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Performance and Carcass Characteristics of Different Cattle Types

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Summary

Different cattle types were evaluated for growth, feed efficiency, and carcass and meat traits. Hereford, Angus, Jersey, South Devon, Limousin, Simmental, and Charolais sires were bred artificially to Angus and Hereford dams to obtain different cattle types. Three calf crops were born in March, April, and May of 1970, 1971, and 1972 and were weaned when 200 days old. All male calves (1,123) were castrated, fed out and slaughtered in a commercial slaughter plant. Carcass cooler data were obtained and the right side transported to Kansas State University for detailed cut-out and meat quality evaluations.

Jersey crosses, a small early-maturing type, had the poorest feedlot performance of all breed types. They were similar to the Angus x Hereford and Hereford x Angus controls in U.S.D.A. quality and yield grades, in retail percentages and meat palatability traits. Simmental and Charolais crosses, a large type, were superior to controls in feedlot performance, yield grade, and retail percentages. They were lower in quality grade and had steaks slightly less desirable in palatability than controls.

Limousin crosses surpassed controls in feed efficiency, final weight, yield grade and retail percentages. They were equal in A.D.G. and had a definitely lower quality grade and meat palatability than controls. South Devon crosses surpassed controls in A.D.G. and final weight, were slightly higher in cutability and retail product percentages but were equal in feed efficiency, quality grade and palatability.

Introduction

Three years results from the U.S. Meat Animal Research Center's "cattle germ plasm evaluation program" are reported here. Dr. Keith Gregory, director of the U.S. Meat Animal Research Center at Clay Center, Nebraska, initiated the project. Kansas State University and the Standardization Branch, A.M.S., U.S.D.A. are cooperating on the carcass and meat aspects of the study.

The project was designed to characterize breeds from different cattle types regarding economic traits that relate to reproduction, maternal ability, growth, feed efficiency, and carcass and meat characteristics.

Calving ease and preweaning growth data on all three calf crops were presented in the 1973 Cattlemen's Day report. Preliminary data on post weaning growth, feed efficiency, and carcass and meat traits from two

calf crops were presented in the 1972 and 1973 Cattlemen's Day reports. Performance and carcass characteristics from the three year study are reported here.

Data on reproduction and maternal traits of the female progeny in this study were also obtained. In addition, calving difficulty results of artificially mating Hereford, Angus, Red Poll, Maine Anjou, Brown Swiss, Gelbvieh and Chianina sires to Hereford and Angus cows were obtained. This information can be obtained by writing for:

Report 1, March 1974
Germ Plasm Evaluation Program
U.S. Meat Animal Research Center
Clay Center, Nebraska 68933

Experimental Procedure

Hereford and Angus females were artificially bred to Hereford, Angus, Jersey, South Devon, Limousin, Simmental and Charolais bulls. The three calf crops were born in March, April and May of 1970, 1971 and 1972 and were weaned when approximately 200 days old. All male calves (1,123) were castrated, fed in a feedlot by breed of sire groups to obtain growth and feed efficiency data. The steers were fed a corn silage-and-concentrate ration that approximated 70-72% TDN most of the feeding period. Final slaughter weights were adjusted for 200-day adjusted weaning weights. Feed efficiency for each breed group was obtained by dividing the cumulative average daily TDN consumed per steer by average daily gain.

Approximately one-third of the steers in each sire breed-by-dam breed group were slaughtered at each of three slaughter times that averaged 212, 247 and 279 days on feed after weaning. Steers slaughtered at each of the three times had approximately the same average birth date but varied in age about 80 days within slaughter groups.

Steers were transported to a commercial slaughter plant approximately 12 hours before slaughter. Carcass data were obtained after a 24-hour chill. Carcasses were evaluated for conformation, maturity, marbling, color, texture, firmness and USDA quality grade by representatives of the U.S. Meat Animal Research Center; Standardization Branch, A.M.S., U.S.D.A.; and Kansas State University. Longissimus muscle area, external fat thickness and U.S.D.A. yield grade were determined.

The right side of each carcass was transported to Kansas State University for detailed cutout and meat quality evaluations. Each side was separated into essentially boneless, closely trimmed retail cuts. Steaks were cooked at 350°F to an internal temperature of 150°F and evaluated for tenderness, flavor, juiciness and overall acceptability by an experienced taste panel of six members and for tenderness by the Warner-Bratzler shear.

Results and Discussion

Postweaning A.D.G., final weight and feed efficiency data are in table 21.1. Simmental and Charolais crossbred steers gained 0.23 lb. per day (average) more than Angus x Hereford or Hereford x Angus crossbred steers (controls); South Devon crosses 0.12 lb. per day more than controls;

Limousin crosses equalled the controls. As expected, Jersey crosses gained the least (0.16 lb. less than controls). Steers from Hereford dams gained 0.10 lb. per day more than steers from Angus dams.

Superior feedlot gains and weaning weights gave Simmental and Charolais crosses considerably higher final weight ratios than controls. South Devon crosses had a 2.5% higher ratio than controls; Limousin crosses, because of their heavier weaning weights, had a 1.5% higher ratio than controls. Again Jerseys were lowest in final weight ratio, and straightbred Angus and Hereford steers were 2.6% lower in ratio than controls.

Charolais, Simmental, and Limousin crosses and even straightbred Angus steers used feed more efficiently than the controls. Limousin crosses had a slight advantage over all types, apparently because they were depositing less fat. However, it is difficult to explain why straightbred Angus and Hereford steers were identical in efficiency to Simmental and Charolais crosses. Jersey crosses used feed least efficiently.

Dressing percentages and U.S.D.A. quality grades are in table 21.2. Differences in dressing percentages were small although Simmental and Jersey crosses tended to be lowest. Straightbred steers, controls, Jersey crosses and South Devon crosses were essentially equal in quality grades; 68% graded low Choice or higher. Limousin crosses had the lowest quality grades; only 32% graded low Choice or higher; 58% of the Charolais crosses and 51% of the Simmental crosses graded low Choice or higher; 67% of steers from Angus dams graded at least low Choice, while 48% of steers from Hereford dams graded at least low Choice.

Limousin, Simmental and Charolais crosses were similar in yield grades, rib eye areas, and fat thicknesses and were superior in those traits to the other breeds (table 21.3).

Cutability and retail product percentages in table 21.4 were higher for Charolais and Limousin crosses, followed closely by Simmental crosses. The Jersey crosses were equal to the controls in product percentages, while South Devon crosses and straightbred Angus and Herefords had slightly higher product percentages.

Bone percentage differences were small among breeds. Fat trim percentages were inversely related to both cutability and retail product percentages. Charolais, Simmental and Limousin crosses had lower percentages of fat trim than all other breeds.

Warner-Bratzler shear values in table 21.5 suggest that all breeds had steaks with desirable tenderness despite some differences among breeds. Jersey and South Devon crosses had steaks somewhat more tender than the other breeds, while Limousin and Simmental crosses had steaks less tender than other breeds. However, the taste panel only detected minor differences in palatability. Steaks from all breeds were evaluated as "moderately" desirable in palatability.

Table 21.1. Postweaning Average Daily Gains, Adjusted Final Weights and Feed Efficiencies, 1970-71-72 Calf Crops.

Breed of sire	Breed of dam	No. steers ^a				Postweaning average daily gain ^b				Adjusted final weight ^c					Feed efficiency ^d			
		212	247	279	Total	212	247	279	Avg.	212	247	279	Avg.	Ratio ^e	212	247	279	Avg.
Hereford Angus	Hereford	23	24	22	69	2.42	2.30	2.28	2.33	955	1005	1090	1017	97.6				
	Angus	28	28	29	85	2.35	2.26	2.15	2.25	952	1030	1057	1013	97.2				
	Average	51	52	51	154	2.38	2.28	2.21	2.29	954	1018	1074	1015	97.4	6.17	6.74	6.97	6.63
Angus Hereford	Hereford	31	34	32	97	2.42	2.42	2.35	2.39	961	1060	1125	1049	100.7				
	Angus	39	37	38	114	2.35	2.30	2.24	2.29	960	1048	1096	1035	99.3				
	Average	70	71	70	211	2.38	2.36	2.29	2.34	961	1054	1110	1042	100.0	6.34	6.81	7.09	6.75
Jersey	Hereford	17	18	18	53	2.41	2.14	2.17	2.24	938	975	1068	994	95.4				
	Angus	27	27	27	81	2.21	2.13	2.05	2.13	929	979	1030	979	93.9				
	Average	44	45	45	134	2.31	2.13	2.11	2.18	934	977	1049	986	94.6	6.64	7.21	7.37	7.07
South Devon	Hereford	14	16	14	44	2.51	2.49	2.40	2.47	977	1068	1128	1057	101.4				
	Angus	16	17	17	50	2.55	2.50	2.29	2.45	1013	1091	1129	1078	103.5				
	Average	30	33	31	94	2.53	2.49	2.34	2.46	995	1080	1128	1068	102.5	6.30	6.83	7.06	6.73
Limousin	Hereford	28	28	29	86	2.36	2.41	2.28	2.35	992	1070	1093	1052	101.0				
	Angus	30	30	29	89	2.29	2.35	2.25	2.30	987	1082	1121	1063	102.0				
	Average	59	58	58	175	2.32	2.38	2.27	2.32	990	1076	1107	1058	101.5	6.19	6.56	6.93	6.56
Simmental	Hereford	27	29	26	82	2.70	2.63	2.62	2.65	1047	1135	1213	1132	108.6				
	Angus	30	32	33	95	2.43	2.45	2.48	2.46	1023	1111	1201	1112	106.7				
	Average	57	61	59	177	2.57	2.54	2.55	2.55	1035	1123	1207	1122	107.7	6.23	6.69	6.91	6.61
Charolais	Hereford	25	27	26	78	2.81	2.61	2.60	2.67	1074	1128	1189	1131	108.5				
	Angus	32	34	34	100	2.57	2.47	2.47	2.50	1066	1113	1206	1128	108.2				
	Average	57	61	60	178	2.69	2.54	2.53	2.59	1070	1121	1197	1129	108.3	6.31	6.74	6.80	6.62
Average all sire breeds	Hereford	166	176	167	509	2.52	2.43	2.38	2.44	992	1063	1129	1061	101.8				
	Angus	202	205	207	614	2.39	2.35	2.28	2.34	990	1065	1120	1058	101.5				
	Average	368	381	374	1123	2.46	2.39	2.33	2.39	991	1064	1125	1060	101.7	6.31	6.80	7.02	6.71

^aNumber of steers slaughtered for the 3 years after an average of 212, 247, and 279 days on feed.^bADG = (actual final wt. - actual weaning wt.) ÷ days on feed, adjusted for year and to a mature age of dam bases.^cAdj. final wt. = 200-day wt. + (postwn. A.D.G. x days on feed postwn.), adj. for year and to a mature age of dam bases.^dTDN efficiency = lb. TDN consumed per lb. gain.^eRatio computed relative to the average 1042 lb. Angus x Hereford and Hereford x Angus controls.

Table 21.2. Hot Carcass Weights, Dressing Percentages, U.S.D.A. Quality Grades, and Marbling Scores^a, 1970-71-72
Calf Crops.

Breed of sire	Breed of Dam	Hot carcass wt., lb.				Dressing percent				U.S.D.A. quality grade ^b				Marbling score ^c			
		212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.
Hereford Angus	Hereford	593	630	676	633	60.1	60.8	60.7	60.5	11.0	11.0	11.6	11.2	9.5	9.6	11.0	10.0
	Angus	603	661	673	646	60.8	61.8	61.9	61.5	12.2	12.5	12.7	12.5	12.5	12.7	14.5	13.2
	Average	598	646	675	639	60.4	61.3	61.3	61.0	11.6	11.7	12.2	11.8	11.0	11.1	12.7	11.6
Angus Hereford	Hereford	598	664	711	657	60.1	61.3	61.9	61.1	11.7	12.0	12.3	12.0	11.0	12.0	13.4	12.1
	Angus	607	668	706	661	60.6	61.5	62.0	61.4	11.6	11.8	11.8	11.7	11.2	11.2	11.8	11.4
	Average	602	666	709	659	60.4	61.4	61.9	61.2	11.6	11.9	12.0	11.9	11.1	11.6	12.6	11.8
Jersey	Hereford	576	601	662	613	59.0	59.6	60.4	59.7	10.9	11.2	11.8	11.3	11.3	12.4	14.5	12.7
	Angus	585	617	647	617	60.4	60.1	60.3	60.3	11.8	12.3	12.2	12.1	14.2	14.2	15.6	14.7
	Average	580	609	654	615	59.7	59.9	60.3	60.0	11.3	11.7	12.0	11.7	12.7	13.3	15.0	13.7
South Devon	Hereford	603	669	715	663	60.5	61.4	61.9	61.3	11.2	11.4	11.9	11.5	10.3	10.4	12.4	11.0
	Angus	642	701	714	686	61.4	62.5	61.9	61.9	11.9	12.3	12.1	12.1	11.8	12.3	13.2	12.4
	Average	623	685	714	674	61.0	61.9	61.9	61.6	11.6	11.8	12.0	11.8	11.0	11.4	12.8	11.7
Limousin	Hereford	611	669	674	652	61.0	61.7	61.3	61.3	10.2	10.4	11.0	10.5	8.1	8.4	9.7	8.7
	Angus	620	685	707	670	61.6	62.3	62.2	62.0	10.8	10.8	11.1	10.9	9.4	9.4	10.3	9.7
	Average	615	677	690	661	61.3	62.0	61.7	61.7	10.5	10.6	11.0	10.7	8.7	8.9	10.0	9.2
Simmental	Hereford	638	696	740	691	59.5	60.3	60.2	60.0	10.8	11.0	10.8	10.9	9.8	9.4	9.6	9.6
	Angus	643	695	746	695	60.7	60.8	61.1	60.9	11.3	11.3	11.6	11.4	10.8	10.3	11.8	11.0
	Average	640	696	743	693	60.1	60.6	60.7	60.4	11.1	11.1	11.2	11.1	10.3	9.8	10.7	10.3
Charolais	Hereford	668	700	753	707	60.9	60.5	61.1	60.8	10.5	10.9	11.8	11.0	8.8	9.3	12.2	10.1
	Angus	672	710	768	717	60.9	61.9	62.1	61.7	11.4	11.9	12.1	11.8	10.7	11.5	12.7	11.6
	Average	670	705	760	712	60.9	61.2	61.6	61.2	10.9	11.4	11.9	11.4	9.7	10.4	12.4	10.9
Average all sire breeds	Hereford	613	661	704	659	60.1	60.8	61.1	60.7	10.9	11.1	11.6	11.2	9.8	10.2	11.8	10.6
	Angus	625	677	709	670	60.9	61.6	61.6	61.4	11.6	11.8	12.0	11.8	11.5	11.7	12.8	12.0
	Average	619	669	707	665	60.5	61.2	61.4	61.0	11.2	11.5	11.8	11.5	10.7	10.9	12.3	11.3

^aData for all traits are adjusted for year and to a mature age of dam bases.

^bU.S.D.A. quality grade: 10 = average good, 11 = high good, 12 = low choice, 13 = average choice, etc.

^cMarbling score: 9 = slight⁺, 10 = small⁺, ... 21 = slightly abundant⁺.

Table 21.3. U.S.D.A. Yield Grades, Ribeye Areas, Fat Thicknesses, and Percentages of Kidney, Pelvic and Heart Fat, 1970-71-72 Calf Crops.

Breed of sire	Breed of dam	U.S.D.A. yield grade				Ribeye area, sq. in.				Fat thickness, in.				Estimated percent kidney, pelvic and heart fat			
		212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.
Hereford Angus	Hereford	3.0	3.1	3.5	3.2	10.7	11.5	11.4	11.2	.44	.58	.60	.53	2.4	2.5	2.6	2.5
	Angus	3.4	3.6	3.7	3.6	10.9	11.6	11.6	11.4	.60	.69	.77	.68	3.3	3.4	3.0	3.2
	Average	3.2	3.4	3.6	3.4	10.8	11.5	11.5	11.3	.52	.63	.68	.61	2.8	2.9	2.8	2.9
Angus Hereford	Hereford	3.1	3.5	3.7	3.5	11.2	11.6	12.0	11.6	.53	.67	.74	.65	3.0	3.1	2.8	2.9
	Angus	3.2	3.7	3.9	3.6	11.2	11.3	11.9	11.5	.57	.70	.80	.69	2.8	2.9	3.0	2.9
	Average	3.2	3.6	3.8	3.5	11.2	11.4	12.0	11.5	.56	.68	.77	.67	2.9	3.0	2.9	2.9
Jersey	Hereford	3.1	3.3	3.7	3.4	10.9	10.9	11.4	11.0	.30	.40	.54	.41	4.7	4.7	4.9	4.8
	Angus	3.4	3.5	3.8	3.5	11.0	11.1	11.3	11.1	.51	.50	.59	.53	4.6	4.8	5.0	4.8
	Average	3.2	3.4	3.7	3.5	10.9	11.0	11.3	11.1	.41	.45	.56	.47	4.6	4.8	4.9	4.8
South Devon	Hereford	2.9	3.2	3.7	3.3	11.7	11.8	11.7	11.7	.41	.50	.55	.48	3.6	3.4	3.5	3.5
	Angus	2.9	3.3	3.5	3.2	12.1	12.4	12.4	12.3	.45	.54	.64	.54	3.3	3.7	3.8	3.6
	Average	2.9	3.3	3.6	3.3	11.9	12.1	12.0	12.0	.43	.51	.59	.51	3.5	3.5	3.6	3.5
Limousin	Hereford	2.2	2.4	2.8	2.4	12.5	13.3	12.7	12.8	.34	.41	.48	.41	2.5	3.0	2.9	2.8
	Angus	2.2	2.8	2.8	2.6	12.8	12.9	13.4	13.0	.37	.45	.51	.44	2.9	3.3	3.2	3.1
	Average	2.2	2.6	2.8	2.5	12.6	13.1	13.0	12.9	.35	.43	.50	.42	2.7	3.1	3.1	3.0
Simmental	Hereford	2.3	2.6	2.8	2.6	12.3	12.5	12.8	12.5	.32	.38	.44	.38	2.8	2.8	2.8	2.8
	Angus	2.6	2.9	3.2	2.9	12.3	12.6	12.7	12.5	.40	.44	.53	.46	3.2	3.4	3.4	3.3
	Average	2.5	2.7	3.0	2.7	12.3	12.6	12.7	12.5	.36	.41	.48	.42	3.0	3.1	3.1	3.1
Charolais	Hereford	2.4	2.4	2.7	2.5	12.5	13.0	13.1	12.9	.33	.35	.42	.36	2.8	2.7	2.8	2.8
	Angus	2.4	2.8	2.9	2.7	12.8	13.0	13.9	13.2	.36	.45	.52	.44	2.8	3.3	3.4	3.2
	Average	2.4	2.6	2.8	2.6	12.7	13.0	13.5	13.1	.34	.40	.47	.40	2.8	3.0	3.1	3.0
Average all sire breeds	Hereford	2.7	3.0	3.3	3.0	11.7	12.1	12.2	12.0	.38	.47	.54	.46	3.1	3.2	3.2	3.2
	Angus	2.9	3.2	3.4	3.2	11.9	12.1	12.4	12.1	.47	.54	.62	.54	3.3	3.5	3.6	3.5
	Average	2.8	3.1	3.3	3.1	11.8	12.1	12.3	12.1	.42	.50	.58	.50	3.2	3.3	3.4	3.3

^aData for all traits are adjusted for year and to a mature age of dam bases.

Table 21.4. Percentages of Cutability, Retail Product, Fat Trim, and Bone^a, 1970-71-72 Calf Crops.

Breed of sire	Breed of dam	Actual cutability, % ^b				Retail product, % ^c				Fat trim, %				Bone, %			
		212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.
Hereford Angus	Hereford	54.9	54.0	52.6	58.8	68.3	66.8	64.9	66.7	18.4	20.7	23.1	20.8	13.3	12.5	11.9	12.6
	Angus	53.6	51.4	51.4	52.1	67.5	64.9	64.0	65.5	20.3	23.8	24.9	23.0	12.2	11.3	11.1	11.6
	Average	54.2	52.7	52.0	53.0	67.9	65.8	64.5	66.1	19.4	22.2	24.0	21.9	12.8	11.9	11.5	12.1
Angus Hereford	Hereford	53.2	52.4	51.8	52.4	66.9	65.4	64.2	65.5	20.5	22.7	24.2	22.5	12.6	11.9	11.6	12.1
	Angus	53.2	51.4	51.1	51.9	66.7	64.2	63.4	64.8	20.9	24.1	25.6	23.5	12.4	11.6	11.0	11.7
	Average	53.2	51.9	51.4	52.2	66.8	64.8	63.8	65.1	20.7	23.4	24.9	23.0	12.5	11.8	11.3	11.9
Jersey	Hereford	53.6	52.2	51.7	52.5	67.1	65.1	64.0	65.4	19.6	22.2	23.8	21.9	13.2	12.7	12.2	12.7
	Angus	52.1	51.4	51.0	51.5	65.9	64.6	63.6	64.7	22.0	23.5	24.7	23.4	12.1	11.9	11.7	11.9
	Average	52.8	51.8	51.4	52.0	66.5	64.8	63.8	65.1	20.8	22.9	24.2	22.6	12.7	12.3	12.0	12.3
South Devon	Hereford	53.9	53.2	52.1	53.1	67.3	66.6	64.3	66.0	19.6	20.9	23.8	21.5	13.1	12.5	11.9	12.5
	Angus	54.2	52.8	52.1	53.1	68.0	66.3	64.9	66.4	19.5	21.9	23.5	21.6	12.5	11.9	11.6	12.0
	Average	54.0	53.0	52.1	53.1	67.6	66.4	64.6	66.2	19.6	21.4	23.6	21.5	12.8	12.2	11.8	12.3
Limousin	Hereford	58.6	56.3	55.7	56.9	71.8	69.7	68.3	70.0	14.6	17.7	19.3	17.2	13.6	12.6	12.4	12.9
	Angus	57.9	56.0	55.5	56.5	71.5	69.4	68.2	69.7	15.3	18.5	19.8	17.9	13.1	12.1	11.9	12.4
	Average	58.2	56.2	55.6	56.7	71.6	69.6	68.3	69.8	15.0	18.1	19.5	17.5	13.4	12.3	12.2	12.6
Simmental	Hereford	56.7	55.5	55.2	55.8	70.2	68.6	67.9	68.9	15.4	17.8	18.8	17.4	14.3	13.6	13.3	13.7
	Angus	55.4	54.8	54.1	54.8	68.9	68.0	66.9	67.9	17.6	19.1	20.5	19.1	13.4	12.8	12.6	12.9
	Average	56.1	55.2	54.7	55.3	69.6	68.3	67.4	68.4	16.5	18.5	19.7	18.2	13.9	13.2	12.9	13.3
Charolais	Hereford	57.1	56.7	56.3	56.7	70.8	69.9	68.9	69.9	15.7	16.9	18.1	16.9	13.5	13.2	13.0	13.2
	Angus	56.4	55.3	54.7	55.5	70.0	68.7	67.5	68.7	16.6	18.9	20.5	18.7	13.3	12.4	12.1	12.6
	Average	56.8	56.0	55.5	56.1	70.4	69.3	68.2	69.3	16.2	17.9	19.3	17.8	13.4	12.8	12.5	12.9
Average all sire breeds	Hereford	55.4	54.3	53.6	54.5	68.9	67.4	66.1	67.5	17.7	19.9	21.6	19.7	13.4	12.7	12.3	12.8
	Angus	54.7	53.3	52.8	53.6	68.4	66.6	65.5	66.8	18.9	21.4	22.8	21.0	12.7	12.0	11.7	12.2
	Average	55.1	53.8	53.2	54.0	68.6	67.0	65.8	67.1	18.3	20.6	22.2	20.4	13.1	12.4	12.0	12.5

^aData for all traits are adjusted for year and mature age of dam.^bActual cutability, % = Actual yield of boneless, closely trimmed beef from the round, loin, rib, and chuck.^cRetail product, % = Actual yield of boneless, closely trimmed beef from the carcass.

Table 21.5. Warner-Bratzler Shear and Taste Panel Evaluations of Cooked Steaks, 1970-71-72 Calf Crops.

Breed of sire	Breed of dam	Warner-Bratzler shear, lb. ^a				Taste panel tenderness ^b				Taste panel flavor ^b				Taste panel juiciness ^b				Taste panel acceptability ^b			
		212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.	212	247	279	Avg.
Hereford Angus	Hereford	7.0	6.6	7.2	6.9	7.6	7.3	7.4	7.4	7.5	7.4	7.4	7.4	7.1	6.8	7.0	7.0	7.3	7.2	7.3	7.3
	Angus	7.1	7.0	7.0	7.0	7.5	7.2	7.4	7.4	7.7	7.4	7.5	7.5	7.1	7.1	7.1	7.1	7.4	7.2	7.3	7.3
	Average	7.0	6.8	7.1	7.0	7.5	7.3	7.4	7.4	7.6	7.4	7.4	7.5	7.1	7.0	7.0	7.0	7.4	7.2	7.3	7.3
Angus Hereford	Hereford	6.8	7.1	6.7	6.8	7.6	7.8	7.4	7.6	7.5	7.5	7.4	7.5	7.2	7.2	6.9	7.1	7.4	7.5	7.2	7.4
	Angus	7.9	7.1	7.3	7.4	7.3	7.3	7.6	7.4	7.3	7.3	7.7	7.4	7.1	6.8	7.3	7.1	7.2	7.2	7.5	7.3
	Average	7.3	7.1	7.0	7.1	7.5	7.5	7.5	7.5	7.4	7.4	7.5	7.5	7.2	7.0	7.1	7.1	7.3	7.3	7.3	7.3
Jersey	Hereford	7.0	6.7	6.7	6.8	7.4	7.7	7.8	7.6	7.7	7.6	7.6	7.6	7.3	7.0	7.5	7.3	7.5	7.5	7.5	7.5
	Angus	6.6	6.1	6.6	6.5	7.6	7.8	7.4	7.6	7.6	7.5	7.6	7.6	7.4	7.3	7.4	7.4	7.4	7.5	7.4	7.4
	Average	6.8	6.4	6.6	6.6	7.5	7.8	7.6	7.6	7.6	7.5	7.6	7.6	7.4	7.2	7.5	7.3	7.4	7.5	7.5	7.5
South Devon	Hereford	6.8	6.8	6.8	6.8	7.6	7.4	7.4	7.5	7.5	7.6	7.2	7.4	7.0	7.1	7.2	7.1	7.4	7.4	7.2	7.3
	Angus	6.5	6.5	6.2	6.4	7.8	7.7	7.7	7.7	7.5	7.4	7.6	7.5	7.5	7.2	7.2	7.3	7.4	7.4	7.5	7.4
	Average	6.7	6.6	6.5	6.6	7.7	7.5	7.5	7.6	7.5	7.5	7.4	7.5	7.2	7.1	7.2	7.2	7.4	7.4	7.4	7.4
Limousin	Hereford	7.4	7.5	7.6	7.5	7.2	6.7	7.2	7.0	7.5	7.4	7.6	7.5	7.3	6.8	7.2	7.1	7.3	6.8	7.2	7.1
	Angus	7.4	7.5	7.7	7.5	7.7	7.1	7.1	7.3	7.5	7.4	7.5	7.5	7.1	6.9	6.9	7.0	7.4	7.1	7.2	7.2
	Average	7.4	7.5	7.6	7.5	7.4	6.9	7.1	7.2	7.5	7.4	7.5	7.5	7.2	6.9	7.0	7.0	7.3	6.9	7.2	7.2
Simmental	Hereford	7.9	7.7	7.5	7.7	6.6	7.0	6.7	6.7	7.2	7.5	7.4	7.4	7.1	6.7	6.9	6.9	6.8	7.0	6.9	6.9
	Angus	7.8	7.3	7.4	7.5	7.5	7.3	7.0	7.3	7.6	7.6	7.4	7.6	7.2	7.4	7.1	7.2	7.4	7.4	7.0	7.3
	Average	7.8	7.5	7.5	7.6	7.0	7.1	6.8	7.0	7.4	7.6	7.4	7.5	7.1	7.1	7.0	7.1	7.1	7.2	7.0	7.1
Charolais	Hereford	7.0	7.4	7.2	7.2	7.4	7.2	7.3	7.3	7.4	7.4	7.6	7.5	7.1	6.9	7.3	7.1	7.2	7.3	7.4	7.3
	Angus	6.9	6.6	7.0	6.8	7.7	7.4	7.6	7.6	7.5	7.5	7.7	7.6	7.2	6.9	7.1	7.1	7.4	7.3	7.5	7.4
	Average	6.9	7.0	7.1	7.0	7.5	7.3	7.5	7.4	7.5	7.5	7.7	7.5	7.1	6.9	7.2	7.1	7.3	7.3	7.4	7.3
Average all sire breeds	Hereford	7.1	7.1	7.1	7.1	7.3	7.3	7.3	7.3	7.5	7.5	7.5	7.5	7.2	6.9	7.1	7.1	7.3	7.2	7.2	7.2
	Angus	7.2	6.9	7.0	7.0	7.6	7.4	7.4	7.5	7.5	7.4	7.6	7.5	7.2	7.1	7.1	7.1	7.4	7.3	7.4	7.3
	Average	7.2	7.0	7.1	7.1	7.5	7.3	7.3	7.4	7.5	7.5	7.5	7.5	7.2	7.0	7.1	7.1	7.3	7.3	7.3	7.3

^aPounds of force required to shear one-half inch cores of steaks cooked at 350°F to 150°F internal temperature (obtained on steaks from all 1123 steers).

^bTaste panel scores are based on a 9-point scale, with higher scores indicating greater acceptability. Taste panel steaks from 4 steers per sirexdam breed group, per slaughter date, per year (496 steers).