Ribeye Area Trends in Yearling Angus Heifers

A.S. Leaflet R1716

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Summary

Ultrasound carcass data from yearling Angus heifers were analyzed to determine trends in ribeye area. Heavier heifers at scanning had larger ribeyes. Also, heifers with an increased amount of external rib fat had larger ribeye areas. The most efficient heifers with the largest ribeyes had the greatest amount of 12-13th 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 heifer data from 1998-99 to determine trends for ribeye area by scan weight and 12-13th rib fat on Angus yearling heifers. (For analysis of bull data, see A.S. Leaflet1715.)

Materials and Methods

Ultrasound images on 7,471 yearling Angus heifers 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 scan weight classes, ribeye area increased as 12-13th rib fat increased (Table 3, Figure 3). Within each of the different 12-13th rib fat classes, ribeye area increased as scan weight increased (Table 3, Figure 4). The trend lines on these figures are not as smooth as the lines in the figures describing the bulls. This can be explained by group size. There were fewer heifers analyzed than bulls, so outliers are more likely to cause deviations from the expected smooth lines. As expected, at a given level of rib fat, heavier heifers had larger ribeyes. Like the bulls analyzed previously, at a given weight, heifers with more rib fat had larger ribeyes.

Like the bull data, the heifer weight categories are separated by 100 pounds. Within each category, the fatter heifers are slightly heavier and have larger ribeye areas (Tables 4, 5 and 6). However, the difference in ribeye area between the leanest and fattest heifers within each weight category is larger than would be expected due to the increase in weight alone. For example, in the 800 to 900 pound category (Table 5), between the leanest and fattest heifers, the difference in weight is about 23 pounds, and the difference in ribeye area is approximately 1.25 inches. This large of an increase in ribeye area is not likely to be due to the 23 pound increase in weight alone.

Predicting absolute carcass performance of steer progeny from ultrasound carcass data on their dams is difficult because of physiological differences between heifers and steers, and because of differences in the time that carcass measurements are taken. However, as with bulls, relative differences in carcass merit between females should be passed on to their progeny. For example, if cow A has a larger ribeye than cow B, offspring from cow A would be expected to have larger ribeyes than offspring from cow B.

As with the bulls, it is possible that the fatter heifers have a larger appetite and are able to eat more feed. They use the feed energy to put on as much lean tissue as their genetic potential allows, with the rest of the feed going to fat deposition. Selecting against external fat could decrease appetite, eventually limiting the amount of muscle an animal can deposit. Some level of external fat is also necessary for efficient heifer reproduction. Therefore, it is important for producers not to overly discriminate against fatter heifers. External rib fat is also highly affected by time of marketing. 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 fat on the carcass without having to discriminate against 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 heifers with above average 12-13th rib fat should not be discriminated against. Within a given weight category, the most efficient heifers with the largest ribeyes may be the fattest females.

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	<0.10	0.10-0.15	0.15-0.20	0.20-0.25	0.25-0.30	>0.30	Total
<700	258	271	93	48	18	9	697
700-800	283	660	519	305	148	104	2019
800-900	116	436	569	595	412	445	2573
900-1000	14	126	227	274	291	563	1495
>1000	6	46	69	96	108	362	687
Total	677	1539	1477	1318	977	1483	7471

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
<700	8.1108	0.0782
700-800	8.5925	0.0339
800-900	9.1879	0.0305
900-1000	9.6974	0.0512
>1000	10.0896	0.0783

12-13th rib fat	LSMean	SE
<0.10	8.5483	0.0943
0.10-0.15	8.8665	0.0430
0.15-0.20	9.0767	0.0403
0.20-0.25	9.3480	0.0421
0.25-0.30	9.4555	0.0549
>0.30	9.5188	0.0749

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	<0.10	0.10-0.15	0.15-0.20	0.20-0.25	0.25-0.30	>0.30
<700	7.42±0.07	7.70±0.06	7.92±0.10	8.63±0.13	8.54±0.21	8.46±0.34
700-800	8.03±0.06	8.34±0.04	8.58±0.05	8.78±0.06	8.89±0.08	8.95±0.09
800-900	8.62±0.09	8.95±0.05	9.19±0.04	9.33±0.04	9.49±0.05	9.54±0.05
900-1000	9.33±0.24	9.41±0.08	9.67±0.06	9.76±0.06	9.95±0.06	10.06±0.05
>1000	9.34±0.36	9.93±0.14	10.03±0.12	10.23±0.10	10.40±0.09	10.60±0.06

Table 4. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for heifers weighing 700 to 800 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.10	292	744.22±27.56	7.6802±0.8750
0.10-0.15	662	748.69±27.81	8.1177±0.9034
0.15-0.20	520	755.39±27.23	8.4472±0.9218
0.20-0.25	305	758.33±25.89	8.6885±1.0092
0.25-0.30	149	761.79±26.05	8.8824±1.0252
>0.30	105	767.68±24.90	8.9846±1.0147

Table 5. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for heifers weighing 800 to 900 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.10	122	834.52±24.19	8.4741±1.0542
0.10-0.15	436	840.61±28.13	8.7736±0.9761
0.15-0.20	570	841.47±28.25	9.1179±0.9352
0.20-0.25	597	846.15±28.38	9.3348±0.9706
0.25-0.30	414	849.93±28.45	9.5701±1.0843
>0.30	447	856.61±28.36	9.7315±1.0505

Table 6. Scan weights (pounds) and ribeye areas (inches^2) by 12-13th rib fat (inches) category for heifers weighing 900 to 1000 pounds.

12-13th rib fat	n	Scan weight	Ribeye area
<0.10	17	940.65±30.12	9.3571±1.0151
0.10-0.15	126	935.22±28.15	9.3468±1.0192
0.15-0.20	227	936.59±27.09	9.7705±1.1094
0.20-0.25	276	938.89±29.07	9.8500±1.0676
0.25-0.30	291	941.91±28.81	10.0625±1.1050
>0.30	567	945.38±27.86	10.3492±1.0779

Figure 1. Effect of scan weight on ribeye area.

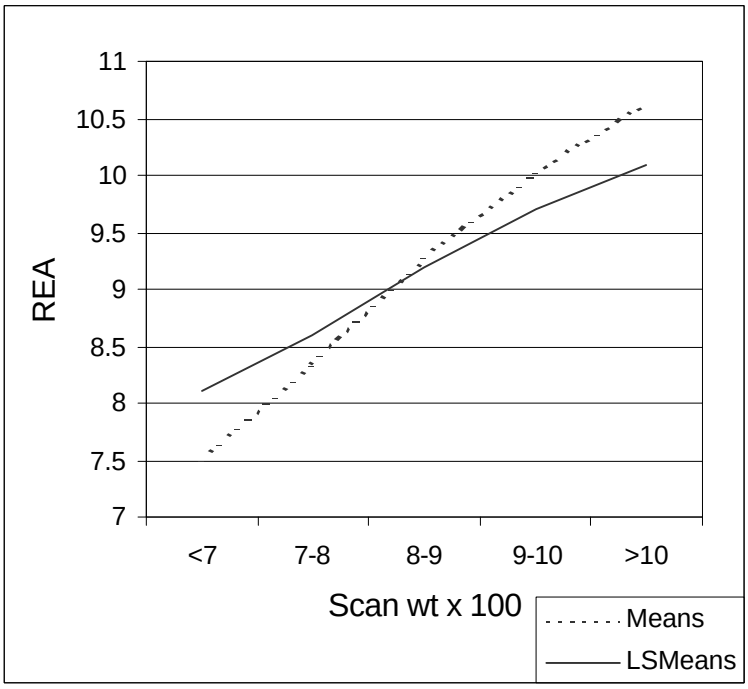

Figure 2. Effect of 12-13th rib fat on ribeye area.

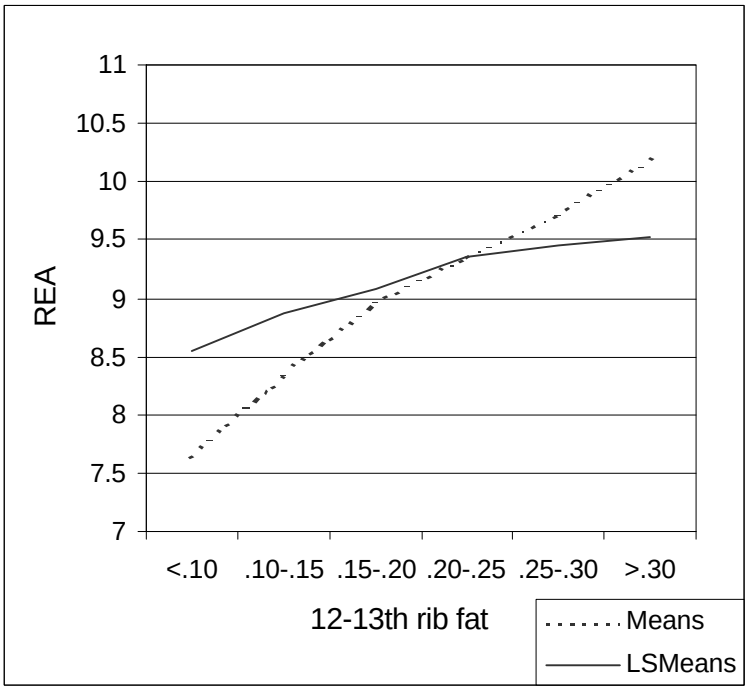

Figure 3. Effect of 12-13th rib fat on ribeye area for different of scan weights.

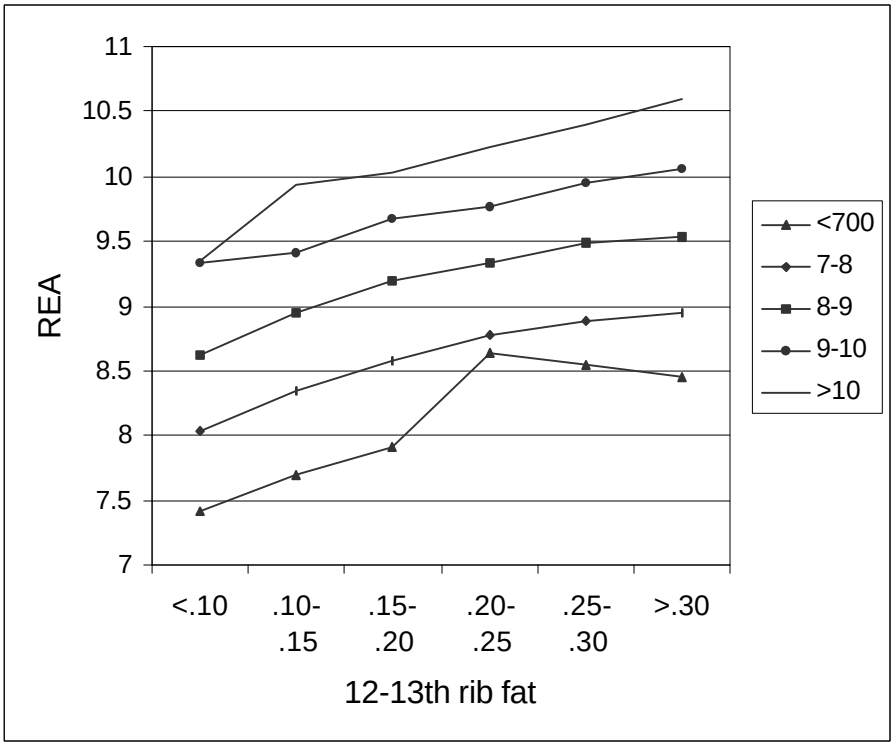

Figure 4. Effect of scan weight on ribeye area for different levels of 12-13th rib fat.