



The Case for Composite Commercial Cattle
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In the previous article in this series, I defined composite cattle and developed a list of criteria for judging any crossbreeding system. The list is reproduced below. You can find a more detailed explanation of the list in the first article. My purpose in this second article is to evaluate composite breeding systems for the criteria in the list and in so doing give you a feeling for the relative strengths and weaknesses of composite cattle.

Criteria for Judging a Crossbreeding Program

1. Merit of component breeds
2. Level of hybrid vigor produced (HV)
3. Simplicity (EASE)
4. Replacement considerations (REPS)
5. Complementarity (COMP)
6. Consistency of performance (CONS)
7. Accuracy of genetic prediction (ACC)

A basis for comparison: the traditional three-breed pasture rotation

To see how composite cattle stack up for these criteria, let's first establish a baseline by evaluating a better known traditional system^{3/4} the three-breed pasture rotation. In this system there are three breeding pastures. Purebred bulls of three breeds are assigned to these pastures, one breed per pasture. Cows are allotted to pastures according to their breed composition^{3/4} those with the least amount of a particular breed in their background are assigned to the pasture containing bulls of that breed. Replacement daughters, having different breed composition than their mothers, will be bred to a different sire breed. As shown in the accompanying figure, the entire scheme appears graphically as a rotation, with replacements moving sequentially from their dams' breeding pasture to the next breeding pasture in a circular fashion.

Hybrid vigor, replacement considerations, and accuracy of genetic prediction. My evaluation of the three-breed rotation is summarized in the accompanying "report card." The system does well (scores a "+") in the hybrid vigor category. A large proportion of F1 or maximum achievable hybrid vigor, in theory 86%, is maintained with the rotation. The system also scores well in the replacement category

because it produces all its own replacement females. Accuracy of genetic prediction is good too because the purebred bulls used are likely to come with state-of-the-art EPDs.

Simplicity. The three-breed rotation is not simple from a management standpoint, however. It requires at least three breeding pastures, and if heifers are bred separately from cows, an additional one to three pastures. Fencing, sorting animals, and keeping bulls in the right pastures can be painful. With cattle divided among a number of pastures, opportunities for high density/short duration grazing and related grazing schemes are limited. Furthermore, the system is infeasible for small herds^{3/4} those using less than three bulls.

Complementarity and consistency. The three-breed rotation fares poorly for complementarity and is questionable for consistency of performance. Because breed composition varies considerably within the herd (cows can be as much as 57% of a particular breed or as little as 14% of the same breed), the only way to be sure of consistent performance is to use breeds that are very similar in biological type. Doing so, however, rules out any possibility of breed complementarity. You could not, for example, use one breed that excels in milk production and another that excels in growth rate (a classic complementary combination) without producing sets of calves within a crop that differ a good deal in these traits. So if complementary breeds are used, consistency suffers, and if breeds are chosen for consistency, complementarity is eliminated.