

## METHODS FOR ACHIEVING GENETIC CHANGE

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Today, let us review some of the basics in the use of new breeding technology for making rapid genetic change in beef breeds. This will be done in the context of the design and conduct of a creative breeding program using a performance program.

A sound, simple performance program is a necessary adjunct to modern day breeding programs. To be on a performance program does not imply a breeder is conducting a breeding program since it is the use the breeder makes of the records that defines his breeding program.

### BREEDING PROGRAMS

A breeding program is a complete system of management that is designed to bring about genetic change in the herd of the breeder. In beef, the general breeding problem is to find sires that when mated to the cow herd produce progeny that are superior, in the chosen direction of the breeder, to the current sires being used. In the beef industry there are two types of breeding programs. One serves the other. The types differ in what they sell and in the forces available to bring about genetic change.

Breeding stock programs sell breeding value, the value of the animal as a parent in the herd of the buyer. Commercial programs sell numbers times pounds. The breeder, once he has chosen the breed, can use selection for the moderate and highly heritable traits within the breed and linebreeding to increase the genetic relationship to a desirable ancestor, if such is found. Accurate selection of sires across herds is important to all breeders of a breed. Commercial producers can select among breeds and breed combinations as well as select the parents of the chosen breeds. They can select for heterosis as well as individual animal superiority. Therefore, breeders of a breed must have a relevant, specified product to merchandise to the progressive commercial producer.

There are really few choices a breeder must make in his design of a breeding program since selection, choice of parents, is the only directional force available to all breeders to bring about genetic change in a desired direction. There is no other! The choices are three dimensional. They are direction, differences and decisions. That is, the breeder must clearly define his long-range direction or goal, he must choose a performance program that best evaluates differences among his stock, and he must design a selection scheme that makes decisions based on the differences measured that will move his herd in the direction he has chosen.

#### Direction

Consider direction for breeders of a breed. Many breeds qualify as an established breed that has a general performance level that is satisfactory

for both market and maternal traits making it available for a breed to use in rotational crossbreeding or as a breed in the maternal rotation of a terminal sire system. To preserve this relevance to the commercial producer, the direction in general needs to be one that improves both the maternal and market traits. However, the choice of specific direction belongs to the breeder.

### Differences

The choice of the way a breeder measures and records differences among his stock that are on performance tests is the second choice that must be made in the design of a creative breeding program. The differences among the stock are then used to make genetic change through selection of animals best fitting the chosen direction and to specify the breeding value of the product offered for sale to the commercial producer. Choice of performance program is of paramount importance. Such a program should, for a minimum of effort by the breeder, give the "best" evaluation of differences among the stock so the breeders will have the opportunity to maximize genetic change per unit of time.

### Decisions

Two times for selection exist in the conduct of a performance program. The first involves primarily female selection and is at the weaning of a calf crop. The second is at the return of the yearling information on the bulls and possibly the heifers. The heifers may be evaluated for yearling performance at 18 months and then this information can be used in the first selection time. The second selection time involves a bull evaluated and the development of a mating scheme using the selected sires.

Many breeders spend hours mating each female to the selected sires. This is fun, but probably is not worth the effort and can really bias the comparisons that need to be made among the progeny of the selected sires. The issue is to be able to compare all sires with each other fairly so genetic change can be made.

An issue of mating is to devise a way to participate in national sire evaluation with one or more yearling bulls each year while producing calves from them in the breeders' herd as well. Participation in the sire evaluation is necessary for breeders to access their relative position to other breeders so they can design the best breeding program for their herd.

### SUMMARY

A performance program is a necessary adjunct to modern breeding programs. The design and conduct of a breeding program involves choice of direction, differences and decisions. Differences among animals are used to make selection decisions that can move the program in the desired direction. It is imperative that a national sire evaluation program be participated in to remain relevant to the commercial industry.