Scrotal Circumference in Angus Beef Bulls: Association Among Age, Weight, Expected Progeny Differences (EPD's) and Production Traits

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Introduction

Multiple farm source Angus bulls were brought to bull test stations operated by the Virginia Beef Cattle Improvement Association located at three locations in Virginia for a 4 month weight gain trial. Data from bulls entering the test station from 2002 to 2006 were retrospectively evaluated. The objective of this study was to study scrotal circumference (SC) genetics as it relates to production and reproduction traits.

Materials and Methods

Multiple farm source Angus bulls (N = 1374) were brought to bull test stations operated by the Virginia Beef Cattle Improvement Association located at three locations in Virginia, for a 3 to 4.5 month weight gain trial. Data from bulls which entered the test station from 2002 to 2006 were retrospectively evaluated. All bulls were subjected to examination of the scrotum and its contests and scrotal measurement procedures upon arrival. A test ration was balanced to support a growth rate of 3 to 4 pounds per day. At the end of the test period bulls were subjected to weight measurement and reproductive examination procedures including scrotal circumference measurement. The individual bulls and their sires' expected progeny difference (EPD) for production and reproduction traits were obtained from the American Angus Association data bank (http://www.angus.org/registeredangus/index.html). The variables of interest were bull's age, weight, daily weight gain, scrotal circumference, adjusted 240-day scrotal circumference, adjusted yearling scrotal circumference, bull and its sire's scrotal circumference EPD, adjusted yearling rib fat, adjusted yearling rib eye area, and adjusted yearling percent intramuscular fat. Univariate regression analysis was used to estimate the correlations.

Results

The results indicated positive correlations for the following: between sire and progeny (N= 577) SC estimated progeny difference (EPD) scores (r2 = 0.45; P = 0.0001), and between sire EPD scores and progeny adjusted 365 d SC (r2 = 0.05; P = 0.0001); within progeny positive correlations were observed for the following: between weight (lbs) and SC (r2 = 0.19; P = 0.0001), between age (m) and SC (r2 = 0.08; P = 0.0001), between EPD values and adjusted 365 d SC (r2 = 0.25; P = 0.0001) and between adjusted 240 d SC and adjusted 365 d SC (r2 = 0.05; P = 0.0001). Associations between SC and carcass traits were present but with low correlations: between adjusted 365 d rump fat and SC, between 365 adjusted rib fat and SC (r2 = 0.02; P = 0.0001), between 365 adjusted REA (rib eye area) and SC (r2 = 0.02; P = 0.0001), between 365 adjusted % IMF (intramuscular fat) and SC (r2 = 0.003; P = 0.05). Average daily gain in the weight during the trial period was positively correlated with growth difference in the SC during the same period ((r2 = 0.02; P = 0.0001). The average daily SC for age at the end of trial period and EPD scores indicated the following:

Average daily change in the scrotal circumference based on EPD scores.

S/C EPD scores	Age at the end of trial period			
	> 1 year (n=443)		< 1 year(n=124)	
	N	S/C ADG	N	S/C ADG
< - 0.5	9	0.047	4	0.067
≥-0.5 to 0	128	0.055	38	0.074
≥ 0 to 0.5	195	0.060	55	0.084
≥ 0.5 to 1	100	0.061	24	0.082
≥ 1	11	0.066	3	0.092

Significance

In conclusion, significant correlation among the production and reproductive traits was observed. Quite high correlations (r2=0.45) were found between young bulls' own SC and EPD for SC substantiating that SC is quite highly heritable and that the EDP system predicts this heritability well. Weight, age and sire EPD had significant but lower correlations. Even though we were able to demonstrate significant correlations between SC and carcass traits because of large numbers, these values were quite low (< or = to r2=0.02). This would suggest that selection for carcass traits such as fat thickness, rib eye area and intramuscular fat would not result in rapid changes in SC values.