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Performance and Carcass Traits of Feeder Calves Scored for Muscling, Frame Size, and Condition

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Summary

Calves with different USDA frame sizes had similar carcass composition and quality when slaughtered within the recommended weight range for their frame size. Large-framed calves had higher dressing percentages and gained faster than medium- or small-framed calves. Condition score appeared more useful than muscling score to characterize calves' performance and carcass traits. Calves thin at weaning had poorer performance, lower marbling scores, less fat, and higher retail product percentages than calves in medium or fat condition at weaning. Medium condition calves gained faster, had less fat, higher retail product percentages, and lower marbling scores than fat calves. Calves with large frame, thick muscle, and medium condition scores performed best in the feedlot and produced more desirable carcasses.

Experimental Procedure

Twelve sire breeds differing in biological type were mated artificially to Hereford and Angus dams to produce the 1,669 crossbred steer calves we studied. Calves were born in 1970 through 1974 and were part of the Germ Plasm Evaluation project at the U.S. Meat Animal Research Center at Clay Center, Nebr. Calves were weaned when approximately 200 days old, and were scored for condition, muscling, and frame size at about 250 days. Steers were fed a corn silage-and-concentrate diet that averaged 72 to 76% TDN over the entire feeding period. One third of the steers in each sire breed group was slaughtered when Hereford x Angus crosses reached 950 lb., and the second and third groups were slaughtered 35 and 70 days later. The right carcass side of each animal was fabricated into boneless, trimmed retail cuts.

Results and Discussion

Table 2.1 presents the number of steers in each frame size and the slaughter weights, average daily gains, and dressing percentages. Only steers slaughtered within the weight ranges recommended by USDA for the different frame sizes were compared. For example, a small-framed steer slaughtered at 1150 lb., or a large-framed steer slaughtered at 975 lb., would not be included.

Slaughter weights increased almost 200 lb. with each increase in frame size, and dressing percentage increased significantly with each increase in frame size. Large-framed calves gained significantly faster than medium- or small-framed calves, but there was no significant difference between medium- and small-framed calves (likely due to few small-framed calves).

Table 2.1. Frame sizes and performance traits.

Frame size	No.	Slaughter wt, lb.	Dressing %	ADG
Large	82	1271[a]	61.5[a]	2.78[a]
Medium	563	1080[b]	60.8[b]	2.51[b]
Small	17	886[c]	59.2[c]	2.27[b]

[a,b,c]Means within the same column with different superscripts differ statistically (P<.05).

Carcass traits for different frame sizes are presented in table .2. There were no significant differences between frame sizes for any of the carcass traits presented. Therefore, stratifying calves into frame sizes, and then slaughtering them at weights recommended by USDA, results in similar carcass composition and quality.

Table 2.2. Frame sizes and carcass traits.

Frame size	12th rib fat, in.	Kidney knob, %	%Retail product	%Bone	Marbling[1]
Large	.50	4.4	67.7	12.6	11.2
Medium	.54	4.2	67.0	12.3	11.9
Small	.50	4.0	67.8	13.3	11.5

[1]10 = Small^{-}, 11 = Small^{0}, 12 = Small^{+}, etc.

Table 2.3 shows performance traits for calves stratified by muscling scores. We had no calves scored as thick muscled even though some Jersey crosses were included. Thick muscled calves were heavier at weaning and at slaughter, but gained slower than calves with medium muscling, which we cannot explain. Medium muscled calves were significantly fatter at slaughter, had higher marbling scores, and lower percentages of trimmed retail product (Table .4).

Table 2.3. Muscling scores and performance traits.

Muscling score	No.	Slaughter wt., lb.	Dressing %	ADG
1 (thick)	1394	1052[a]	60.2	2.36[b]
2	275	1033[b]	60.1	2.43[a]
3 (thin)	0	--	--	--

[a,b,c]Means within the same column with different superscripts differ statistically (P<.05).

Table 2.4. Muscling scores and carcass traits.

Muscling score	12th rib fat, in.	Kidney knob, %	%Retail product	%Bone	Marbling[1]
1 (thick)	.47[b]	3.9[b]	69.3[a]	12.8	10.5[b]
2	.50[a]	4.8[a]	65.6[b]	12.7	12.9[a]
3 (thin)	--	--	--	--	--

[a,b,c]Means within the same column with different superscripts differ statistically (P<.05).

[1]10 = Small^{-}, 11 = Small^{0}, 12 = Small^{+}, etc.

We also scored calves for condition on a three-point scale (Table 2.5). Thin calves were significantly lighter at slaughter, partly because they were lighter at weaning, but they gained significantly slower, so compensatory gain probably was not involved. Calves thin after weaning had lower dressing percentages than their higher-condition counterparts. Interestingly, medium-condition calves gained significantly faster and had lower dressing percentages than fat-condition calves but, their slaughter weights were equal.

Table 2.5. Condition scores and performance traits.

Condition score	No.	Slaughter wt., lb.	Dressing %	ADG
1 (Thin)	385	1031[b]	59.3[C]	2.16[c]
2	958	1053[a]	60.3[b]	2.45[a]
3 (Fat)	326	1060[a]	60.9[a]	2.36[b]

[a,b,c]Means within the same column with different superscripts differ significantly (P<.05).

As weaning condition scores progressed from thin to fat, fat thickness and marbling increased, and retail-product and bone percentages decreased significantly (Table 2.6).

Table 2.6. Condition scores and carcass traits.

Condition score	12th rib fat, in.	Kidney knob, %	%Retail product	%Bone	Marbling[1]
1 (Thin)	.38[c]	3.5[b]	72.5[a]	13.2[a]	8.9[a]
2	.47[b]	4.2[a]	68.3[b]	12.8[b]	11.1[b]
3 (Fat)	.61[a]	4.1[a]	65.0[c]	12.1[c]	12.7[c]

[a,b,c]Means within the same column with different superscripts differ significantly (P<.05).

[1]9 = Slight^{+}, 10 = Small^{-}, 11 = Small^{0}, 12 = Small^{+}, etc.