

Inbreeding, Linebreeding, Linecrossing, and Crossbreeding

What Are They, and Which is for You?

"If it works, it's linebreeding. If it doesn't work, it's inbreeding."

—Dick Robbins, Jr. (or Socrates, Confucius or another great philosopher)

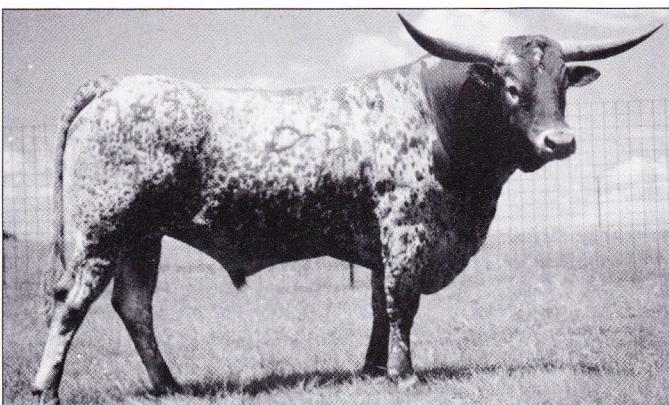
Inbreeding, linebreeding, and crossbreeding are terms that describe various ways to breed cattle, and these terms can be emotionally loaded for many cattle breeders. Each describes an approach to cattle production, and each has an essential place in any breed. Each has strengths, and each also has weaknesses. So what are these approaches to cattle breeding, and what will each do for a herd?

Inbreeding is the mating of animals that have common ancestors. An extreme form is a father-daughter or son-mother mating, but less extreme forms include brother to sister, or any other combination where the resulting calf has occurrences of one or more ancestors on both the sire's side and the dam's side

its sister criollo breeds, started out with a somewhat inbred base. Other, more well documented, examples of successful inbreeding are the early English Shorthorns.

One inescapable consequence of inbreeding is that it tends to make the resulting animals more consistent. That is, the resulting calves are expected to be uniform. If good cattle went into the inbreeding, good cattle uniformly come out. If weak or deformed cattle went into the inbred combinations, then weak or deformed cattle come out. Also, and very importantly, if good cattle that are hiding weaknesses go in, these weaknesses will be exposed by inbreeding. As a result, any inbreeding needs to be coupled with culling for excellence in conformation, viability, and fertility. Inbreeding can be a useful technique—but cannot be undertaken without close attention to detail.

The difference between linebreeding and inbreeding can be subtle. A good summation of this is the quote from the esteemed Mr. Robbins at the beginning of this article. It may sound a bit flippan, but it is fairly accurate. Robbins' statement comes very close to the thinking of most people, which is that linebreeding is good, inbreeding is bad. In a more technical, animal breeding sense, linebreeding is a form of inbreeding that concentrates on only one given ancestor. The goal with line-



Buckshot, pictured here, is an example of successful linebreeding. This 1987 bull traces back five times to Texas Ranger JP. He is sired by Bail Jumper (by Cowcatcher, a Texas Ranger grandson and out of a Texas Ranger daughter, Ranger's Measles) and his dam is Ranger Yet (a daughter of Texas Ranger out of Better Yet, a daughter of Impressive).

of the pedigree. Inbreeding, in and of itself, is "value neutral." It is neither bad nor good—the quality of the result depends entirely on what goes into the inbred combination. Put good things in, and good things come out, but put in any weaknesses and very, very bad thing can come out. Inbreeding generally has negative connotations for most breeders, but in some situations it can be a very powerful tool. Since probably fewer than 300 cattle were ever brought from Spain to the New World it is true to at least some extent that the Texas Longhorn, along with all of

breeding is to concentrate the one excellent animal in an attempt to recreate it throughout a population. The most usual example of linebreeding is a half-brother, half-sister mating. Various sorts of cousin matings also are a form of linebreeding. Linebreeding can usually be considered to be a more moderate form of inbreeding. Most of the same remarks made about inbreeding are also true of linebreeding, although the degree is somewhat less with linebreeding in most cases. As a result linebreeding is less extreme than inbreeding, and the benefits can be enjoyed with less risk.

The major strength of inbreeding and linebreeding is that they both tend to narrow the range of variation. Another way to say this is that the resulting populations are more uniform. One philosophy of animal breeding is that this should be the goal of every purebred breeder: a uniform, predictable, high quality herd. The major weakness of inbreeding and linebreeding is that in some lines these techniques can result in a loss of vigor and reproductive traits. This weakness is not true of all lines, and also need not be true if wise culling and selection take place along with the inbreeding or linebreeding.

Crossbreeding is the other extreme of an approach to animal breeding. This is usually used in reference to the crossing of dif-

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ferent breeds. It is a very useful and fascinating phenomenon. The initial results of crossbreeding are usually fantastically good. The good results come from the blending and hybrid vigor of the breeds of the cross.

The initial results of crossbreeding tend to be fairly uniform. A good example of this phenomenon is the common crossing of Angus and Hereford cattle. The initial results are very uniform black baldy cattle. If you in turn use the black baldies on themselves, the results are black cattle, red cattle, white faced blacks, white faced reds, horns on some, others hornless. A very, very nonuniform group. Not only will the colors and horns vary, but also the body type and performance will vary between the Angus extreme and the Hereford extreme. So, crossbreeding results in an initially uniform population that in its own turn produces increased variability.

Linecrossing is a step back from crossbreeding, and involves the crossing of different lines within a single breed. Linecrossing is less extreme than is crossbreeding. Linecrossing does yield much the same result as crossbreeding: initial uniformity but then increased variability. This is an advantage in some situations, a disadvantage in others.

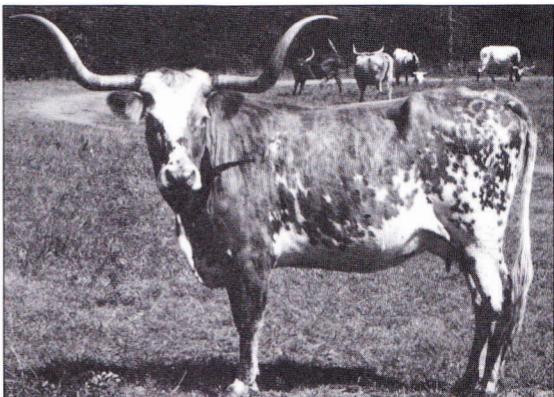
The choice of using inbreeding, linebreeding, or linecrossing in a herd is an indi-

vidual, philosophic choice that the herd owner needs to make. If the goal is an excellent herd with decreased variability with high predictability, the choice should be linebreeding or inbreeding. This choice generally implies a long term commitment to a line of cattle, and can produce excellent long term results. Regardless of the direction you wish to go, selection of highest-possible quality stock to use in your program is important. There is no trick or shortcut where two medium-quality cattle may be mated to produce greatness. Upon investigation, you will find that the outstanding cattle in the Texas Longhorn breed have similarly great cattle in their pedigrees.

The animals produced in a linebred or inbred herd are also useful for other breeders with other programs, largely due to the predictability that these animals offer. If the goal is excellent individuals, then linecrossing may be the approach to take. This will, even in the long term, produce some very excellent individuals. What linecrossing fails to produce is a uniform population of such individuals. Along with the excellent ones are the more marginal ones. Linecrossing does work well, though, for certain programs with certain specific goals.

The characteristics of linebred, inbred, and linecrossed individuals also have consequences for the selection of new individuals for a breeding program. Consider the situation in which two bulls are being considered for addition into a herd. One is linecrossed, the other inbred or linebred. If the quality and subjective appeal of the bulls is similar it is usual for the linebred/inbred bull to outproduce the linecrossed bull. This is due to the fact that the linebred/inbred bull is more genetically uniform. The advantage of the linebred or inbred individuals is that it is more true that "what you see is what you get." In fact, inbred or linebred individuals generally outproduce themselves, especially if they are used for linecrossing. By contrast, the linecrossed individual is the result of certain favorable combinations and some hybrid vigor. It is likely with such individuals that "what you see is *not* what you get." They will produce some animals like themselves, but will not do this as uniformly as an inbred or linebred animal.

The careful reader will have already made the jump from these phenomena within a breed to the situation with using a breed for crossbreeding. When comparing breed to breed, each is like a line of cattle within



The late WR 1850 is a well-known member of perhaps the most intensely linebred strain of Texas Longhorns—the Wichita Refuge herd. Many of today's WR cattle originate from the 20 individuals (19 cows and one bull) which were the foundation herd on the Refuge in 1927.

a breed. For a breed to succeed in crossbreeding it should be kept pure, and should also be unique. The purity and uniqueness of a breed then allow maximum consistency and hybrid vigor to pop up in crossbreeding systems. This is an important lesson for all Longhorn breeders—regardless of their choice of breeding system. If Texas Longhorns are kept pure and unique they will

always be distinct from other breeds, and will always perform excellently in crossbreeding systems.

The choice of breeding systems will always boil down to the philosophy of a breeder, and whether uniformity or individuality is desired in a breeding program. There is no right or wrong answer to this, just individual choice. It is healthy for a breed to have linebred, inbred, and linecrossed herds all contributing to the overall breeding of cattle. In the Texas Longhorn it is unfortunate (at least in our view) that very few herds are linebred or inbred, and as a result the breed has lost some of the individual components of the original families (Butler, Marks, Peeler, Phillips, WR, Woods, Wright, Yates). Such individual linebred components are always of value to the linecrossing breeder. Many of these components are now gone as distinct units that could have been added so usefully to a variety of linecrossing programs.

The choices of today's Longhorn breeders will determine if, and how many of, the distinct components existing in the breed today will be available to the breeders of tomorrow. We all need to work towards passing along a full representation of the genetic wealth that the thoughtful breeders of the past have given to us. To fail to do so will shortchange the next generation of Texas Longhorn breeders.

NEW BREEDERS' SECTION