

RELATIONSHIPS BETWEEN PERFORMANCE TRAITS, INDIVIDUAL EXPECTED PROGENY DIFFERENCES AND SALE PRICES OF CENTRALLY TESTED BULLS

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Story in Brief

Postweaning records were collected on 7,428 bulls completing gain tests from 1981 to 1994 at Oklahoma BEEF, Inc. Central Bull Test Station. A total of 3085 bulls (A=806 Angus, B=497 Brangus, H=533 Hereford, P=601 Polled Hereford, C=399 Charolais and L=249 Limousin) completed the 140-day test from 1981 to 1986. From 1987 to 1994, performance data were collected on 4343 bulls (A=2384 Angus, B=487 Brangus, H=220 Hereford, P=544 Polled Hereford, G=132 Gelbvieh, L=360 Limousin and S=216 Simmental) completing the 112-day test. Trends among on-test weight showed increases for all breeds except G and S. Off-test weight increased during 140-day test for all breeds, yet decreased during 112-day test for all breeds except H and P. A, P, B, and H bulls showed increases in cumulative average daily gain, while C, G and S decreased. No trends in average daily gain were evident for L bulls. Weight per day of age increased for all breeds during 140-day test. P, H and G bulls showed increases in weight per day of age during 112-day test while all other breeds decreased. Performance records were combined with selling price from 2,419 bulls sold from 1983 to 1994 to evaluate the effect that performance traits had on selling price. Price was positively correlated ($P < .01$) many of the performance traits, and correlations were strongest for test index, WDA, and off-test weight and off-test height. However, the magnitude of these correlations was not great. Small correlations were found among EPDs and performance traits were small but significant for Angus but not for Polled Hereford bulls.

(Key Words: Beef Cattle, Performance Testing, Feedlot.)

Introduction

Oklahoma Beef, Incorporated (OBI) Central Bull Test Station was organized in June 1973 to locate and recognize superior breeding bulls and to provide a source of performance-tested bulls for commercial and purebred

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breeders. Over the years, numerous performance records have been collected and sales have been held.

Breeders have an interest in performance trends of the OBI cattle, and they study the impact of performance records on the sale price of their bulls. Using the data currently summarized for bulls of eight breeds, the purpose of the current study was two-fold: 1) Trends in performance traits for postweaning bulls were examined and 2) Relationships among selling price, performance traits and Expected Progeny Differences (EPD) were studied to determine what performance records available to bull buyers in the sale catalog had an effect on price.

Materials and Methods

Oklahoma BEEF, Incorporated (OBI) is a central bull test station located eight miles west of Stillwater on land leased from Oklahoma State University. The test station is the site for postweaning gain tests for bulls of many breeds. A board of directors consisting of equal representation by 10 member breeds governs OBI. Bulls arrive at OBI for a two to three week warm-up period before the official gain test period begins. Calves arrive at OBI at 8 to 9 months of age and finish test at approximately one year of age. Two sales per year are held in conjunction with the regularly scheduled gain tests of participating breeds.

Data available for the current study were from 13 years of data (1981-1994) representing complete postweaning performance records on 7,428 bulls from eight breeds. Two test lengths were represented in the data. From 1981 to 1987, bulls were placed on a 140-day gain test. In June of 1987, the test period was altered to a 112-day gain test. The 28 days removed to shorten the test were taken off the first part of the official test period. Thus, calves were arriving at an older age but would still complete the gain test at approximately 365-days of age. A total of 3,085 bulls (806 Angus, 497 Brangus, 533 Hereford, 601 Polled Hereford, 399 Charolais and 249 Limousin) completed the 140-day test from 1981 to 1986. From 1987 to 1994, performance data were collected on 4,343 bulls (2,384 Angus, 487 Brangus, 220 Hereford, 544 Polled Hereford, 132 Gelbvieh, 360 Limousin and 216 Simmental) completing the 112-day test.

Performance traits included in this study were on-test weight (OFFICWT), off-test weight (OFFWT), 365-day weight (WT365), 365-day height (HT365), cumulative average daily gain (CUMADG), cumulative weight per day of age (CUMWDA), off-test scrotal circumference (SC) and test index (INDEX). In general, the index is a composite value of the cumulative ADG ratio, WT365 ratio and WDA ratio; however, the index varies slightly among breeds.

To examine trends in performance traits, data were analyzed separately by test length (112-d vs 140-d) and breed. Year and test group within year differences were considered for the various traits.

Performance records were combined with selling price from 2,419 bulls (1,202 Angus, 201 Brangus, 159 Hereford, 387 Polled Hereford, 252 Limousin, 51 Charolais, 86 Simmental and 81 Gelbvieh) sold in OBI All-Breed Performance Tested Bull Sales from 1983 to 1994 to evaluate the effect that performance traits had on price. Sale catalogs were available to buyers at the time of sale. Information in the catalog included identification of the bull, sire and dam identification, pedigree, birthdate, owner, sire expected progeny differences (EPD) from 1985 to 1987, and individual EPDs from 1989 to 1994. The OBI performance data included in the catalog were: on-test weight, off-test weight, adjusted yearling height, adjusted yearling weight, scrotal circumference, average daily gain, weight per day of age, number of animals in group tested and index.

The top 70% of the bulls within a test group based on index are eligible to sell in an OBI sale. Also, bulls weighing at least 1,100 lb on their WT365 and gaining at least 3.25 CUMADG qualify for the sale. Relationships among performance traits and selling price were studied by combining data available for both 140- and 112-d day tests to study sale price and performance relationships, with each breed analyzed separately.

Residual correlations between performance traits and selling price were generated. The effects of year and contemporary group within year were included in the model. Simmental and Gelbvieh bulls contained only 112-day data, while Charolais bulls were only represented in the 140-day data. All other breeds contained data for both testing periods.

In addition, individual expected progeny differences (EPDs) were correlated with performance traits and selling price on Angus and Polled Hereford bulls to determine their relationships. The EPDs represented individual estimates at the time of sale and were taken from OBI catalogs from 1989 to 1994. EPDs included were birth weight (BW), weaning weight (WW), yearling weight (YW) and maternal milk (MM). The number of observations for Polled Hereford bulls were 142, 139, 139 and 139 for BW, WW, YW and MM EPDs, respectively. Among Angus bulls the number of observations were 537, 643, 396, and 633 for BW, WW, YW and MM EPDs, respectively. Any performance traits available to potential buyers were included in the study, with the exception of ultrasonic fat and ribeye area measures. Correlations were generated separately for each particular EPD and the performance traits.

Selling price and EPD correlations were generated using a model which included BW, WW, YW, MM EPDs, and price. Data from 479 bulls (348 Angus and 131 Polled Hereford) were used to generate correlations between EPDs and price for each breed.

Results and Discussion

Number of bulls tested by year has varied over time. Figure 1 presents the number of bulls across all breeds in the OBI program from 1980 to 1995. A low point in testing numbers occurred in 1986. This low point may have been due in part to the cattle prices at that time.

Performance trends for off-test weight are depicted graphically by plotting the least squares means by year and breed in Figure 2. Although the 140-d and 112-d records were analyzed separately, they are pictured together on the graphs with a vertical line at 1987 to mark the change to the 112-d feeding period. For the 140-d test, on-test and off-test weights tended to increase between 1982 and 1987. Year and test group effects were important sources of variation ($P < .01$) in these weights. For the 112-d test period, year differences were not generally evident for weight.

Height is a trait that has gone through changes in the beef industry over time. In both the 140-d and 112-d tests, significant year differences ($P < .01$) were found. Since 1982, changes have occurred in the on-test and 365-d heights for bulls tested at OBI. HT365 increased over both test periods for all breeds except Simmental and Charolais. WT365 showed an increase for all breeds during 140-day test. Increases in WT365 during 112-day test were shown for Polled Hereford, Hereford and Gelbvieh, while weights of other breeds decreased.

Angus, Polled Hereford, Brangus, and Hereford bulls showed increases in CUMADG, while Charolais, Gelbvieh and Simmental decreased. No trends in CUMADG were evident for Limousin bulls. CUMWDA increased for all breeds during 140-day test. Polled Hereford, Hereford and Gelbvieh bulls showed increases in CUMWDA during 112-day test while all other breeds decreased.

Correlations among sale price and performance traits are given in Table 1. Price was positively correlated ($P < .01$) with all the performance traits where correlations are presented. Correlations of price with other traits were strongest for test index, WDA, and off-test weight and off-test height. However, the magnitude of these correlations was not great, with the highest correlation being .53 between price and test index among Gelbvieh bulls. Scrotal circumference was more lowly correlated with price. Changes in price per unit change in each trait accounted for 40 to 58% of the variation in selling price due to performance traits.

Individual expected progeny differences (EPDs) were correlated with selling price and performance traits on Angus and Polled Hereford bulls to determine their relationships. EPDs included were birth weight (BW), weaning weight (WW), yearling weight (YW) and maternal milk (MM). Small correlations were found among EPDs and performance traits for both breeds.

Significant correlations between EPDs and price were also small and positive for Angus (Table 1). These phenotypic correlations were nonsignificant in the Polled Hereford data.

It is important to consider that other factors may have an influence on sale price. Sale order, pedigree, reputation of the breeder, and other factors may have effect. Also, the impact of visual appraisal of the bulls prior and during the sale is unknown.

Table 1. Correlations^a between price and other traits.

Trait	Breed							
	AN	BR	HF	PH	CH	LM	SM	GB
OFFICWT	.23	.28	....^b	.32	....	.29	.37	....
OFFWT	.46	.44	.38	.47	....	.42	.36	.41
HT365	.26	.28	.44	.36	.46	.38	....	.40
WT365	.46	.38	.42	.42	.43	.45	.52	.46
CUMADG	.41	.32	.37	.34	....	.23	....	.44
CUMWDA	.45	.42	.44	.46	.39	.50	.51	.46
SC	.17	.23	.23	....	....	....	....	.33
INDEX	.52	.45	.51	.47	.46	.50	.35	.53
EPD-BW	....			....
EPD-WW	.19			....			
EPD-YW	.24			....			
EPD-MILK	.27			....			

^a All correlations were significant ($P < .01$).

^b Nonsignificant correlations were not presented.

Figure 1. Number of bulls finishing test by year (1980-1995).

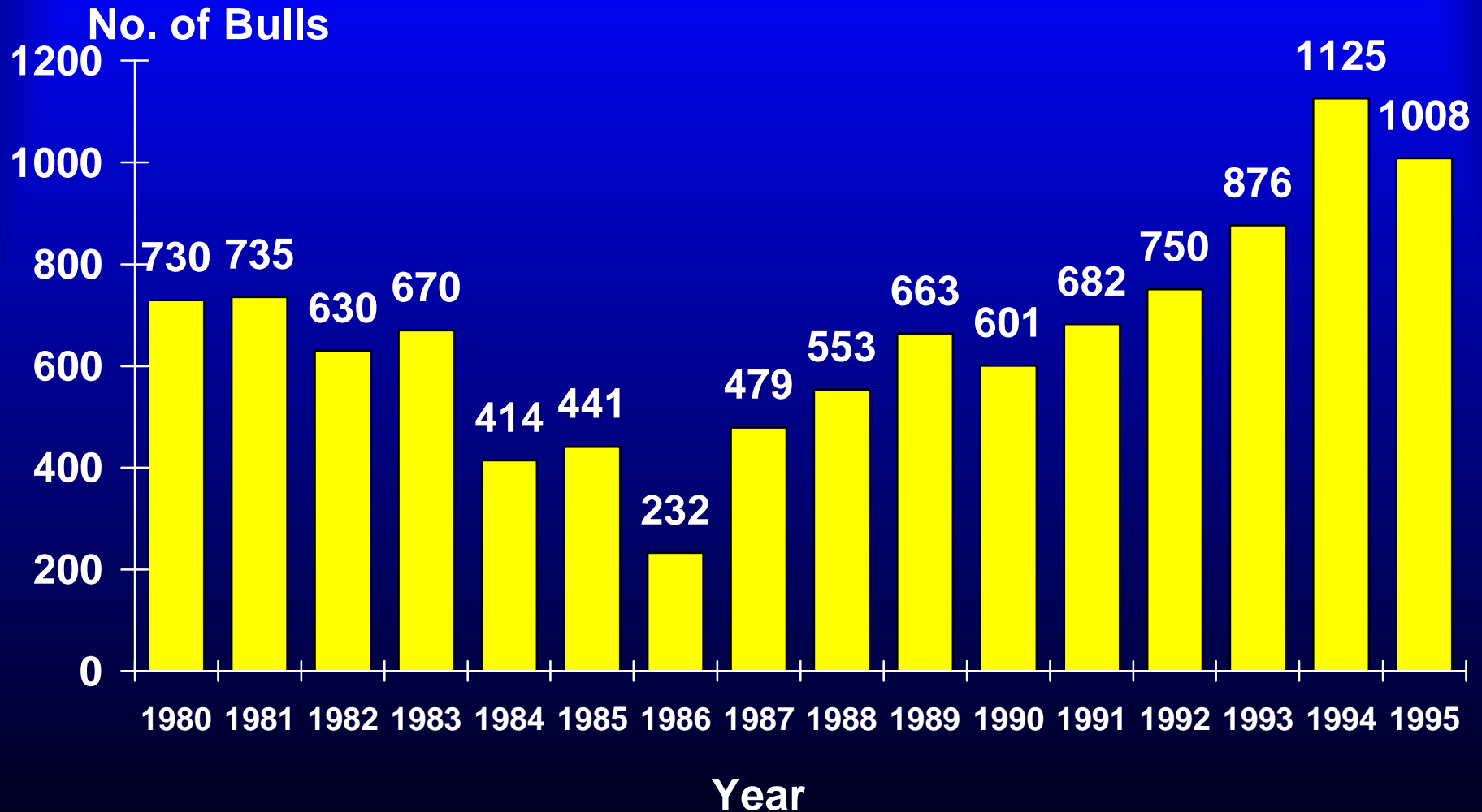


Figure 2. Off-test (OFFWT) weight trends by year and breed.

