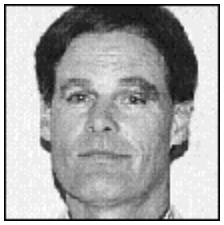

Breeding the Formed Composite
Part 2: Breeding the Formed Composite
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In the last article, I pointed out that composite breeding differs from purebred breeding because in composite breeding we are interested not only in improving breeding value through selection, but also in maintaining a high level of hybrid vigor. I discussed this difference in the context of forming a new composite breed. In this article, I examine the same thing, but this time in the context of breeding the formed composite.

Improving breeding value through selection

Once a composite breed has been assembled, breeding composite animals is much like breeding purebreds. The principal objective is to improve breeding value through within-breed selection. The tools are the same: pedigree and performance records, EPDs, visual appraisal for soundness and (possibly) color uniformity, etc. Selection of composites differs from purebred selection only with regard to certain constraints needed to maintain hybrid vigor within the composite population.

Maintaining hybrid vigor

In purebred breeding, we usually do not concern ourselves much with hybrid vigor. Because purebreds are likely to be crossed with cattle of other breeds at the commercial level, hybrid vigor within purebred populations is not a major priority. Composites, on the other hand, are designed to be used commercially without crossbreeding. Any loss of hybrid vigor among seedstock composites can therefore mean a loss of hybrid vigor at the commercial level. The key to maintaining hybrid vigor within composite seedstock populations is to avoid inbreeding. Following is a list of ways to do that.

Have a large herd. The rate of inbreeding is much faster in small populations than in large ones. If you have created your own composite breed and keep the herd closed (no animals from outside the herd allowed in), it is important that your herd be large enough that inbreeding accumulates very slowly. How large is large enough? That depends upon the rate of inbreeding you are willing to accept. I suggest a minimum of 500 cows.

Cooperate with other breeders. Your herd may be small, but if you work with other seedstock producers by exchanging semen, bulls, or females, the "effective" size of the composite population can be kept large. Cooperative arrangements of this sort essentially replicate the structure of pure breeds.

Avoid linebreeding. Linebreeding, the mating of individuals within a particular line or strain, is a time honored practice in purebred breeding. Purebred breeders do not hesitate to make half brother % half sister matings or build pedigrees laced with sons and daughters of a particular bull. However, if certain lines become prominent within a composite population, inbreeding occurs much more rapidly.

Avoiding linebreeding basically means not overusing any one sire or line of sires. This is a departure from purebred breeding where whole breeding programs have been built around one outstanding animal. Compared to purebred breeding, composite breeding places less emphasis on selecting superior individuals and more emphasis on selecting better groups of animals.

It is possible for a number of prominent lines to be developed within a composite breed and then for commercial breeders to avoid inbreeding within their commercial composites by judiciously choosing sires from the various lines. The problem with this idea is that it misses the main point of the commercial composite breeding system¾ simplicity. If commercial producers must keep bulls from one composite line separate from bulls from another line, then, from a management perspective, we are back to rotational crossbreeding and the headaches associated with it.

There is a perception among some breeders that selection should be avoided in a formed composite because it leads to inbreeding¾ presumably through linebreeding (I cannot think of any other mechanism). Indeed, it is true that intense selection among purebreds has in some cases resulted in linebreeding. The highest performing animals were often relatives, and selection of the best performers amounted to de facto linebreeding. This need not be the case, however. We can select better performing animals and pay attention the pedigree relationships of those animals at the same time. Selection within a composite breed is important¾ just as selection is important within a pure breed.

Reconstitute the composite from time to time. One nice thing about inbreeding is that it can be "undone." As soon as inbreds are mated to unrelated animals, the offspring are no longer inbred. In a composite context, inbreeding can be undone by adding to the composite population new first generation composites, particularly animals whose purebred parents or grandparents are relatively unrelated to the purebreds that formed the foundation for the original composite population. I like to call this "reconstituting" the composite. Reconstitution can be a pain, but it is the best solution for a composite population that is nearing the point of too much inbreeding.

Problems (opportunities) in marketing composite seedstock

Composite cattle are new to most producers, and like any new product, they will take some selling before they are widely accepted. Marketing composite cattle presents some real challenges¾ and some real opportunities for those who can meet the challenges.

Name recognition. If you say you raise Angus cattle, most everybody in the cattle world will know what you are talking about. If you say you raise "Range Cruisers," however, you are likely to get some funny looks. Name recognition is very important to marketing, and for this reason, we want a new composite breed to receive broad exposure as quickly as possible. This may be difficult, especially for newly formed composites developed by a single breeder.

Accuracy of genetic predictions. To be competitive with purebreds, composite seedstock should come with a similar level of genetic information on individuals. They should have EPDs and accuracies for the more important traits. At the moment, few do¾ partly because many composite breeds are small and unorganized, and partly because the multibreed/hybrid nature of composites confuses the issue from a technical standpoint. The technology for composite EPD production is available. Lacking are mechanisms for accumulating data and for tying composite data to existing purebred databases. These problems can and will be solved if purebred organizations cooperate.

Considering the need for large population size in order to avoid inbreeding, the need for name recognition, and the need for performance comparisons and EPDs, a strong case can be made for composite breed organizations. Such groups could be similar to purebred associations in terms of data handling and promotional responsibilities. In fact, they might even be offshoots or subsidiaries of purebred associations.

Famous sires. Purebred breeders often promote their cattle by emphasizing the merits of individual sires they have bred, purchased, or otherwise used. Great importance is placed on a relatively few famous individuals. In composite populations, dependence on a few heavily promoted sires leads to inbreeding. Only in the largest composite breeds, where there are many seedstock breeders and a broad source of germ plasm, will breeders be able to market semen from famous bulls in the same way that purebred breeders do and still avoid significant inbreeding. For most composite breeds, the best strategy may be to promote breeding programs rather than individual animals.

Perceptions about uniformity. Even if composite seedstock breeders pay special attention to uniformity, particularly color uniformity, during formation of the composite or afterward, the common misconception that composites lack uniformity is likely to persist¾ at least for a while. Confronting the basic myth about hybrids and variability will take a concentrated educational effort.

Breeding composite cattle will not be easy. Not only are the genetic aspects of composite formation and production daunting, there are likely to be organizational, educational, and political difficulties as well. I doubt that fortunes will be made overnight. Still, composite breeding is probably the ultimate challenge for a seedstock producer.