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Effect of Implants on Testicular Growth in Feedlot Yearling Beef Bulls

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Summary

Implanting young feedlot Angus bulls with Synovex-S reduced scrotal circumference and testicular weight. Implanting increased testicular weight but not scrotal circumference in Gelbvieh crossbred bulls. Scrotal circumference was an accurate predictor (correlation = .84 and .87) of testicular weight in Angus and Gelbvieh bulls, respectively.

Introduction

Testicular traits have recently been shown to be important reproductive characteristics in yearling beef bulls and appear to be the most practical method for evaluating reproductive capacity.

Testicular weight represents the most accurate means to assess sperm-producing ability but cannot be measured directly in breeding bulls. Roberts (1971) related firmness to seminal quality and fertility, in which case, soft testes were associated with poor semen quality and poor fertility.

As early as 1957, Willett and Ohms showed that scrotal circumference could be used as an accurate predictor of the spermatozoa produced per week. Hahn et al. (1969) found that scrotal circumference increased with age, as did testicular weight and total daily sperm output. Daily sperm output per gram of testes decreased with age and scrotal circumference, presumably due to the fact that, as bulls age beyond 6 years, testes contain proportionately more connective tissue and less sperm-producing parenchyma.

Foote et al. (1972) reported that scrotal circumference measured at 1 year of age was highly correlated with measurements obtained in sexually mature bulls at 3 years of age. The significance of this correlation is that bulls can be accurately selected on scrotal circumference at an age before sexual maturity.

Brinks et al. (1978) studied the genetic relationship between scrotal circumference measurements in yearling bulls and age of puberty in half sister heifers. Interpretation of the strong favorable genetic relationship indicated that the same sets of genes are responsible for scrotal circumference in yearling bulls and for age of puberty in their half sisters. Furthermore, in conjunction with the high heritability estimate (h^2 = 60%) of scrotal circumferences, sires with large scrotal circumference would sire daughters which mature sexually at an earlier age.

Plane of nutrition does not appear to have an important effect on scrotal circumference and testicular weight. No differences in testicular weight were observed in bulls on varying levels of energy consumption (Coulter, 1979; Wilsey, 1972). Also, no differences in scrotal circumference were found in bulls fed diets of 8, 10 and 14% protein (Sitarz, 1977).

More recently, Corah (1980) reported on the effect of implanting bulls with Ralgro at birth and every 100 days to slaughter at 15 months. Ralgro reduced testicular weight to 50% of that for nonimplanted control bulls. Semen quality, sex drive and incidence of "bulling" were reduced or eliminated in the implanted bulls as compared to the nonimplanted control bulls.

Little research has been conducted on the effect of growth promotants on testicular traits. The objective of the present study was to determine the effect of implanting on scrotal circumference and testicular weight in Angus and Gelbvieh yearling feedlot bulls.

Materials and Methods

Eighty-three Gelbvieh crossbred and 48 Angus bulls which were a part of ongoing experimental trials at the Cornbelt Research and Extension Center at Beresford, South Dakota, were fed diets of corn and corn silage to allow for growth rates of 3.0 lb per day and 2.5 lb per day, respectively. The Angus bulls were divided into two groups, one group implanted with Synovex-S and the other as a nonimplanted control. The Gelbvieh bulls were arranged into four groups, with one group as a control and the others implanted with Synovex-S, Synovex-H or Ralgro. Bulls were reimplanted 100 days later. All bulls were weighed and placed on their respective diets December 16, 1981. The Gelbvieh bulls were fed until July 19 and then slaughtered, with the Angus bulls finishing 1 month earlier.

Scrotal circumference was measured on the 85 Gelbvieh and 48 Angus bulls 1 week prior to slaughter. Only bulls with complete birth and postweaning gain data were included. One week following scrotal circumference measurement, bulls were slaughtered at Cimpl Packing Company, Yankton, South Dakota, where testes from each bull were collected. Testes were uniformly trimmed of nontesticular tissue and weighed.

Data were analyzed by least squares procedures (Barr et al., 1979). Analyses were conducted within breeds since treatment effects differed by breed. The levels of treatments were only partially cross classified in Angus bulls. The model for the Gelbvieh and Angus bull analyses was the same, including the effect of treatment and the linear effect of age.

Results and Discussion

Least squares treatment means of scrotal circumference, testicular weight and initial and final body weight are presented in table 1.

Implanted Angus bulls had reduced testicular weight and smaller scrotal circumferences than nonimplanted controls. Conversely, implanted Gelbvieh bulls had greater testicular weights than the nonimplanted Gelbvieh controls, but scrotal circumference was not affected by implanting treatment.

Table 1. Least Squares Means of Testicular and Feedlot Traits by Treatment Within Breed

Treatment/breed	Number	Weight, lb Initial	Weight, lb Final	Testicular weight, g	Scrotal circum-ference, cm
Angus					
Control	23	618	1131	530.3	37.0
Synovex-S	25	645	1179	479.0	35.3
Gelbvieh					
Control	20	495	1110	452.2	34.7
Ralgro	19	527	1150	508.9	35.1
Synovex-S	23	523	1177	572.0	36.3
Synovex-H	21	551	1207	459.0	34.8

Adjustment for age was not important for testicular weight in either Angus or Gelbvieh bulls. Likewise, the effect of age was not important on scrotal circumference in the Angus or Gelbvieh bull analyses.

Initial weights were different by treatment in Angus bulls (P<.05) but not in the Gelbvieh bulls. Final weights were different by treatment in both the Angus and Gelbvieh bull analyses. The effect of age was not significant for initial and final weights in either group of bulls.

Correlations among traits presented in table 2 were calculated within treatment and adjusted for age. The relationship among traits in Gelbvieh bulls are shown above the diagonal, while the Angus relationships are shown below the diagonal. All traits in the Gelbvieh analysis showed highly significant (P<.001) correlations. The correlation between testicular weight and scrotal circumference in Angus was similar to the correlation calculated in the Gelbvieh analysis. The relationship between initial and final weight in Angus bulls was higher than in the Gelbvieh analysis.

Table 2. Within Treatment Subclass Correlations

	Testicular weight	Scrotal circumference	Weight Initial	Weight Final
Testicular weight	--	.87	.43	.59
Scrotal circumference	.84	--	.41	.63
Initial body wt	-.05	.01	--	.74
Final body wt	.11	.27	.62	--

Gelbvieh correlations above diagonal.
Angus correlations below diagonal.

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