

GENETICS FOR A COMMODITY OR A CONSUMER PRODUCT?

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Summary

Charolais sires were evaluated for net economic value for their possible use in breeding programmes with a range of types of cows. Two price grids were considered; one a commodity grid based on current market prices, and the other a quality grid based on more definite specification of carcass weights and higher premiums for marbling. Sires ranked similarly for their use across cow types for the commodity grid, except when carcass weights became too high. Sires ranked very differently for their use across cow types for the quality grid. More specialized market requirements means more specialized selection of sires is needed. Careful attention must be given to the combination of sires and cow populations to produce progeny that are most profitable.

Introduction

Choices of sires for use in commercial production should be based on expected progeny performance for a variety of economically important traits. Bio-economic models of beef production are in use in Australia and Canada to put the information on these traits together into a measure of profitability. Beef Improvement Ontario (BIO) provides rankings on bulls for two possible markets with their Bio-Mate program. Evaluations can be customized for variables such as price grids and population means as influenced by choices of breeds and crossbreeding programmes.

The objective of this paper is to compare the rankings of sires as evaluated through a bio-economic modeling approach with varying levels of population means of traits and two price grids. One price grid reflects payments based essentially on weight with modest discounts for under- or over-weight carcasses. The second grid reflects a much more highly defined product in terms of a preferred carcass weight and higher levels of marbling. Evaluations were for a population of Charolais bulls evaluated for growth, feed intake, scrotal circumference, backfat, longissimus muscle area and marbling in BIO's bull evaluation program.

Material and Methods

Data were available on 62 Charolais sires evaluated in 2001 as part of the BIO bull evaluation program. Sires were evaluated for total gain on test over 112 days, feed intake over 112 days, and backfat, longissimus muscle area, scrotal circumference and marbling at end of test.

The Bio-Mate economic model represents an integrated beef production program. Revenues are based on market animals (males and surplus replacement females) and cull cows. Prices are based on consideration of market weight, lean yield and marbling differentials. Costs include feed, labour, housing, and other variable costs for both the feedlot and cow-calf sectors of the program.

Calculations of net economic values were made for two breeding programmes. One set of values was generated for progeny performance levels for Angus cows mated to the Charolais sires available, with this set divided into five possible sub-sets of Angus cows (very early, early, average, late and very late finishing types). For example, late finishing types would require more days in the feedlot to reach market finish and would also have heavier carcass weights as a result. The second set of values was for progeny levels of Charolais cows mated to the Charolais sires available.

Net economic value was calculated from predicted progeny performance for market weight, marbling grade, retail yield and feed intake. Progeny performance levels included consideration of the population means of the Charolais and Angus breeds. Performance levels were estimated using genetic evaluations of direct and

correlated traits. Performance levels for carcass weight, retail yield, feed intake, and marbling were based on the genetic evaluations for gain on test, feed intake on test, and backfat, longissimus muscle area and marbling at end of test.

The price grid structures both included an optimum market weight with discounts for over- and under-weight carcasses and varying non-linear prices for differing categories of marbling. Proportions of progeny in each grid category were calculated based on the predictions of performance just described. The major difference in the grids was that the second grid had much higher values for marbling and considerably higher discounts for animals outside the preferred market weights. The first grid is considered the commodity grid and the second the quality grid.

Rank correlations were calculated among the evaluations of sires for each possible cow population.

Results and Discussion

Rankings of Charolais bulls in this study were sensitive to the average levels of finishing ability of the cow populations to which they were assumed to be mated only for very late finishing cows (very late finishing (VL) Angus or Charolais) if the price grid was a commodity grid (Table 1). For example, the rank correlation of bulls was 0.95 when evaluated for use in a population of late finishing (L) Angus cows relative to when they were evaluated for use in a population of early finishing (E) Angus cows.

Rankings of sires were, however, very sensitive to the cow population averages for the quality grid (Table 2). For example, the correlation was actually negative between the rankings of sires for use on late finishing (L) Angus than on early finishing (E) Angus (-0.36). The impact of different population averages arises from the expected progeny averages and their distribution over the grid classes involved. In the quality pricing system, there was a much greater effect of both the expected distribution of carcass weights and marbling grades. These distributions of the progeny were dependent on both the finishing ability of the cow population and the genetics of the sires.

Conclusions

Rankings of a group of Charolais sires evaluated for use on a range of populations were found to be very sensitive to the means of those populations for finishing ability if a quality grid system of pricing is in place. Very large re-ranking of sires was found when mated to cows differing in backfat or finishing ability.

Significance to the Industry

More specialized market requirements for beef will mean more specialized selection of sires. Careful attention will need to be given to the combination of sires and cow populations to produce progeny that are most profitable.

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Table 1. Rank correlation coefficients between bio-economic evaluations of sires when mated with Angus (at varying population means for backfat) and Charolais cows for the commodity grid (n=62).^a

	Angus (VE)	Angus (E)	Angus (A)	Angus (L)	Angus (VL)	Charolais (A)
Angus (VE)		.98	.98	.89	.26	.24
Angus (E)			.99	.95	.38	.36
Angus (A)				.96	.41	.39
Angus (L)					.62	.60
Angus (VL)						.99
Charolais (A)						

^a VE = Very early, E = Early, A = Average, L = Late, and VL = Very late finishing.

Table 2. Rank correlation coefficients between bio-economic evaluations of sires when mated with Angus (at varying population means for backfat) and Charolais cows for the quality grid (n=62).^a

	Angus (VE)	Angus (E)	Angus (A)	Angus (L)	Angus (VL)	Charolais (A)
Angus (VE)		.96	-.09	-.55	-.77	-.76
Angus (E)			.12	-.36	-.61	-.60
Angus (A)				.82	.67	.67
Angus (L)					.95	.95
Angus (VL)						.99
Charolais (A)						

^a VE = Very early, E = Early, A = Average, L = Late, and VL = Very late finishing.