

## COMBINED SELECTION FOR THE BEEF CATTLE INDUSTRY

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Beef cattle production entails a small sector of purebred seedstock producers supplying bulls to the much larger commercial sector. Crossbreeding plays a vital role in increasing the productivity and profitability of many commercial producers through breed complementarity and heterosis. In commercial herds, bull selection should be geared toward producing crossbreds that are optimal for the production system, thereby raising the question, "Are we better served in utilizing purebred information alone, or a combination of purebred and crossbred information, in genetic evaluation of potential sires?" Combined Crossbred Purebred Selection (**CCPS**) allows the combination of vast amounts of performance data potentially available on crossbreds with that on purebred cattle in a selection index or BLUP evaluation. The genetic correlation between purebred and crossbred performance indicates the extent to which genetic progress achieved in purebreds will translate to crossbred offspring. Genetic correlations of less than 0.7 suggest that crossbred data can aid in genetic improvement, due to the weak relationship between additive gene effects of purebreds and crossbreds. The purebred heritability and crossbred heritability are also useful for determining potential selection accuracy and potential rates of progress with CCPS. Combined Crossbred Purebred Selection has been used in the swine and poultry industries; however the increased requirements for pedigree and performance recording have limited its acceptance in beef cattle. Still, if genetic gains were sufficiently accelerated with CCPS, the potential use of molecular genetics tools to verify parentage in multiple sire pastures may provide incentive to collect phenotypes on crossbred cattle. Adoption of CCPS needs to be evaluated as cost effective and applied initially to intensively-managed commercial operations.

