

*Cattlemen's Day 1997*

## DETERMINANTS OF PRICES FOR PUREBRED BEEF BULLS

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### Summary

Animal characteristics and sale price data for 1651 bulls sold at 26 Kansas purebred beef sales during 1993 were collected and analyzed to determine which factors affected price differentials for beef bulls. Bull sale price varied, from \$650 to \$20,000 per head. Regression analysis was used to determine the price differential associated with bull traits and marketing factors. Black bulls in the Simmental, Gelbvieh, and Limousin breeds brought premium of 15% to 53% compared to their nonblack peers. Conformation, disposition, and muscling affected sell prices. Bulls with lower birth weights and birth weight expected progeny differences (EPD) brought higher prices. Bulls with higher adjusted weaning weights, weaning weight EPD, and milk EPD also brought higher prices, although these varied depending upon bull breed. Several marketing factors, including sale order, semen retention, and pictures in the sale catalogs, influenced bull prices. Bull buyers can use this information to make more informed bull buying decisions, and purebred producers can use results to target production and marketing.

(Key Words: Bull Prices, Bull EPD, Bull Marketing.)

### Introduction

The value of a breeding bull is determined by its expected value in production. Bull sale prices vary considerably, and numerous physical and genetic characteristics contribute to that variation. Additionally, reputation of the seller

impacts sale price. The large number of bull attributes that must be considered make it difficult for bull buyers and sellers to determine the market value of individual bulls. Our objective was to determine the relative impact of individual physical attributes on sale prices of breeding bulls. Buyers can use this information to make more informed purchase decisions, and producers can use these results to better target their production and marketing.

### Experimental Procedures

Sale price, physical characteristics, genetic information, and marketing factors were collected on individual animals from 26 purebred beef bull sales in Kansas during spring, 1993. The data set included 1700 bulls representing seven breeds. Because of incomplete data, 1651 observations were retained for analysis. The data set included Angus (46.5%), Charolais (12.4%), Gelbvieh (14.4%), Hereford (7.5%), Limousin (3.6%), Red Angus (4.4%), and Simmental (11.2%).

Individual bulls were evaluated at the time of sale and assigned a rank of 1 (poor) to 5 (excellent) with respect to conformation, muscling, structural correctness, and disposition. Other information recorded at the time of sale were sale order, breed, lot, horned status, color, age, and price. Performance information was obtained from sale catalogs, although information printed in the catalogs varied among sales. Physical and genetic characteristics considered were actual birth weight, birth weight EPD, adjusted weaning weight, weaning weight EPD, and milk EPD. We also noted from sale catalogs whether

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semen was retained and whether the bull was pictured in the catalog.

Regression analysis was used to determine the relative value of each piece of information on a bull's sale price. This procedure enabled us to allocate the entire price paid for a bull into values of individual attributes.

## Results and Discussion

Bull sale prices ranged from \$650 to \$20,000 and averaged \$2308.70 per head. Average birth weight was 85 lb and average adjusted weaning weight was 652 lb. Bulls averaged 450 days of age with, a range of 298 to 1136 days. On average, 8% of the bulls were pictured in the catalog. Roughly 1% of bulls had at least some proportion of semen rights retained by the seller.

Numerous factors were statistically important in explaining bull price differentials. After adjusting for all other attributes, no significant differences were found in prices between breeds. However, bull color was a significant price determinant. Black Simmentals, Gelbvieh, and Limousins brought premiums ranging from 15% to 53% over their nonblack peers. This is consistent with previous K-State studies indicating that black feeder cattle brought market premiums. Polled bulls brought premiums of 10%. Bull conformation was more important than muscling, structural correctness, and disposition with price premiums of 7% associated with each unit increase in conformation score.

Historically, bulls often have been sold as 2-year-olds, but the beef industry has shifted to greater use of yearling bulls. This is confirmed by the fact that 79% of the bulls sold were less than 18 months old. Age had a nonlinear effect on bull prices, indicating that buyers paid a premium for older bulls but at a decreasing rate (Figure 1). Two-year-old and older bulls brought premiums compared to younger bulls, but it was generally not enough to offset the added expense.

Bull birth weight, adjusted weaning weight, and EPDs for birth weight to weaning weight, and milk were all important price determinants, but their importance varied among bull breeds. Table 1 reports the price impacts of these growth performance and EPD measures. For Angus and Charolais, the bull's actual birth weight was an important price determinant, with prices declining by 3.8% and 7.7%, respectively, for each pound increase in bull birth weight. For Simmental, Angus, and Gelbvieh, the birth weight EPD was a significant ( $P < .05$ ) variable with price discounts of 4.4% to 4.6% for each unit increase in EPD. Adjusted weaning weight was significant for all breeds except Red Angus and Limousin. Lack of significance of some growth performance factors and/or EPD measures does not indicate that these are unimportant. The sample size for a breed may have been too small to detect a significant impact.

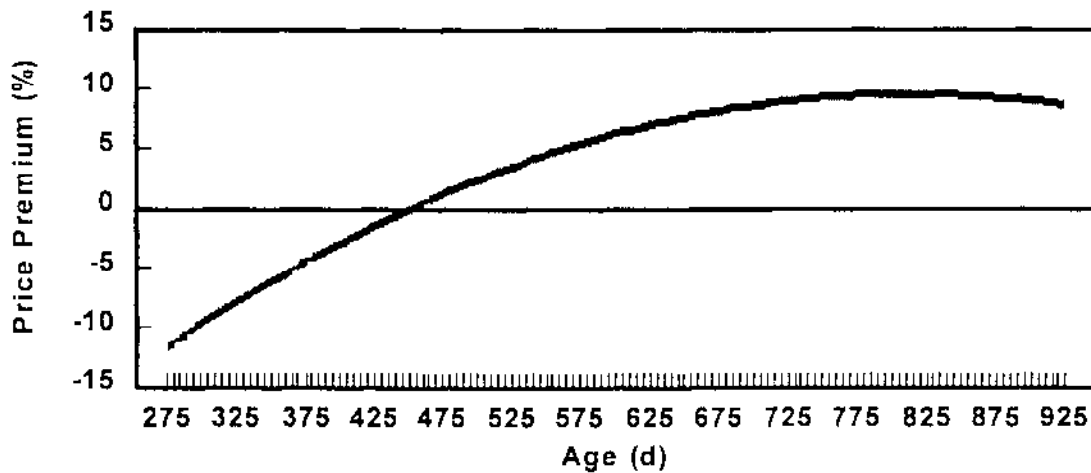
Several marketing factors also affected sale prices. After adjusting for all other factors, bull prices differed across sales. This was probably a reflection of seller reputation, level of competition among buyers at a particular sale, location, and/or other marketing factors not evaluated in this study. Sale order significantly affected price. The highest priced and highest quality bulls usually were sold early in the sale. The rate of price decline associated with sale order differed depending upon the total number of bulls in the sale; smaller sales experienced smaller total percentage price declines relative to larger sales. Bulls pictured in sale catalogs received premiums averaging 27% relative to those not pictured, after adjusting for all other differences.

One interesting feature of purebred beef bull sales is that some bulls brought considerably higher prices than their set of attributes predicted. Typically, the highest priced bulls were sold early in the sale. Although buyer identity wasn't available, these bulls may have been purchased by purebred as opposed to commercial breeders. In these instances, the bulls sold for prices that were 20% or more greater than prices for other bulls.

**Table 1. Effect of Growth Performance and Expected Progeny Differences on Bull Price**

| Breed   | Birth Wt, lb | Adjusted Weaning Wt, lb | Birth Wt EPD | Weaning Wt EPD | Milk EPD |
|---|--------------|-------------------------|--------------|----------------|----------|
| -----% price change for a one-unit change in each facto -+--- |              |                         |              |                |          |
| Simmental   | <sup>a</sup> | .009                    | -.44         | .14            | .28      |
| Angus   | -.038        | .012                    | -.44         | .08            | .08      |
| Charolais   | -.077        | .012                    |              |                |          |
| Hereford  |              | .022                    |              | .12            |          |
| Red Angus   |              |                         |              |                | .24      |
| Gelbvieh  |              | 0.14                    | -.46         | .10            |          |
| Limousin  |              |                         |              | .33            |          |

<sup>a</sup>Indicates not statistically different from zero (P<0.10).



**Figure 1. Effect of Age on Bull Price (Base Age is 450 Days).**