

Growth Rates of Hip Height, Scrotal Circumference and Weight for Purebred Hereford and Angus Bulls

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Story in Brief

Seasonal differences and growth rates were studied on 60 Hereford and Angus bulls born in the spring and fall calving seasons at Oklahoma State University. Hip height, scrotal circumference and weight measurements were taken over the two 10-month experiments.

Season of birth had no influence on scrotal circumference for either Hereford or Angus bulls. Season of birth in Angus bulls did not show a difference in hip height, scrotal circumference, or weight between spring and fall-born bulls.

Hip height and scrotal circumference growth rate, along with average daily gain, showed a linear decline from 6 to 17 months of age in both Hereford and Angus bulls. Hip height growth rate from 180 to 365 days of age averaged .0325 and .0321 in./day for Hereford and Angus bulls, respectively. In addition, hip height growth rate from 365 to 510 days of age averaged .0222 and .0207 in./day for Hereford and Angus bulls, respectively. Scrotal circumference growth rate from 180 to 510 days of age ranged from .0790 to .0000 cm/day for Herefords and .0843 to .0040 cm/day for Angus. Adjustment factors for scrotal circumference at 6 and 12 months of age were .08 and .04 cm/day, respectively. Average daily gain was faster for Angus bulls at the start of the test than for Herefords, but declined much faster later in the test period. Average daily gain of Angus bulls from 180 to 510 days of age averaged 2.51 lb/day. Hereford bulls averaged 2.42 lb/day.

Introduction

In today's marketing and production systems it would be beneficial to have fast growing, rapidly gaining cattle that reach sexual maturity as young as possible. The desire to increase frame size and growth rate in cattle has generated considerable interest in hip height growth rates. Many studies have looked at hip height growth rate up to 12 months of age, but little has been reported on bulls after a year of age. In addition, some concern exists in the beef industry relative to the effect of increasing frame size and growth rates on scrotal circumference and sexual development. Relatively little is known about scrotal circumference growth rates in young bulls of different breeds. Although many studies have looked at the effect of age on scrotal circumference, few have reported actual growth rates that may be important for scrotal circumference adjustment factors at different ages.

The purpose of this study was to examine growth rates for hip height, scrotal circumference and body weight. In addition, a major objective was to evaluate the effect of breed, season and ambient temperature on scrotal circumference measurements in young beef bulls.

Materials and Methods

The data used in this study were the performance traits and scrotal measurements on Hereford and Angus bulls in the Oklahoma State University purebred herd. Data was collected from 20 Hereford and 12 Angus bulls born between January 1 and May 30, 1979, and these bulls were classified as spring-born. An additional 12 Hereford and 12 Angus bulls born between September 1 and December 10, 1979, were classified as fall-born. The Hereford bulls were mainly out of D4 Mischief dams and sired by seven different L1 Domino sires. The Angus bulls were straight-bred Emulous with four different sires represented.

Bulls used in this study were weaned at an average age of 6 months and placed on a warm-up period for 14 days prior to the start of this study. All bulls were fed the same ration (Table 1), grouped by season of birth and penned together on Bermuda grass pasture during the entire study. Hip height, scrotal circumference and weight were obtained every 30 days until the bulls reached approximately 17 months of age.

Table 1. O.S.U. purebred bull ration

Ingredients	Percent of ration
Alfalfa hay (ground or pellet)	30.0
Rolled corn	32.0
Soybean meal	12.5
Cotton seed hulls	10.0
Rolled oats	10.0
Molasses	5.0
Trace mineral salt	.5

Results and Discussion

Hip height and scrotal circumference data were measured by two different technicians, and repeatabilities of .99 and .97 were recorded, respectively. These highly-significant values are mainly due to great care being taken in each measurement as well as the bulls' becoming extremely gentle and accustomed to the handling procedures during the two 10-month studies.

There was a difference ($P < .05$) between spring and fall-born Angus calves for hip height and weight from 6 to 17 months of age. Angus bulls born in the spring averaged 1.26 in. taller and 66.4 lb heavier from 6 to 17 months of age than Angus bulls born in the fall (Table 2). Season of birth had little influence on hip height and weight of Hereford bulls from 6 to 17 months of age.

The desire to increase frame size and growth rate in cattle has generated considerable interest in hip height growth rate from weaning to yearling and beyond. In addition, some concern exists in the beef industry relative to the effect of increasing frame size and growth rate on sexual development.

Figures 1, 2 and 3 depict the effect of age on hip growth, scrotal circumference growth and average daily gain. These traits decrease linearly in growth rate as

Table 2. Season of birth means for hip height, scrotal circumference and body weight from 6 to 17 months of age

Season	Hip height (in)	Scrotal circumference (cm)	Weight (lb)
Hereford			
Spring	47.8 ± .03 ^a	32.1 ± .10 ^a	955.8 ± 3.0 ^a
Fall	47.7 ± .03 ^a	32.3 ± .09 ^a	967.9 ± 2.6 ^a
Angus			
Spring	49.2 ± .04 ^a	34.4 ± .10 ^a	1081.5 ± 3.2 ^a
Fall	47.9 ± .03 ^b	33.5 ± .06 ^a	1015.1 ± 1.8 ^b

^{a,b}Means in the same row that do not show at least one superscript are significantly different by LSD test (P < .05).

days in age increases. Hip height growth rate from 180 to 365 days of age ranged from .0373 to .0277 in./day (average = .0325) in Hereford bulls and from .0373 to .0270 in./day (average = .0321) in Angus bulls (Figure 1). These results are in agreement with the .03 in./day adjustment factor for height recommended by the Beef Improvement Federation Guidelines. Hip height growth rate from 365 to 510 days of age ranged from .0267 to .0183 in./day (average = .0222) in Hereford bulls and from .0247 to .0163 in./day (average = .0207) in Angus bulls.

Scrotal circumference growth rates also declined linearly at a rapid rate with increasing age (Figure 2). The increase in scrotal circumference as age increased ranged from .0790 to .0000 cm/day from 180 to 510 days of age for Hereford bulls and from .0843 to .0040 cm/day for Angus bulls. Very rapid growth in scrotal circumference was observed up to 13 months of age with a gradual decline in rate of growth until the end of the test. The average scrotal circumference growth rates from 180 to 390 days of age in Hereford and Angus bulls were .0543 and .0602 cm/day. Therefore, between weaning and yearling weigh periods, the Hereford and Angus bulls in this study tended to increase in scrotal circumference by approximately 12 cm or 4.7 in. Because of the very rapid decline in growth rate of scrotal circumference with increasing age, adjustment factors for scrotal circumference measurements for each month are recommended (Table 3).

Table 3. Scrotal circumference adjustment factors for Hereford and Angus bulls

Months of age	Scrotal circumference growth rate (cm/day)
6-7	.080
7-8	.070
8-9	.060
9-10	.055
10-11	.050
11-12	.040
12-13	.030
13-14	.025
14-15	.015
15-16	.010
16-17	.000

Average daily gain was faster for Angus initially but decreased at a faster rate as age increased (Figure 3). Average daily gain from 180 to 510 days of age in Hereford bulls ranged from 2.97 to 1.83 lb/day (average = 2.42) while the Angus bulls ranged from 3.23 to 1.80 lb/day (average = 2.51). Feed intakes were adjusted every 28 days so that the average daily gain for all bulls would be 2.5 lb/day for the entire study. Even though feed intakes were controlled, a definite separation in average daily gains occurred.

In general, performance traits and scrotal circumference tend to differ between breeds and between different frame sizes. Further study is necessary on the influence of season, preweaning effects of dam and nutrition on skeletal size and growth rates prior to weaning and after 365 days of age.

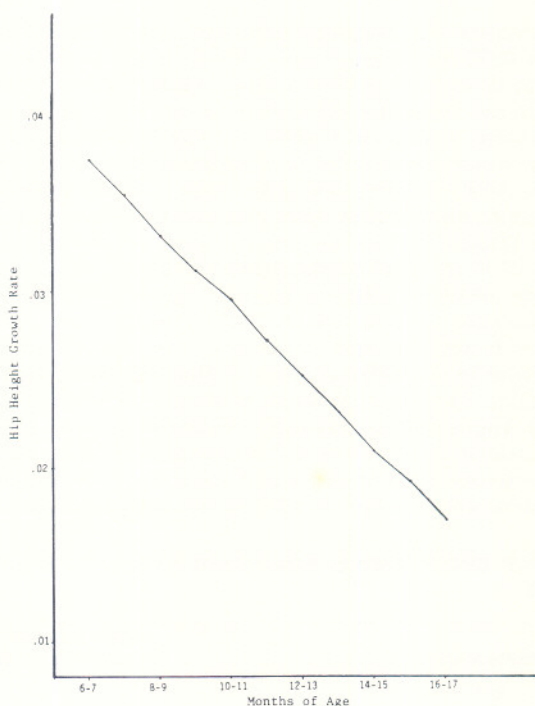


Figure 1. Predicted effect of age on hip height growth rates (in/day in Hereford and Angus bulls

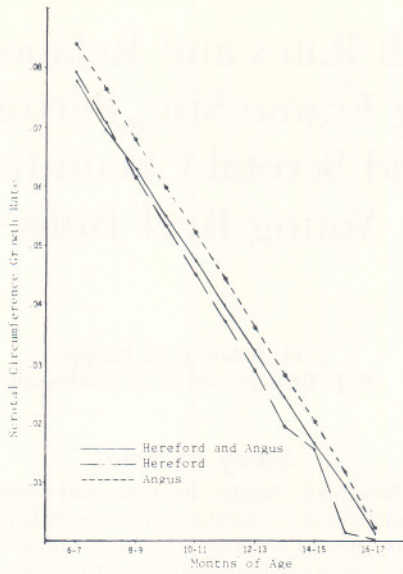


Figure 2. Predicted effect of age on scrotal circumference growth rate (cm/day) in Hereford and Angus bulls

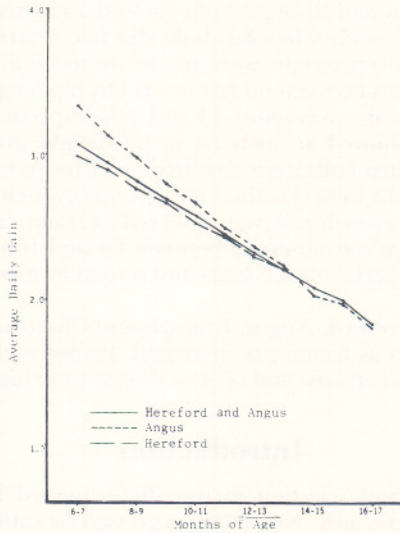


Figure 3. Predicted effect of age on average daily gain (lb/day) in Hereford and Angus bulls