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Evaluation of the New (U.S.D.A., 1974) Carcass Beef Quality Grade Standards

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Summary

Carcasses from 1,117 steers from Hereford and Angus dams mated artificially to Hereford, Angus, Charolais, Jersey, South Devon, Simmental and Limousin sires were studied. The study was to evaluate the U.S.D.A., 1965 quality grade ('65-QG) standards in relation to palatability of rib steaks, and also to see how the new grades change the distribution of carcasses in each grade. Rib steaks from 494 of these carcasses were cooked and evaluated by a taste panel; a rib steak from each of the 1,117 carcasses was cooked and measured for tenderness by a Warner-Bratzler shear-device. All data were adjusted to a constant carcass weight of 626 lb.

Fifty-eight percent of the carcasses graded Choice or higher by '65-QG standards and 68% by '74-QG standards. Restricting the Good grade marbling requirement and eliminating conformation increased the number of carcasses that graded Standard. Jersey sired carcasses made the largest increase to Choice or higher, while Charolais and Angus sired carcasses made the smallest increase (7% and 6%, respectively).

Generally, as quality grades evaluated by both grade standards decreased from Prime to Standard, mean values for marbling and palatability also decreased. However, there were no differences in palatability between high Good and low Choice, regardless of which set of grade standards was used. It seems highly unlikely that changes in the '74-QG standards, will make any difference consumers will recognize in the palatability of the grade of beef they are accustomed to eating.

Introduction

The recently proposed new carcass beef grade standards (U.S.D.A., 1974) differ from the U.S.D.A., 1965 grade standards on four major points. First, conformation is eliminated from quality grade standards. Second, minimum marbling requirements in Prime, Choice, Good and Standard do not increase with increasing A maturity. For B maturity and older carcasses, increases in marbling are required with increases in maturity, but minimum marbling is decreased one degree. Third, the marbling requirement for the Good grade is narrowed. Fourth, all graded beef carcasses (except bulls) must be both quality and yield graded.

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In this study, we evaluated the two grade standards in relation to palatability of rib steaks. Distribution of carcasses graded under the 1965 and the 1974 standards is also described.

Experimental Procedure

Quality grades were determined on 1,117 carcasses of steers from Hereford and Angus cows artificially mated to Hereford, Angus, Charolais, Jersey, South Devon, Simmental and Limousin bulls. These steers were from the "cattle germ plasm evaluation project" at the U.S. Meat Animal Research Center, Clay Center, Nebr. Calves were weaned each year (three years) when approximately 215 days old, conditioned 28 days, assigned to feeding groups, then slaughtered after approximately 184, 218 or 251 days on feed.

Quality grades were determined by U.S.D.A. 1965 quality grade ('65-QG) standards 24 hours after slaughter. A steak at the 10th rib from each of the 1,117 carcasses were frozen, later thawed, cooked at 350F to an internal temperature of 151F and sheared by a Warner-Bratzler shear device. A steak at the 11th rib from 494 of the carcasses (equal number from each breed) was cooked and evaluated by a six-member taste panel.

Quality grades under the U.S.D.A., 1974 quality grade ('74-QG) standards were computed from original cooler data for individual carcasses; all were A maturity. Data were analyzed with all carcasses adjusted to a constant carcass weight of 626 lb.

Results and Discussion

Least squares means for marbling and palatability characteristics within levels of quality grade are shown in table 26.1. Generally, as quality grades (evaluated by both grade standards) decreased from Prime to Standard, marbling and palatability also decreased. Yet it must be appreciated that the mean values for taste panel tenderness and overall acceptability in any grade were above 5, the minimum required to be judged acceptable.

The important point in table 26.1 is the comparison between low Choice and high Good palatability traits since the '74-QG standards allow many cattle graded high Good by the '65-QG standards to grade low Choice. There were not statistical or meaningful differences in Warner-Bratzler shear values or taste panel scores between high Good and low Choice, regardless of which set of grade standards was used. It seems highly unlikely that changes in the '74-QG standards will make any difference consumers will recognize in palatability of the grade of beef they are accustomed to eating.

Distribution of carcasses by quality grades under both standards are shown in table 26.2. The percentage of carcasses graded Choice or higher was 58% using '65-QG standards and 68% using '74-QG standards. The percentage of carcasses that graded Good was 41% using '65-QG standards and 26%

using '74-QG standards. Carcasses that graded Standard was 1% using '65-QG standards and 5% using '74-QG standards.

Table 26.3 shows the distribution of carcasses by sire breed under the two grade standards. The greatest percentage increase in carcasses that graded Choice or higher ('65-QG versus '74-QG) was for Jersey sired steers (23%) and the lowest percentage increase was for Charolais (7%) and Angus sired steers (6%). The large increase for Jerseys results from removing conformation from the grading system since Jersey crosses generally rate lower in conformation relative to quality. The increase also reflects flattening the minimum marbling requirement in A maturity as Jersey crosses were judged the most physiologically mature.

Narrowing the marbling requirement of the Good grade ('74-QG standards) and removing conformation contributed to the increased number of Standard carcasses. That was most evident for the faster growing, later maturing Charolais, Simmental and Limousin crosses; however, the statistical adjustment of all carcasses to a constant 626 lb. favors earlier maturing breeds.

Table 26.1 Means for Marbling and Palatability by
U.S.D.A., 1965 and U.S.D.A., 1974 Quality Grade Standards

Grade	U.S.D.A. standards	Marbling ¹	W.B. shear, kg. ²	Taste panel ³	
				Tenderness	Overall acceptability
High Prime	'65-QG	-----	-----	-----	-----
	'74-QG	25.68	2.67	8.13	7.86
Avg. Prime	'65-QG	25.82	2.31	7.95	7.89
	'74-QG	22.22	2.80	7.85	7.86
Low Prime	'65-QG	21.41	2.90	7.99	7.73
	'74-QG	18.08	2.90	7.85	7.72
High Choice	'65-QG	17.47	2.95	7.73	7.62
	'74-QG	16.48	3.10	7.53	7.48
Avg. Choice	'65-QG	14.53	3.16	7.44	7.42
	'74-QG	13.86	3.16	7.34	7.33
Low Choice	'65-QG	11.65	3.14	7.32	7.28
	'74-QG	10.97	3.20	7.27	7.26
High Good	'65-QG	9.90	3.21	7.25	7.28
	'74-QG	9.12	3.16	7.32	7.31
Avg. Good	'65-QG	8.60	3.36	7.06	7.08
	'74-QG	8.17	3.30	7.07	7.06
Low Good	'65-QG	6.73	3.32	6.80	6.85
	'74-QG	7.20	3.40	6.83	6.91
High Standard	'65-QG	5.54	3.68	6.69	6.90
	'74-QG	5.85	3.20	6.95	6.92
Avg. Standard	'65-QG	-----	-----	-----	-----
	'74-QG	4.78	3.57	6.44	6.68

¹Marbling: 10=small-, 11=small⁰, 12=small+, etc.

²Warner-Bratzler shear: kilograms of force required to shear 1.27 cm. ($\frac{1}{2}$ in.) diameter core. Each mean is average of 8 shears.

³Taste panel: scale of 1=extremely undesirable, ..., 9=extremely desirable.

Table 26.2 Distribution of Carcasses by USDA, 1965 and USDA 1974 Quality Grade Standards.

Grade		'65-QG	'74-QG
Prime	High	0	12
	Avg.	6	14
	Low	18	37
Choice	High	69	87
	Avg.	213	215
	Low	341	395
Good	High	210	129
	Avg.	150	95
	Low	93	64
Standard	High	12	45
	Avg.	4	23
	Low	1	1

¹ Number of carcasses in each grade.

Table 26.3 Distribution of Carcasses by Breed of Sire for USDA, 1965
and USDA, 1974 Quality Grade Standards.¹

Grade		Breed of Sire													
		Hereford		Angus		Charolais		Jersey		South Devon		Simmental		Limousin	
		65 QG	74 QG	65 QG	74 QG	65 QG	74 QG	65 QG	74 QG	65 QG	74 QG	65 QG	74 QG	65 QG	74 QG
Prime	high	--	--	--	2	--	4	--	6	--	--	--	--	--	--
	avg.	--	1	3	5	2	1	1	5	--	2	--	--	--	--
	low	2	4	8	12	6	3	1	10	--	5	1	2	--	1
Choice	high	10	12	24	22	4	7	15	31	9	5	6	9	1	1
	avg.	31	30	50	50	30	31	35	36	23	24	28	28	16	16
	low	68	81	53	58	63	71	38	33	33	34	54	70	32	48
Good	high	38	22	21	14	30	20	30	8	13	10	30	23	48	32
	avg.	17	15	17	9	24	17	9	2	9	6	29	10	45	36
	low	14	8	5	6	14	8	5	2	7	5	22	17	26	18
Standard	high	2	8	1	4	1	9	--	1	--	2	3	8	5	13
	avg.	--	1	--	--	2	5	--	--	--	1	1	7	1	9
	low	--	--	--	--	1	1	--	--	--	--	--	--	--	--

¹Number of carcasses in each grade.