

Relationships Among Carcass Characteristics of Cattle  
Exhibited at Shows in the Midwest

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Carcass data were collected from 24 carcass shows held throughout the Midwest, including eight county shows in Kansas and one county show in Nebraska, seven years' results from the Kansas National Junior Livestock Show in Wichita, two years' results from the Midwest Steer and Carcass Show at Austin, Minn., two years' results from the St. Joseph Live Steer and Carcass Show, St. Joseph, Mo., and one-year results from AK-SAR-BEN, Omaha, Nebr.; Waterloo Carcass Show, Waterloo, Iowa; Hoosier Beef Show, Indianapolis, Ind.; and the 4-H Beef Carcass Summary, Nebraska State Fair, Lincoln, Nebr.

The shows were from 1962 through 1969. Gross data collected included live weight, carcass weight, USDA carcass grade, USDA carcass conformation score, dressing percentage, rib-eye area, rib-eye area/carcass hundredweight, fat cover at the 12th rib, fat cover/carcass hundredweight, percentage of kidney fat, percentage of lean cuts, marbling, maturity, carcass index, quality grade, and daily gain. Each show collected its data so data collected were not the same for each show. Table 21 shows the number of measurements taken, the average for each measure, and the standard error for each.

Carcass grade correlated highly (.886) with marbling, as is true with carcasses normally found in coolers. Squaring the simple correlation gives us a measure of the variation percentage in carcass grade due to marbling. Marbling accounted for 78% of the variation in carcass grade at the 24 shows studied.

The relationship between fat cover and carcass grade has been discussed in many ways at recent livestock shows. Here simple correlations involved were .272 for fat cover and carcass grade and .343 for fat cover and marbling, indicating that fat cover accounts for 14% of the variation in carcass grade and 12% of the variation in marbling. So 86% and 88%, respectively, of the variation in carcass grade and marbling are accounted for by factors other than fat cover.

Rib-eye area was negatively correlated with both fat cover and marbling. As fat cover increases, muscling, as related to rib-eye area, tends to decrease. Basically, the correlation between rib-eye area and carcass grade is zero. So, muscling can be increased in cattle without jeopardizing carcass grade. The correlations between carcass conformation and rib-eye area and between carcass conformation and fat thickness are .202 and .347, respectively. Our present system of assigning carcass conformation scores, therefore, emphasizes fat more than muscling.

Fat cover accounted for only 14% of the variation in dressing percentage and rib-eye area, as an indicator of muscling, accounted for only 1% of the variation in dressing percentage. In nonshow cattle fat and muscle account for more variation, so dressing percentage in show cattle is a poor measure of net merit. The highest correlation between daily gain and any other measure was the correlation between daily gain and rib-eye area (.116). Observations reported here indicate that the steers exhibited by juniors or adults at carcass contests are not representative of normal steer populations. Measures are needed to help eliminate show animals that do not represent a normal population.

Simple correlations for indicated measurements are presented in table 20.

Table 20. Simple Correlations for Carcasses from  
24 Midwest Shows

	Live weight	Carcass grade	Carcass conformation	Rib-eye area	Fat cover
Carcass grade	.026				
Carcass conformation	.154	.399			
Rib-eye area	.430	-.090	.202		
Fat cover	.162	.372	.347	-.249	
Marbling	-.009	.886	.330	-.130	.343

Table 21. Numbers, Means, and Standard Errors for Traits Measured on Carcass at 24 Midwest Carcass Shows, 1962-69.

Trait measured	Number of measures	Mean* (Average)
Live weight	1216	965 $\pm$ 2.6 lb.
Carcass weight	1269	610 $\pm$ 1.8 lb.
Carcass grade <sup>a</sup>	1192	10.6 $\pm$ .04
Carcass conformation <sup>a</sup>	592	11.5 $\pm$ .05
Dressing %	757	62.6 $\pm$ .1
Rib-eye area	1297	11.46 $\pm$ .04 sq. in.
REA/cwt. carcass	543	1.88 $\pm$ .01 sq. in.
Fat cover	1297	.60 $\pm$ .006 in.
Fat cover/cwt. carcass	543	.096 $\pm$ .001 in.
% kidney fat	676	2.9 $\pm$ .002
% lean cuts	758	49.7 $\pm$ .07
Marbling <sup>b</sup>	628	16.5 $\pm$ .18
Maturity <sup>c</sup>	345	1.8 $\pm$ .05
Carcass index	667	
Quality grade <sup>a</sup>	185	10.28 $\pm$ .12
Daily gain	80	1.96 $\pm$ .08 lb.

a 10 = low choice  
11 = average choice  
12 = high choice

\*  $\pm$  indicates standard error

b 16 = low modest  
17 = average modest  
18 = high modest

c 1 = A<sup>-</sup>  
2 = A<sup>O</sup>  
3 = A<sup>+</sup>