

Should Composite Bulls Be Considered An Option?

In the last 50 years, the use of crossbred or composite bulls has been strongly discouraged. Animal breeders have developed breeding programs for the commercial cattle producer which revolve around crossbred females and purebred bulls. Animal breeders have strongly pushed the use of performance information and EPD values in selecting replacement females and bulls. Using a crossbred or composite bull was a strict no-no.

However, producers are not taking advantage of planned breeding programs to retain heterosis. Systems developed by animal breeders to retain heterosis (crossbreeding systems) can be complicated, are high management and most producers do not have large enough (60-plus) herds to implement the systems.

Using composite animals can allow commercial producers to retain heterosis and produce a high quality product for market. Not just any composite bull or female will do though. Just like the purebred breeding animals, make sure there is performance data behind them. No one needs any surprises!

What are Composites?

Composites, synthetics or hybrids are names used somewhat interchangeably to signify new breeds or new lines of breeding. Two or more breeds are crossed to obtain genetic superiority not found in any one breed. A carefully planned breeding program results in obtaining (1) a combination of genetic merit of each breed and (2) hybrid vigor (heterosis) that can be maintained through successive generations without further crossbreeding. The breeding program should combine a balance of selection for reproduction, growth and carcass traits so that the cattle will fit the most economical production and marketing environments.

Some breeders use the term "composite" to identify a closed breeding program (a fixed number of breeds with a certain percentage of genetic material from each breed). Other breeders use "synthetic" as an open breeding concept where new breeds can be added at any time and with no fixed percentage from each breed. "Hybrid" could imply either Composite or Synthetic cattle.

Are They Just a New Breeding Fad?

No. These breeding principles and programs are time tested. Profitable production of hybrid commercial poultry and swine has been based on these principles for many years. Brangus (3/8 Brahman and 5/8 Angus) have been utilized for nearly 50 years. Why the renewed interest in composites when several have been developed and utilized for decades? The primary reasons are: (1) breeds have recently been more critically evaluated as to their strengths and weaknesses, (2) breeding technology has been refined so that genetic prediction is more accurate, and (3) the kinds of cattle that economically fit commercial cow-calf operations have been more completely evaluated.

Composite animals are created to take advantage of breed complementarity. Breed complementarity refers to the production of a more desirable offspring by crossing breeds that are genetically different from each other, but have complementary attributes. Breed complementarity is the result of "mixing and matching" the mean breeding values of different biological types of breeds.

Another more subtle but still important form of breed complementarity occurs in the creation of hybrid seedstock. This type of breed complementarity results from crossing genetically diverse breeds to produce a hybrid breeding animal with just the right mix of

breeding values. For example, suppose several pure breeds are locally available for use in a crossbreeding program. Suppose also that the mean breeding values for some of these breeds are too high in one important trait and too low in another, and the mean breeding values for the remainder of the breeds are too low in the first trait and too high in the second trait. A hybrid breeding animal derived from crossing these two breed types would have appropriate breeding values for both traits. It would contribute this second form of complementarity--let's call it "hybrid seedstock" complementarity--to the crossbreeding system.

Aren't The Animals Extremely Variable?

No. In a 20 year study, the University of Alberta showed that two synthetic lines (each involving several breeds) were no more variable for weaning weight or post-weaning gain when compared to purebred Herefords. The United States Meat Animal Research Center (USMARC) has also shown the variation of composite lines and several purebred breeds to be similar. Color and size may vary if widely divergent breeds are used. However, if breeds of similar size and color are selected, the visual appearance of the cross can be remarkably uniform.

How Can Commercial Producers Use Them?

Many commercial producers have been frustrated with the complexity of crossbreeding systems, e.g., too many breeding pastures, breeding programs which don't fit desired grazing plans, too much sorting of cattle, individual identification of cattle, and difficulties in deciding what breed to use next. Commercial producers often have poorly planned crossbreeding systems involving large differences in cow size, milk levels, and wide color variation resulting in calves lacking uniformity. Composites combine breeds and heterosis into one package that removes most of the frustration associated with conventional crossbreeding.

Composite breeds are especially useful for small and midsize commercial operations. These producers cannot afford the number of bulls from different breeds that are needed to perpetuate a complex crossbreeding system. Operators of large, extensively managed operations also find composite breeding useful because it allows them more flexibility in managing forage resources without having to use separate breeding pastures.

Composite breeds can easily match a uniform biological type (size, milk, growth and body composition) to a specific set of environmental conditions. This can be both cost effective and profitable.

Doesn't Heterosis Rapidly Decrease After 2 Or 3 Generations?

Research at the Meat Animal Research Center (MARC) showed that heterosis is retained in composite even after several generations of breeding. For example, a 3 or 4 breed composite will maintain a 15% advantage in weight weaned per cow exposed over purebreds and will retain 67% or 75% of total possible heterosis that is exhibited by the first cross progeny or cow. Commercial producers can use the same composite over several, perhaps many generations with positive results. However, inbreeding should be avoided or hybrid vigor will be lost.

How Can These Composites be Critically Evaluated?

Visit breeders who are producing these composites. Most of these breeders have had extensive experience in breeding cattle and effectively using performance records. You will find that many of these cattle are being produced under economically realistic commercial conditions, with comprehensive records systems, equivalent to the records maintained in traditional purebred

programs.

In addition, several breed associations are now predicting EPD values on composite breeds. The Simmental and Gelbvieh Associations are providing genetic analyses on animals containing their breed. Other composite breeders (such as Leachman and Bent Tree Cattle Companies) are hiring individuals to predict EPD values on their composite lines of cattle. The bottom line becomes choosing a composite animal is just like a purebred animal. Make sure the performance information is behind these cattle. Make sure the numbers are right, then evaluate structure and disposition. Composites can really help solidify a commercial program.

– adapted from Dave Daley, California State University, Chico, Tom Field, Colorado State University, Bob Taylor, Colorado State University