high for *Bos indicus* x *Bos taurus* F_1 crossbred cows and much lower for the F_1 crosses between *Bos taurus* breeds. To fully utilize the effects of heterosis, both individual and maternal, a *Bos indicus* x *Bos taurus* F_1 cow (Brahman x Angus, for example) would have to nurse an F_1 calf of the same cross. The F_1 cow, however, cannot give birth to an F_1 calf without transferring an embryo into her. The closest we can come to taking full advantage of the effects of heterosis is through the three-breed terminal cross in which the F_1 cow is bred to an unrelated third breed (Brahman x Angus F_1 cow bred to a Charolais.

When choosing breeds for a crossbreeding system, the environment - both nutritional and climatic - must also be considered. For example, the growth potential of the Simmental breed is much higher than that of the Angus and Hereford breeds, but cows sired by Simmental bulls may not maintain sufficient body condition to rebreed while lactating unless the level of nutrition provided is adequate to support their higher requirements. This problem is especially acute for lactating first-calf heifers. So, under low-input production systems (native range, for example), use of the larger, heavier-milking breeds - likely to produce cows weighing over 1100 lb - would not be feasible. Traditional crosses involving the Angus, Hereford, and Brahman breeds and (or) Brangus and Braford are likely to be more profitable because reproductive rate is the trait with the greatest impact on profitability. The higher nutritional requirements of the Simmental and other heavy-milking breeds and their crosses must be considered in order to avoid lowered fertility. With improved, fertilized pastures and adequate supplementation during the winter months, the use of larger, heavier-milking breeds can produce highly productive cows (as long as excessively large-framed bulls that will produce extremely large daughters are not used). An additional advantage to using breeds and breed crosses characterized by high milk production is their early puberty compared to breeds with lower average milk yields.

To produce a consistent set of calves year after year, it is essential that an appropriate crossbreeding system with a particular set of breeds be established and consistently maintained. Thus, continuous availability of superior bulls for each breed included in the system is, necessarily, an important criterion for breed selection. Availability of bulls of some breeds that may be useful for crossbreeding programs in Florida is a major

concern. While adequate numbers of Brahman and Brahman-derivative breed bulls are produced here, only a relatively small number of bulls of the *Bos taurus* breeds are produced in Florida. It is also important that the bulls that are purchased be able to maintain their body condition and breed cows under your ranch's conditions and continue to do so for at least 4 years. Bulls born and raised in the Southeast are more likely to accomplish this goal.