Ribeye Area Trends in Yearling Angus Bulls

A.S. Leaflet R1715

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Summary

Ultrasound carcass data from yearling Angus bulls were analyzed to determine trends in ribeye area. Bulls with a heavier scan weight had larger ribeyes. Also, bulls with an increased amount of 12-13th rib fat had larger ribeyes. The most efficient bulls with the largest ribeyes had the greatest amount of external rib fat.

Introduction

It is beneficial for cattle breeders to know averages and ranges within a breed for carcass data, so they are better able to compare their animals with others in the breed. Ultrasound carcass data collected on yearling Angus cattle are sent to the Centralized Processing Laboratory at Iowa State University to be interpreted. The objective of this report is to summarize the bull data from 1998-99 to determine trends for ribeye area by scan weight and 12-13th rib fat on Angus yearling bulls. (For analysis of heifer data, see A.S. Leaflet R1716).

Materials and Methods

Ultrasound images on 25,748 yearling Angus bulls were interpreted by the Iowa State University Central Processing Laboratory. Data were grouped into categories by scan weight (100 pound increments) and 12-13th rib fat (0.05 inch increments) as shown in Table 1. Data were analyzed using the general linear model procedure of SAS. Least squares means were found for ribeye area by each weight category, each 12-13th rib fat category and each weight by 12-13th rib fat category.

Results and Discussion

Least squares means and standard errors for ribeye area (inches^2) by scan weight (pounds), 12-13th rib fat (inches) and scan weight (pounds) by 12-13th rib fat (inches) are shown in Tables 2 and 3. As scan weight increased, ribeye area also increased. (Table 2, Figure 1). Similarly, as 12-13th rib fat increased, ribeye area increased (Table 2, Figure 2). Within each of the different scan weight classes, ribeye area increased as 12-13th rib fat increased (Table 3, Figure 3). Within each of the 12-13th rib fat classes, ribeye area increased as scan weight increased (Table 3, Figure 4). As expected, at a given level of rib fat, heavier bulls had larger ribeyes. Somewhat more surprising was the fact that at a given weight, bulls with more rib fat also had larger ribeyes.

It is possible that there is a slight bias in the data. The weight categories are separated by 100 pounds. Within each category, the fatter bulls are slightly heavier and have larger ribeyes (Tables 4, 5 and 6). However, the difference in ribeye area between the leanest and fattest bulls within each weight category is larger then would be expected due to the increase in weight alone. For example, in the 900 to 1000 pound category (Table 4), the weight difference between the leanest and fattest bulls is approximately 14 pounds. The difference in ribeye area between the same groups is about one inch^2. This large of an increase in ribeye area would not be expected to be due solely to the 14 pound increase in weight.

It is important to remember the difference between the physiology maturity pattern of bulls and steers. At a year of age, bulls are at a lower point in their growth curve than steers. This means that bulls are putting on more muscle and less fat than steers at the same age. At this age, steers are at a higher point of their growth curve. Their rate of muscle deposition has slowed down, and their rate of fat deposition has increased. In general, steers will be fatter than bulls of the same age. Time of measurement is an important consideration. These bulls were scanned at approximately one year of age. Carcass traits on steers are normally measured at the time of slaughter, which is approximately 14 to 16 months for calves that are put on feed directly after weaning. The differences in time of measurement and stage of growth at time of measurement make it difficult to predict the carcass traits of steer progeny in absolute numbers from the ultrasound carcass data of bulls. However, relative differences in carcass traits between bulls should be transmitted to their steer progeny. In other words, if bull A has a larger ribeye area than bull B, bull A's progeny should have larger ribeyes than bull B's progeny.

It is possible that the fatter bulls are more efficient. They have a greater appetite and are able to take in large quantities of feed. They use this energy to put on lean tissue to the limit of their genetic potential, with the excess going to fat tissue. If this is the case, selecting against external rib fat will decrease appetite, and eventually could limit the amount of muscle a bull can deposit. Therefore, it is important for producers not to discriminate against fatter bulls if they also have large ribeyes. External rib fat is also highly affected by time of marketing. All cattle start at yield grade one and will eventually be at yield grade five if left on feed long enough. The key for a feedlot operator is to market the cattle when they stop depositing muscle and start using most of their feed energy to deposit fat. By marketing cattle at the correct time, a producer can limit the

amount of external rib fat on the carcass without having to discriminate against heavier muscled, fatter breeding stock.

Implications

Realtime ultrasound has been developed as an effective tool for breeders to use in measuring body composition traits. These results would indicate that young bulls with above average levels of external fat should not be discriminated against. Within a given weight category, the most efficient bulls with the biggest ribeye areas may be the fattest bulls.

Acknowledgments

Centralized Ultrasound Processing Laboratory
American Angus Association

Table 1. Number of observations in each scan weight (pounds) by 12-13th rib fat (inches) category.

	12-13th rib fat						
Scan weight	<0.15	0.15-0.20	0.20-0.25	0.25-0.30	0.30-0.35	>0.35	Total
<900	778	392	216	87	34	18	1525
900-1000	1231	1263	1085	657	284	151	4671
1000-1100	1194	1727	2099	1710	909	705	8344
1100-1200	506	961	1515	1604	1174	1261	7021
1200-1300	111	281	498	659	608	1020	3177
>1300	8	54	99	177	196	476	1010
Total	3828	4678	5512	4894	3205	3631	25748

Table 2. Least squares means with standard errors (SE) for ribeye area (inches^2) in each of the scan weight (pounds) categories and each of the 12-13th rib fat (inches) categories.

Scan weight	LSMeans	SE
<900	10.6058	0.0570
900-1000	11.2257	0.0252
1000-1100	11.7549	0.0188
1100-1200	12.2844	0.0192
1200-1300	12.7352	0.0266
>1300	13.2598	0.0671

12-13th rib fat	LSMean	SE
<0.15	11.6109	0.0616
0.15-0.20	11.9232	0.0306
0.20-0.25	11.9864	0.0266
0.25-0.30	12.0192	0.0276
0.30-0.35	12.1236	0.0361
>0.35	12.2024	0.0445

Table 3. Least squares means with standard errors (SE) for ribeye area (inches^2) in each of the scan weight (pounds) by 12-13th rib fat (inches) categories.

	12-13th rib fat					
Scan weight	<0.15	0.15-0.20	0.20-0.25	0.25-0.30	0.30-0.35	>0.35
<900	10.12±0.04	10.44±0.05	10.61±0.07	10.65±0.11	10.82±0.17	10.99±0.23
900-1000	10.91±0.03	11.09±0.03	11.22±0.03	11.35±0.04	11.32±0.06	11.46±0.08
1000-1100	11.50±0.03	11.66±0.03	11.75±0.03	11.77±0.03	11.91±0.04	11.94±0.04
1100-1200	12.00±0.05	12.23±0.03	12.27±0.03	12.36±0.03	12.41±0.03	12.44±0.03
1200-1300	12.42±0.09	12.75±0.06	12.78±0.05	12.76±0.04	12.82±0.04	12.88±0.03
>1300	12.71±0.34	13.36±0.14	13.29±0.10	13.24±0.08	13.46±0.07	13.50±0.05

Table 4. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for bulls weighing 900 to 1000 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.15	1250	948.20±28.10	10.4608±1.1080
0.15-0.20	1264	953.22±27.85	10.7816±1.0946
0.20-0.25	1091	955.25±27.12	10.9397±1.0935
0.25-0.30	662	958.47±26.61	11.1857±1.1358
0.30-0.35	288	959.50±25.68	11.2067±1.0755
>0.35	152	962.49±25.40	11.4311±1.0941

Table 5. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for bulls weighing 1000 to 1100 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.15	1218	1040.81±28.93	11.1584±1.2284
0.15-0.20	1734	1045.04±28.42	11.4085±1.1604
0.20-0.25	2109	1047.35±28.30	11.5949±1.1453
0.25-0.30	1717	1049.43±28.65	11.6518±1.1599
0.30-0.35	917	1052.06±28.48	11.8681±1.1004
>0.35	708	1054.96±28.12	11.9644±1.1411

Table 6. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for bulls weighing 1100 to 1200 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.15	516	1134.86±27.82	11.7986±1.2022
0.15-0.20	971	1137.41±27.63	12.0794±1.1635
0.20-0.25	1520	1141.34±29.03	12.1793±1.1820
0.25-0.30	1612	1143.37±28.35	12.3488±1.1809
0.30-0.35	1181	1145.05±27.72	12.4910±1.1687
>0.35	1273	1148.43±28.19	12.5566±1.1880

Figure 1. Effect of scan weight on ribeye area.

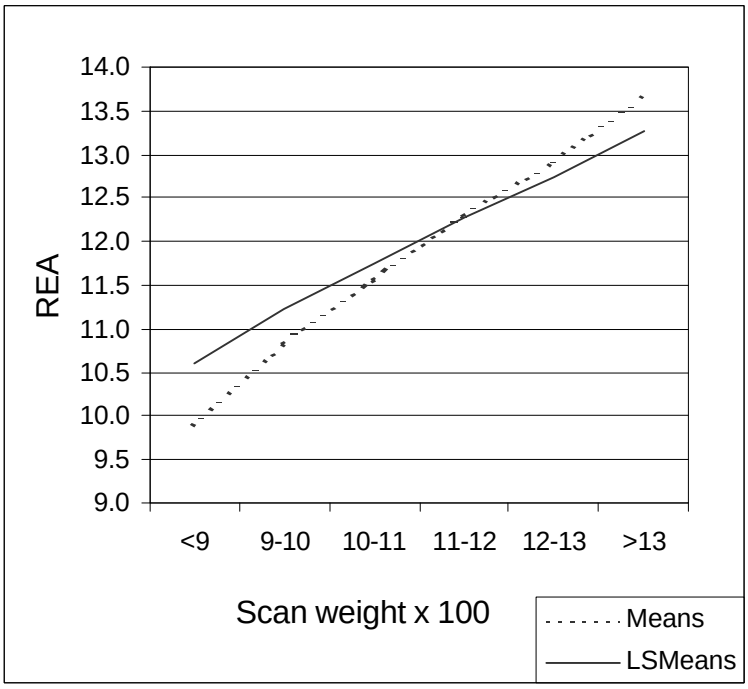

Figure 2. Effect of 12-13th rib fat on ribeye area.

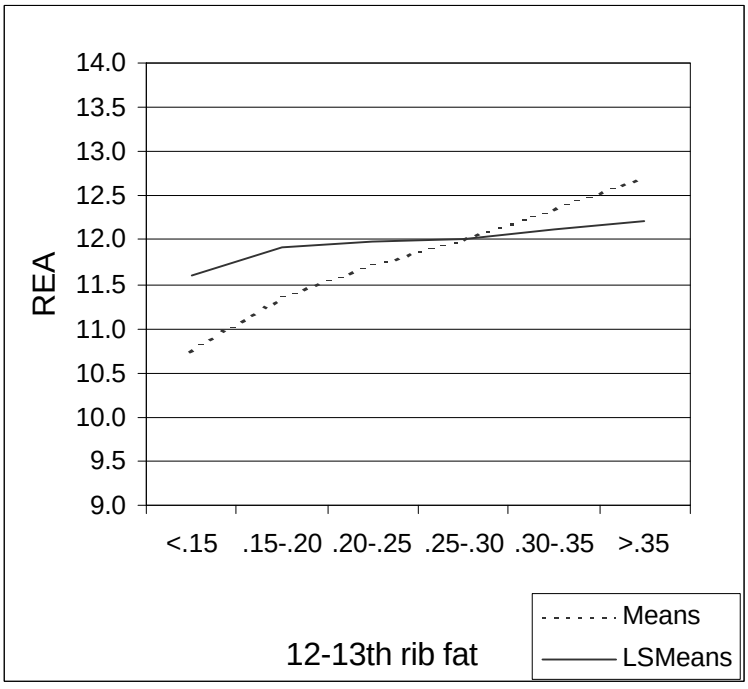

Figure 3. Effect of 12-13th rib fat on ribeye area for different scan weights.

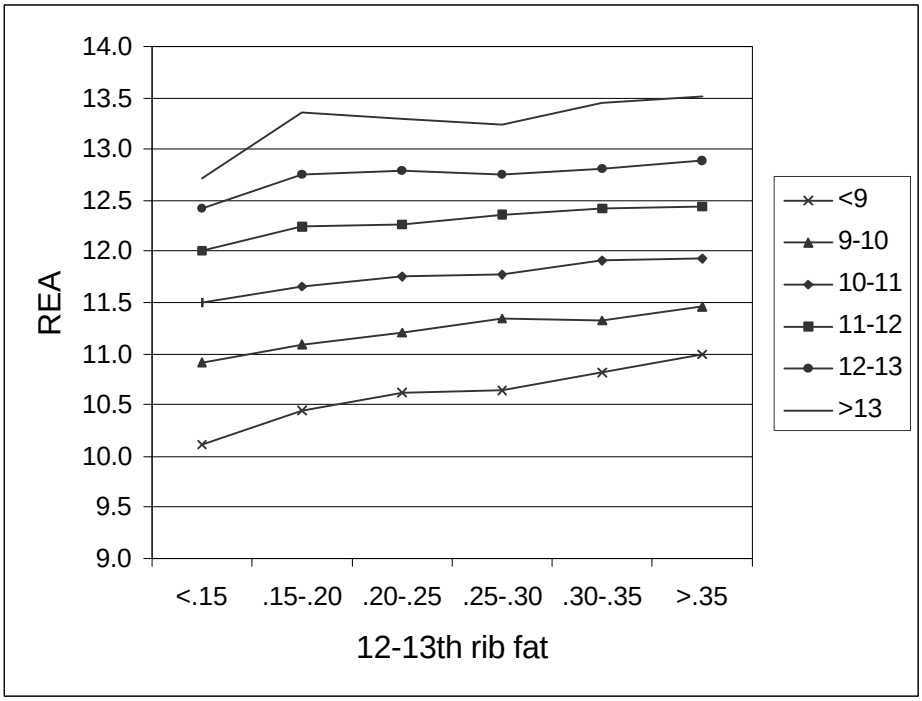

Figure 4. Effect of scan weight on ribeye area for different levels of 12-13th rib fat.