

## FACTORS INFLUENCING THE PRICE PAID FOR BULLS AT CENTRAL TEST STATIONS IN KANSAS FROM 1988-1992

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### Summary

Results of 13 sales of Angus (n= 185) and Simmental (n= 544) bulls at central bull tests in Kansas from 1988 through 1992 were analyzed to determine the relationship between performance and the price received. The Kansas bull test index (based 50% on weight-per-day-of-age and 50% on test ADG) was the most significant single factor determining price in both Angus and Simmental bulls. Birth weight, final weight, and frame score were other major contributors to price in Angus bulls, whereas weaning weight ratio, birth weight, and being polled were important in Simmental bulls. Expected progeny differences made small but significant ( $P < .05$ ) contributions in Angus bulls but not in Simmental bulls.

(Key Words: Bull Tests, Expected Progeny Differences.)

### Introduction

Bull buyers at central test stations in Kansas are provided with a wealth of information, including preweaning and on-test performance and expected progeny differences (EPDs), by the breed associations. Additionally, buyers visually appraise the bulls and consider other factors such as color, disposition, and breeder reputation. This analysis was conducted to determine what information commercial bull buyers use in deciding a bull's value.

### Experimental Procedures

The data we analyzed were collected from the Beloit and Potwin bull tests conducted from 1988 through 1992 - a total of 13 tests. This period was selected because EPD were first provided for a majority of the bulls in 1988. Only the Angus (n= 185) and Simmental (n= 544) breeds were analyzed because numbers in the remaining breeds were considered too small to allow meaningful conclusions. The Angus and Simmental data were analyzed separately because we felt buyers might be selecting for different traits between breeds and because EPDs can't be compared from breed to breed at the current time.

The factors considered in this analysis are shown in Table 1. Other information provided to buyers but not considered includes: breeder, birth date, pedigree, weaning contemporaries, and calving ease EPD for Simmental bulls. The calving ease EPDs weren't considered because of a change in the method of calculation by the breed association during the time period covered in this study.

To avoid differences between tests in performance and prices because of weather, changes in the cattle market, and other factors, the performance and price information were standardized across tests prior to analysis. The EPDs used in the analysis were those published in the final report; pedigree or interim EPD estimates were provided by the respective breed associations. These EPD estimates took into account the actual birth and weaning

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weights but not the actual yearling weight performance of the bulls.

The index used in the Kansas central bulls tests is based 1/2 on the weight-per-day-of-age (WDA) and 1/2 on the ADG of the bull on test. The top 50% of the bulls on index are sold in index order.

Although determining the impact of a single factor on the price of bulls would seem to be a simple process, it is extremely difficult because of the many relationships between traits. For example, there are high correlations within growth traits such as birth weight, weaning weight, and yearling weight. There are also moderate correlations between these traits and the growth EPDs. Numerous multiple regression models were evaluated to determine which specific items of information were significant and what their contribution was to the final price received.

## **Results and Discussion**

Table 2 shows the percentage of the total price variation accounted for by all of the significant ( $P < .05$ ) variables in Angus bulls. Of the over 15 variables considered, only seven were significant. Again, it should be noted that these items are correlated to many of the other items considered. For example, the index is a composite of the ADG and WDA and is a good overall measure of performance. Consequently, neither ADG nor WDA was significant individually in the final model. Our model contained all of the performance information and EPDs but could account for only 30% of the variation in price. This means that other factors, such as visual appraisal and breeder reputation, were major contributors to the final price.

The changes in price for each unit of change in the significant variables are also shown in Table 2. These values represent the linear regression coefficients from the model containing all of the significant ( $P < .05$ ) variables. Although the relationships between items of performance information make it difficult to determine the exact impact of any

one item, these estimates of the price differentials paid for each unit of change give an indication of factors that commercial bull buyers consider important.

A summary of significant variables and price differentials for the Simmental bulls is shown in Table 3. The index was again the most important single piece of information to buyers, followed by the weaning weight ratio. The polled trait and percentage Simmental were also significant. None of the EPDs accounted for a significant portion of the variation in price. As with the Angus bulls, birth weight and final weight were important variables.

Considering over 15 items of performance information, the best model could account for only 24% of the variation in price. Again, factors other than performance and EPDs are major contributors to price. In addition to visual appraisal and breeder reputation (as noted for the Angus), color undoubtedly has been a significant factor for Simmental bulls.

Although it appears that the performance information accounts for a percentage of the variation in price in both breeds, it should be noted that producers may be using the performance information, but selecting in different directions. For example, some producers may be selecting for high yearling weight EPDs, whereas others may select against very high yearling weight EPDs to moderate cow size. Because our analysis evaluated linear relationships, the model appears to ignore yearling weight EPDs, even though the breeders may have been making use of the information.

Breeders should use caution in interpreting the price differentials shown in Tables 2 and 3 because this information represents only commercial cattlemen's preferences for 1988 to 1992. For example, frame score was a significant variable in Angus bulls, but given the current interest in moderating cow size, that factor may become much less important in the future. In fact, it is conceivable that producers many actually select against extremely large framed bulls.

This study clearly shows that EPDs haven't been emphasized by commercial bull buyers in the past 4 years at central bull test sales. Because research has shown that EPDs are several times more accurate in

predicting progeny performance than the individual bull's actual performance, producers should use EPD in making bull selections.

**Table 1. Performance and Descriptive Information Considered in the Analysis of Factors Influencing Price**

<u>Performance Information</u>	<u>Descriptive Information</u>
Birth weight	Frame score
Adjusted weaning weight	Horn status
Weaning weight ratio	Percent Simmental
Weight per day of age	
Weight per day of age ratio	<u>Expected Progeny Differences</u>
Index	Birth weight
Yearling weight	Weaning weight
Final weight (off test)	Yearling weight
Final ADG	Maternal
Final ADG ratio	Milk

**Table 2. Variation in the price of Angus Bulls Sold at Kansas Central Bull Tests Accounted for by the Performance Information Provided to Buyers and Price Differentials for Significant Factors**

Item	Percentage of variation in price accounted for	Cumulative percentage	Unit	Change in the price received per unit, \$
Index	11.6	11.6	%	33.56
Birth weight	4.9	16.5	lb	-16.39
Final weight	4.0	20.5	lb	2.00
Frame score	3.2	23.7	Frame score	203.90
Milk EPD	2.2	25.9	lb	17.68
Birth weight EPD	2.1	28.0	lb	-143.87
Yearling weight EPD	1.9	29.9	lb	12.90
Total for all significant (P < .05) information		29.9		

**Table 3. Variation in the Price of Simmental Bulls sold at Kansas Central Bull Tests Accounted for by the Performance Information Provided to Buyers and Price Differentials for Significant Factors**

Item	Percentage of variation in price accounted for	Cumulative percentage	Unit	Change in the price received per unit, \$
Index	12.8	12.8	%	31.60
Weaning weight ratio	3.6	16.4	%	21.46
Birth weight	2.9	19.3	lb	-15.03
Polled	2.5	21.8		210.78
Final weight	1.0	22.8	lb	.97
Percentage Simmental	.9	23.7		
Total for all significant (P < .05) information		23.7		