

Crossbreeding Beef Cattle

Crossbreeding is a management tool used by many producers to increase economic returns. Unfortunately, it may also yield unproductive results if not used properly. Basically we crossbreed:

- to obtain heterosis (or hybrid vigor) that may result from crossing breeds and
- to take advantage of any breed complementarity that may exist.

CROSSBREEDING CONSIDERATIONS

You should consider these four points in a crossbreeding scheme:

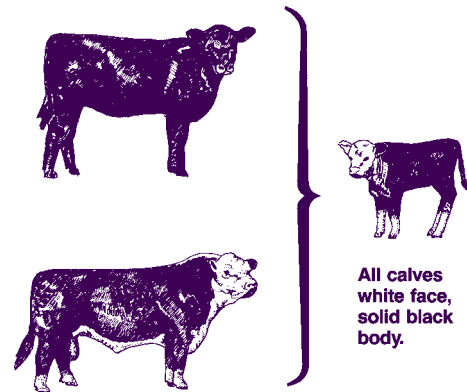
1. The greater the diversity of the parents, the greater the heterosis that is expected.
2. How breeds "fit" together—shortcomings in one breed can be overcome by the strengths of another breed.
3. Evaluating crossbred breeding stock is difficult and often seems to encourage cattle producers to buy "less than the best" parental stock.
4. A structured breeding program should be followed. Calculate what percentage of the various breeds you want, determine where the cattle will be purchased, where and how your cattle will be marketed, where your replacement stock will be purchased or produced, and long-range goals in your breeding program.

CROSSBREEDING SYSTEMS

Some types of crossbreeding available are:

1. **Straightbred Cows/Crossbred Calves.** Some producers prefer to use straightbred cows from a breed noted for outstanding maternal abilities and mate them to a different breed to produce crossbred calves. Generally the calves look quite uniform and can be marketed at premium prices. If the operation is large enough to have at least a two-bull herd, one group of cows (the best group)

Angus Cow x Polled Hereford Bull



can be mated to produce straightbred replacements and the other group F1 crossbred calves.

2. **Two-Breed Cross.** The two-breed cross, or criss-cross as it is sometimes referred to, is a popular system that allows the producer to take advantage of heterosis (approximately 67% of the maximum possible), maintain a certain amount of uniformity in the calf crop, and provide replacement females as well. One of the most popular crosses is the Polled Hereford x Angus cross, which uses traits of both traditional "beef" breeds. Heterosis, however, will not be as great from this cross as it would be from a more diverse cross. Recent research data indicate that it is economically more feasible to use at least one of the larger continental or exotic breeds mated to one of the more readily available British breeds (Angus, Polled Hereford, or Shorthorn).

When using a two-breed cross, you should attempt to use two breeds that complement one another and are both rated high in maternal ability. An example of this would be the use of an Angus- or Polled-Hereford-base cow herd bred to Simmental bulls. Use data from the breed associations to select for maternal ability.

3. Three-Breed Rotational Cross. In large commercial herds, the three-breed, rotational cross can be used to maintain approximately 87% of the maximum possible heterosis. The major problem is to find three breeds that are acceptable and complementary to each other. Due to the number of breeds involved, different percentage of breeds in cows, different ages in females, and the level of management required to successfully carry out the three-breed cross, this system is often not used effectively. Artificial insemination may help alleviate some of the problems in management. Complete and accurate records are a necessity.

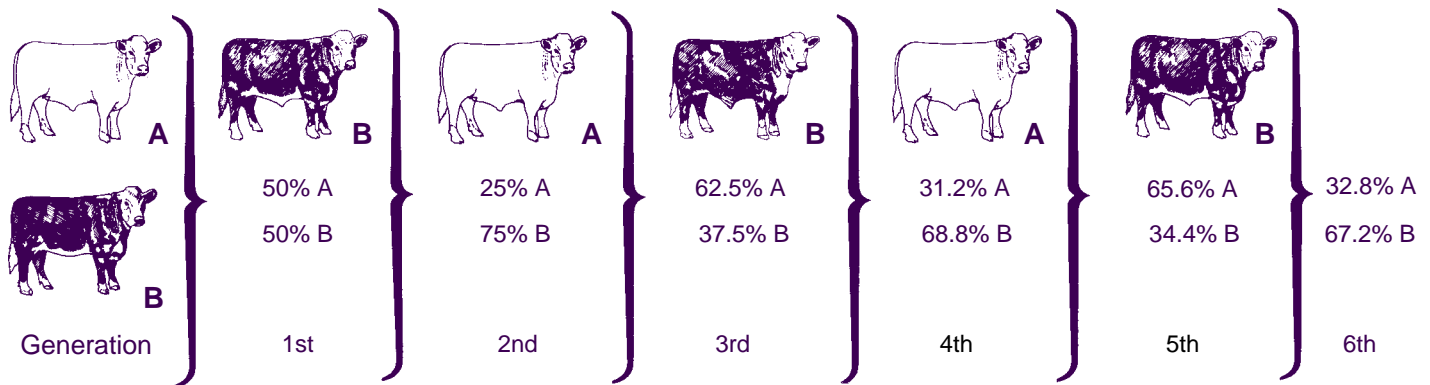
4. Terminal Cross. This version of the rotational crossing scheme breeds two-breed-cross females to a third breed of bull and all calves are sold. This system offers an opportunity to use a two-breed cow with heterosis for maternal traits and a sire breed that is noted for growth. The producer still has the problem of finding a source of replacement females.

The major concern with using the terminal cross is that there is no opportunity to take advantage of the “better heifers” produced from this cross.

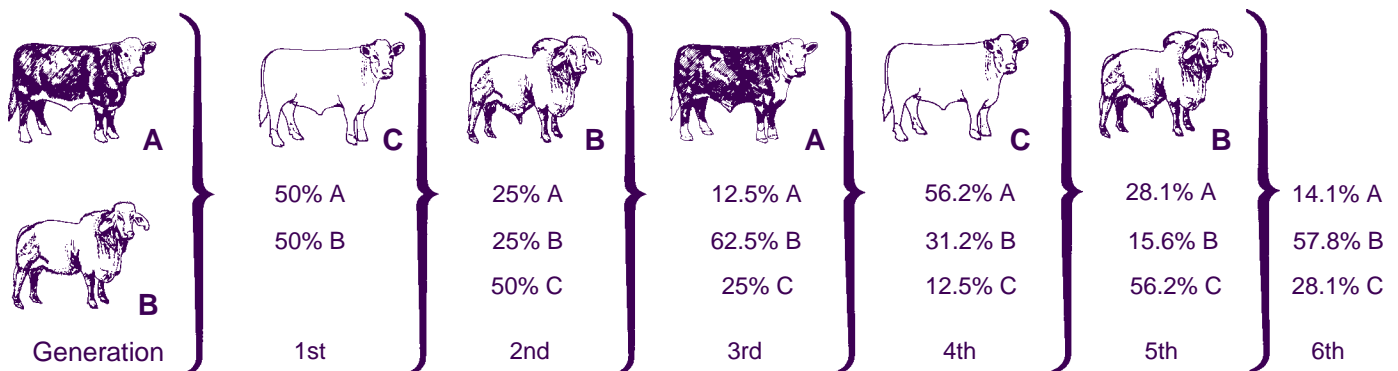
5. Rotational Crossing with Four or More Breeds. Rotational crossing with four or more breeds has been made possible through the use of artificial insemination. The greater the number of breeds involved in a breeding scheme, the more complex the management becomes, and some performance can be lost. It becomes increasingly difficult to plan matings to use the maximum performance of the breed combinations.

6. Incorporation of Genes for a Particular Herd. In recent years, crossbreeding has been emphasized in an attempt to incorporate genes into a cow herd that will add to the genetic merit of that herd. Specifically, herds in hot and humid or semi-humid areas have used genes from Brahman cattle, either directly or indirectly through breeds developed from a Brahman base, or from other

Two-Breed Back Cross or Crisscross



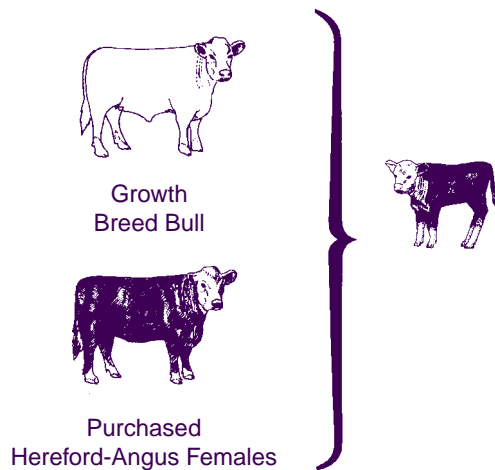
Three-Breed Rotation Cross



heat-adapted or tolerant breeds. Also, crosses on commercial Hereford cattle, using commercial Simmental bulls to increase milk production in their daughters while still maintaining a “white-faced” herd of cattle, have been quite popular. Many other such crosses have been made. You need to determine definitely what percentage of these genes is needed in the herd to determine what breeding program to follow. Usually these are “one-time” matings with back crosses to the original breed thereafter.

7. Development of Synthetic Breeds. From time to time beef cattle producers decide they will develop new breeds that are superior to any other breed for their operations. There are several of these breeds currently available, particularly of Brahman crosses (Santa Gertrudis, Brangus, Simbrah, Braford, Beefmaster, Charbray, etc.). Many breeders have attempted to develop new breeds but have become disillusioned after a few generations and abandoned their breeding schemes. The successful development of a new breed will depend upon many factors, among which is the incorporation of the correct genetic material, proper selection of breeding stock, adequate numbers of animals, adequate facilities, availability of finances, and lots of “luck” in the segregation of desirable genes and gene combinations.

Three-Breed Fixed or Static Cross



AVAILABILITY OF BREEDS

Numerous breeds of cattle are available through the use of artificial insemination. However, if you plan on using a rotational cross based upon natural mating (which is logical), determine if a source of these bulls is available with complete records and at a reasonable price. Make certain you understand the availability of the breeds before you begin your program. Crossbreeding offers many economical advantages, but it must be thoroughly planned and executed as planned. If one of the three or four breeds does not have records, your program is in jeopardy.

SUMMARY

Crossbreeding can be an important tool that, when used properly will yield approximately the same response in one mating that would require 25 to 30 years of selection to achieve. It is most beneficial for traits of low heritability and high economic value such as reproduction. Heterosis resulting from crossbreeding is greatest for traits expressed early in the life of the animal and decreases with maturity. Thus, heterosis for carcass traits and mature characteristics is minimal.

Crossbreeding may also require complex management decisions. Sources of replacements depend upon the system used and often require purchase of outside individuals, which may not be desirable due to herd health problems.

Long-range goals should be developed before embarking on such a program, and breeding plans must be determined in advance. Only a well-designed crossbreeding program will yield results that are profitable and rewarding to the cattle producer.

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