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## Methods of Selection

- ✓ Natural Selection
- ✓ Single Trait Selection
- ✓ Selection by Index
- ✓ Independent Levels of Selection

## SELECTION — The Breeder's Tool

The breeder's goal should be the genetic improvement of his herd and chosen breed. This can only be accomplished by identifying those individual cattle which are genetically superior and selecting them as parents of the next generation. This requires the elimination or culling of individuals found to be inferior.

The level of performance in any inherited characteristic or trait is the sum of an animal's genetic potential for that trait and the environment the animal is exposed to. Therefore, if selection is to be effective, a few basic rules must be followed.

1. Cattle to be compared must be treated alike. Genetic differences can only be determined by comparing cattle of the same age and sex, at the same time and place and under identical nutrition and management.
2. Cattle must be compared under the same conditions as their offspring will be expected to encounter. Almost all cattle are fed high concentrate, low roughage diets in the feedlot before slaughter. Therefore, young bulls on post weaning gain test should receive the same high energy diets as their progeny will receive in the feedlot.
3. Measurement of performance in the traits considered in the selection criteria must be accurate.
4. Selection should only be for traits that contribute to the efficiency and profitability of beef production.

### Methods of Selection

✓ **Natural Selection** — Historically, certain breeds and strains of beef cattle have been promoted as superior because of survival when deprived of feed or exposed to severe weather. The greatest stress on cattle is growth, reproduction and lactation. Therefore, the cattle which survive under extremely unfavorable conditions are those that grow slowly and calve only every two or three years. Selection of such individuals is in conflict with efficient beef production.

✓ **Single Trait Selection** — Selecting for one trait at a time will improve a trait faster than any other method. However, during such a program other important traits must wait for improvement or can regress. Another disadvantage is the possibility of positive or negative correlation between the single trait and other

characteristics which may be undesirable. For example, the recent, unfortunate fad for taller cattle was effective in increasing height but associated with that increase were straight shoulders, post legs, delayed puberty and less marbling at market weights.

✓ **Selection by Index** — The use of an index is considered an excellent method by many animal breeders and is much more effective than the use of only one trait. Not only are several performance items considered at the same time but an index has the further advantage of allowing more emphasis on one trait than another. For example, when dealing with birth weight, weaning weight, yearling weight and muscling score a breeder might choose to give twice as much credit to yearling weight and muscling than to birth weight and weaning weight. The major disadvantage of the use of an index is the fact that the final score for an individual is the total of all items in the index. Assume that a breeder selects the 20 top indexing heifers in a calf crop — half of them may have a high index by virtue of high yearling weight while the other half are superior in muscling score resulting in a group lacking in uniformity.

✓ **Independent levels of Selection** — Perhaps the best overall method of selection is to establish a fairly narrow range of performance in several traits of greatest economic importance and then cull all cattle that do not fit the model. Assume an ideal for expected progeny differences (EPDs) as follows: Birth weight 12 to +5, weaning weight +20 to +30 yearling weight +40 to +60, and frame score 6 or 7 Only individuals which meet all requirements would be selected. The disadvantage would be rather slow progress, but continuation of such a program would result in a uniform herd of excellent performers.

Unfortunately the traits above do not include calving ease, calving interval, milk, quality grade and yield grade. One can only conclude that the development of a superior, uniform herd of beef cattle breeding stock is a difficult, long-time proposition. However, it can be a rewarding one, both financially and in personal satisfaction.

