Influence of Breeding and Length of Feeding Period on Carcass Characteristics and Palatability of Beef (Project 639)

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Carcass measurement, muscle quality, and palatability data have been collected on 88 paternal half-sib Angus steers. At weaning they were subdivided into one of the 11 nutritional and management regimes shown in Table 58. Phase I involved feeding from 0 to 224 days after weaning. Phase II was essentially deferred feeding. The intermittent slaughter of animals from both phases made possible the study of muscle and fat tissue development within as well as between phases. Quantity and quality of muscle are the two factors that determine true beef carcass value.

Results

Superficial linear and circumference carcass measurements proved unreliable in predicting carcass composition, retail yield or quantity of muscle. Quantity of muscle, edible portion, retail yield and cutability are all similar terms and indicate amount of muscle in a carcass. Linear and circumference measurements would be of greater value to estimate muscle quantity or retail cut yield if the amount of subcutaneous (outside) and intermuscular (seam) fat could be controlled or adjusted.

The two nutritional and management regimes were quite different, although the percentage of lean, fat and bone for the last slaughter groups in phase I and II, (groups 8 and 11) were quite similar. Table 59 shows those three composition characteristics varying within 1 percent in the two groups. Average carcass weight of group 11 was 224.7 pounds heavier than for group 8, but quality grades were mostly choice, and muscle quality was quite similar. Even though groups 8 and 11 produced the same percentage of lean and were genetically similar, total pounds of lean was 120.9 greater for group 11. Composition in both phases changed greatly as time progressed from weaning to finishing. In phase I the major change from good to choice grade occurred between 168 and 196 days on feed. The more mature cattle in phase II required slightly less feeding time to achieve similar results.

Shear and taste panel tenderness data indicated that groups 1, 2, 3, 8, and 9 were not as tender or palatable and had less feed, hence less muscle quality, than the other groups.

Table 58
Slaughter Age and Weight, Carcass Weight,[1] and Management Regime for Each Group of Steers Indicated.[2]

Group	Slaughter age (days)	Slaughter weight (lb.)	Carcass weight	Class calf-beef	Carcass grade[2]	Management
			Phase I			Days on feed
1	240	351.3	188.2	8 - 0	7G, 1S	0
2	296	446.9	254.6	7 - 1	8G	56
3	324	492.9	297.7	2 - 6	8G	84
4	352	525.0	327.5	0 - 8	7G, 1C	112
5	380	630.6	391.2	0 - 8	7G, 1C	140
6	408	681.9	430.7	0 - 8	6G, 2C	168
7	436	785.0	487.6	0 - 8	1G, 7C	196
8	464	834.8	521.7	0 - 8	1C, 7C	224
			Phase II			
9	540	496.0	281.2	0 - 8	8S-	Weaned then summer grazed & wintered from June, 1963 to April, 1964
10	660	687.0	374.2	0 - 8	5S+, 1S, 2G-	Summer grazed, wintered and summer grazed from June, 1963 to August, 1964
11	800	1175.0	745.4	0 - 8	2C+, 5C-, 1G+	Summer grazed, wintered and summer grazed from June, 1963 to August, 1964 Full feed 140 days until slaughter.

1. Eight steers per group.
2. C=Choice, G=Good, S=Standard

Table 59
Means of Indicators of Carcass Composition

Group	Fat thickness 12th rib	Ribeye area 12th rib	% kidney & pelvic fat	Weight kidney & pelvic fat	Estimated % bone	Estimated % fat	Estimated % lean	Estimated lbs. of lean
				Phase I				
1	.11	5.44	2.34	2.21	19.7	16.1	64.0	120.4
2	.21	5.97	2.52	3.21	16.2	25.3	58.5	148.9
3	.28	7.87	2.61	3.89	14.0	25.1	60.5	180.1
4	.38	7.68	3.74	6.12	15.5	28.7	57.0	186.7
5	.46	8.33	3.69	7.22	16.0	31.2	53.8	210.5
6	.41	8.84	3.84	8.26	15.5	29.7	56.2	242.1
7	.59	9.31	4.04	9.85	14.6	32.4	51.2	249.7
8	.69	10.16	4.28	11.15	13.1	35.5	53.8	280.67
				Phase II				
9	.03	6.42	1.04	1.46	21.5	6.1	72.2	203.0
10	.20	8.44	2.35	4.39	17.0	22.2	61.7	230.9
11	.57	13.03	3.71	13.85	13.8	35.4	53.8	401.6