ULTRASOUND-MEASURED RIBEYE AREA EPD FOR BRANGUS CATTLE[1]

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Summary

Ultrasound-measured ribeye area (REA) expected progeny differences (EPD) were calculated for 2974 Brangus cattle. Carcass data were collected from 168 steer progeny sired by eight bulls with ultrasound-measured ribeye area EPDs. A heritability estimate of .40 for ultrasound-measured REA and a 2.82 sq. in. range in genetic differences in ultrasound-measured REAs in this population indicate considerable opportunity to make genetic change in this trait. The regression of progeny average carcass REA on the sire's ultrasound measured ribeye area EPD indicated that for each square inch change in the EPD, the carcass REA of their progeny changed by .69 sq. in. The ultrasound-measured ribeye area EPD of young breeding stock appears to be a reasonably good predictor of their progeny's carcass ribeye area.

Introduction

Surveys have shown that consumers want cattle with a reasonable amount of muscle with good quality and low fat. Tools must be developed that let us select foundation stock to produce cattle to meet those specifications. Collection of carcass data is time consuming and expensive, but ribeye area can be measured directly at moderate cost on young breeding stock using ultrasound equipment. Research has indicated that carcass REA is a good indicator of total muscle. With these facts in mind, a research project was started in 1986 using Brangus cattle to evaluate the feasibility of this technique. One year is the most desirable age at which to obtain the ultrasound-measured REA (1991 KSU Cattlemen's Day report). The genetic parameter estimates for the traits involved were reported in the 1992 KSU Cattlemen's Day report. This project has continued with the calculations of ultrasound-measured REA expected progeny differences (EPD) for Brangus cattle and collection of carcass data from progeny sired by bulls with ribeye area EPDs.

Experimental Procedure

Ultrasound-measured REA and yearling weight were obtained from 2178 yearling Brangus cattle from 1986 to 1992 at Brinks Brangus, Eureka, KS and Auburn University. At measurement, they were between 320 and 410 days of age, and both sexes were measured. A two-trait (yearling REA and yearling weight) animal model was used to calculate EPD for REA. Heritabilities of .40 for REA and .44 for yearling weight, and a genetic correlation of .38 between them (1992 KSU Cattlemen's Day report) were used in the analysis. All animals were evaluated, including 796 parents that did not have their ribeye areas measured, and 2,178 progeny who had ultrasound-measured ribeye areas, for a total of 2,974 animals.

Carcass data were collected from 168 steer progeny produced by eight bulls with

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ultrasound-measured ribeye area EPDs in an effort to determine the relationship between the ultrasound-measured trait in young breeding animals and the carcass traits of their progeny. The steers were placed on a finishing ration after weaning at an average age of 284 days and were fed for an average of 129 days, making them 13.6 months old when carcass data were collected at the IBP plant at Emporia, Kansas.

Results and Discussion

The EPDs for ultrasound-measured REA ranged from –.51 to .90 sq. in. Because the EPD is half of the breeding value, this indicates a genetic difference for REA of 2.82 sq. in. With a heritability of .4, considerable change can be made through selection. The genetic trend for the population evaluated is given in Table 1. After ultrasound measurement of REAs became available, some selection was practiced for larger REA, as evidenced by the larger EPDs during the last 2 years.

The average of carcass traits from progeny produced by eight sires and their EPDs are given in Table 2. There was a 1.4 sq. in. difference in REA between the progeny averages of the highest and lowest sire groups. The carcass REAs of progeny were closely related to the EPD of their sire, except for sire 392X, which had one of the larger EPDs but progeny with the smallest REAs. Even so, on the average, for each 1 sq. in. increase in sire's EPD, the progeny carcass REA increased by .69 sq. in. The sire group with the largest REA also had the heaviest carcass weight, least back and kidney-pelvic-heart fat, and lowest yield grade number. The progeny groups with the highest quality grades also had the most backfat. There appears to be little relationship between REA and quality grade. Sire 772X produced progeny with large average REA, one of the higher average quality grades, and a low yield grade.

Table 1. Average Ultrasound-Measured Ribeye Area EPD of Cattle Evaluated by Year of Birth

Birth Year	Ribeye Area EPD[a]
Base Herd	.000
1986	.006
1987	-.003
1988	.007
1989	.040
1990	.117
1991	.167

[a]Reported in square inches of ribeye area.

This project will be continued with carcass data collected from more sire progeny groups. However, sufficient variation seems to occur between sire groups to make changes in carcass traits. At this point, the ultrasound-measured ribeye area EPD appears to be a reasonably good indicator of progeny carcass REA.

Table 2. Sire EPD and Accuracy of (ACC) for Ribeye Area and Average for Carcass Traits of Their Progeny

	Sire		Progeny		
Sire	EPD	ACC	No.	REA sq. in.	Hot Carcass wt, lb
250W	.28	.031	11	12.3^{yz}	697^{z}
409W	-.011	.031	10	12.2^{yz}	696^{z}
548W	-.01	.031	9	12.7^{xyz}	724^{yz}
772X	.087	.069	8	13.2^{xy}	685^{z}
EO	.04	.89	44	12.1^{z}	702^{z}
392X	.66	.078	14	11.9^{z}	706^{yz}
59Y	.53	.51	52	13.3^{x}	743^{y}
71Y2	.10	.74	20	12.1^{yz}	728^{yz}

	Progeny			
Sires	Quality grade[a]	Adjusted fat, in.	KPH, %	Yield grade
250W	Sel 37^{z}	$.36^{z}$	2.24^{z}	2.6^{z}
409W	Ch- 02^{x}	$.53^{xy}$	2.53^{yz}	3.1^{xyz}
548W	Sel 67^{yz}	$.47^{xyz}$	2.32^{yz}	2.8^{xyz}
772X	Sel 70^{xyz}	$.51^{xyz}$	2.59^{yz}	2.7^{yz}
EO	Sel 86^{xy}	$.53^{xy}$	2.31^{z}	3.1^{xy}
392X	Sel 87^{xy}	$.61^{xy}$	2.09^{z}	3.3^{x}
59Y	Sel 60^{z}	$.47^{yz}$	2.18^{z}	2.7^{z}
71Y2	Sel 58^{z}	$.50^{xyz}$	2.70^{y}	3.2^{xy}

[a]Sel = Select, Ch- = low choice. The numerical value is the percent of way to the next grade.
[xyz]Values in the same column with different superscripts are significantly different ($P < .05$).
KPH = % kidney, pelvic, and heart fat.