# UF-Gainesville Beef Cattle News Corner

## Crossbreeding – management practice serving the beef cattle industry.

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Over the next few issues, we will look at different aspects of crossbreeding – a tool to improve productivity through heterosis (hybrid vigor) and through complementarity (combining different breed strengths) to match genetic resources to various feed resources, climates, management levels and markets. Commercial cattlemen need to understand the principles of crossbreeding so they can adapt crossbreeding to their specific environment and needs. Seedstock breeders must be able to intelligently advise their commercial customers and know where their seedstock best fits into crossbreeding programs. The knowledge level regarding crossbreeding has increased dramatically in recent years; now is an ideal time to plan or replan a crossbreeding program.

Crossbreeding, which is the mating of individuals with different breed makeup, should be used by all commercial producers since improvements in efficiency can be dramatic if appropriate breeds are used. Crossbreeding did not receive widespread approval until the last few decades but a very large percentage of commercial livestock are now crossbred. Crossbreeding does not eliminate the need for outstanding purebred livestock since efficient systems require knowledge of the purebred foundations being used.

Planned crossbreeding programs, such as two and three- breed rotations, have probably been used longer and more effectively in Florida than in any other part of the United States. The economic benefits obtained from a crossbreeding system can be great, but efficacy of the system depends upon the proper mating of cows to superior, unrelated bulls.

**Benefits of Crossbreeding.** The benefits of crossbreeding are twofold. Heterosis is the average superiority of a crossbred individual over the average of breeds involved in the cross. Breed Complementarity is the advantage gained from using an optimum combination of breeds. Different types of crossbreeding systems use different levels of these two benefits.

Heterosis arises from combining of genes from different breeds such that inferior recessive genes are concealed. Heterosis may result in the crossbred being better than either parental breed or simply better than the average of the two. For example, an Angus x Hereford crossbred calf will generally grow faster than either Angus or Hereford purebreds while a Holstein x Ayrshire will not give as much milk as a purebred Holstein but will give more milk than the average of purebred Holsteins and purebred Ayrshires.

Heterosis arises from three mating situations. Individual heterosis is the advantage of the crossbred individual relative to purebred individuals. Individual heterosis is heterosis that results because an animal is crossbred (regardless of whether its dam is purebred or crossbred); it is expressed by heavier birth weight and faster growth compared to average performance of the breeds that were crossed to produce the crossbred animal.

Maternal heterosis is the advantage of the crossbred mother over the average of purebred mothers. For example a Hereford x Angus cow is generally a better mother than the average of purebred Herefords and Angus. Paternal heterosis is the advantage of a crossbred male over the average of purebred males. Paternal heterosis generally only has an effect on conception rate. The male does not have any direct effect on growth or survival as does the female so the benefits are more limited. However, particularly if young males are being used, the benefit in added conception rate can be large.

Heterosis levels can be generally grouped into three major classes. Reproductive traits generally show fairly high levels of heterosis. Growth traits generally have moderate levels of heterosis while carcass traits infrequently display much heterosis. There are exceptions to these but the three classes work as a general rule of thumb. It should be pointed out that this is exactly the reverse of the general levels of heritability for these classes of traits. This should make sense as heritability depends upon additive types of gene action while heterosis depends upon non-additive gene action such as dominance and epistasis.