Carcass evaluation procedures compared

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This study compared various methods of evaluating carcasses. Data from 57 barrows on feeding trials for a barrow contest at the 1968 Kansas State Fair in Hutchinson were used.

The barrows went on test weighing approximately 50 pounds each and were taken off feed individually at 200-220 pounds, held off feed over night and slaughtered at the Kansas State University Meats Laboratory. Live weight was determined immediately before slaughter and carcass weight, after a 24-hour chill. Cutting time ranged from 24 to 120 hours post-mortem.

Carcass length was from the anterior portion of the first rib, as close to the backbone as possible, to the anterior portion of the aitch bone (symphysis pubis). Backfat was measured at the first rib, the last rib, and last lumbar vertebra. Average of the three measurements was determined.

Standard cutting procedures were used to obtain trimmed wholesale cuts from one carcass side, and weights were recorded and doubled to obtain whole-carcass yields. Loin eye (longissimus dorsi) area was determined immediately posterior to the 10th thoracic vertebra.

Ham-loin index, percentage four lean cuts of live and of carcass weights, percentage ham plus loin of live and of carcass weights, and the dollar value of the five primal cuts per hundred pounds of carcass was calculated. Carcasses later were ranked according to those measures.

The dollar value was calculated by taking the average of the price of each cut at six times during a year (Table 15).

Table 15. Monthly prices of primal cuts

Wt., lbs.	Loins 8-14	Butts 4-8	Picnics 4-8	Bellies 10-14	Hams 12-14
Week ended					
Mar. 9, 1968	$46.85	$34.45	$26.00	$31.75	$42.00
May 11, "	45.00	31.00	24.00	33.50	43.00
July 13, "	55.00	43.50	27.50	33.50	40.00
Sept. 7, "	52.50	38.00	26.25	31.50	41.50
Nov. 9, "	45.00	35.00	27.50	26.50	43.50
Jan. 2, 1969	47.00	35.00	30.00	29.00	44.50
AVERAGE	$48.55	$36.16	$26.88	$30.96	$42.42

To place in the contest, carcasses had to have 4.0 square inches or more of loin eye area, be at least 29 inches long, have no more than 1.5 inches maximum backfat, and reach 200 pounds live weight in 170 days or less. Only 29 of 57 barrows qualified.

The 29 qualifying carcasses and 28 not meeting these requirements were ranked by the six different methods (Tables 16 and 17). All methods involve possible errors in cutting and trimming because it is difficult for one person to standardize procedures. It would be more difficult under packing plant conditions.

Table 16. Individual value and ranking of barrow carcasses by six indicated methods[a]

Barrow Iden. No.	Ham-Loin Index		% 4 lean cuts of: Live wt.		% 4 lean cuts of: Carcass wt.		% ham + loin of: Live wt.		% ham + loin of: Carcass wt.		Value $, 5 primal cuts per cwt. carcass	
110	137.0	1	45.8	4	62.8	1	31.8	3	43.6	1	$41.04	5
104	132.5	2	46.0	2	61.7	3	32.3	1	43.4	2	42.28	2
109	119.7	3	43.1	9	56.3	15	30.0	7	39.2	9	40.20	7
131	118.4	4	46.0	2	59.7	6	31.1	5	40.4	5	41.22	4
139	118.3	5	47.0	1	62.1	2	30.1	6	39.7	7	43.22	1
135	112.1	6	41.9	15	56.2	17	27.7	19	37.2	19	37.62	18
153	104.2	7	45.5	5	60.5	5	32.1	2	42.6	3	37.18	21
133	100.3	8	42.0	13	55.8	20	27.8	16	37.0	22	39.99	8
137	99.4	9	40.8	23	54.1	25	27.7	19	36.6	25	37.92	16
151	99.1	10	41.1	22	54.6	23	28.1	14	37.3	18	35.70	27
121	98.2	11	39.5	26	55.7	29	26.3	26	37.2	19	37.04	23
108	96.7	12	41.6	17	52.8	28	29.1	10	37.0	22	38.26	15
154	96.7	13	45.0	6	61.3	4	31.2	4	42.5	4	39.16	12
148	96.6	14	43.4	8	58.1	8	29.7	8	39.7	7	37.18	21
119	94.5	15	40.3	24	55.9	19	27.2	23	37.0	22	36.52	24
114	93.7	16	42.5	10	57.4	11	28.8	11	39.0	10	39.30	11
125	92.7	17	42.0	13	58.0	9	28.2	13	39.0	10	37.66	17
156	92.6	18	43.6	7	58.9	7	29.5	9	38.8	6	33.98	29
120	92.2	19	38.9	27	54.6	23	26.4	25	37.1	21	35.74	26
136	91.2	20	42.1	12	57.4	11	27.4	22	37.4	16	40.34	6
138	90.8	21	41.4	20	56.3	15	27.8	16	37.9	14	42.23	2
124	88.0	22	41.6	17	58.0	9	27.9	15	38.9	12	39.10	13
112	86.1	23	41.8	16	56.5	14	28.4	12	38.4	13	39.42	10
130	85.0	24	40.3	24	54.1	25	26.3	28	35.3	28	37.42	19
117	84.6	25	38.6	28	53.1	27	26.0	26	35.8	26	37.28	20
118	84.5	6	45.2	10	57.2	13	27.7	19	37.4	16	38.40	14
102	83.0	27	41.5	19	55.5	22	26.5	24	35.5	27	39.68	9
150	81.7	28	41.2	21	56.0	18	27.8	16	37.8	15	36.12	25
101	75.4	29	37.5	29	53.3	29	25.1	29	34.4	29	35.60	28

[a]Carcasses that met certification requirements

Table 17. Individual value and ranking of barrows by six indicated methods[a]

Barrow Iden. No.	Ham-Loin Index	% 4 lean cuts of: Live wt.	% 4 lean cuts of: Carcass wt.	% ham + loin of: Live wt.	% ham + loin of: Carcass wt.	Value $, 5 primal cuts per cwt. carcass
149	119.6 1	44.4 2	59.4 2	30.1 2	40.3 2	35.44 17
152	112.1 2	45.9 1	61.8 1	30.8 1	41.5 1	38.32 1
113	100.4 3	41.5 6	55.3 9	28.5 3	38.1 3	37.70 5
144	94.7 4	41.9 5	55.2 10	27.7 6	36.5 11	35.10 19
123	84.3 5	38.9 18	54.2 11	25.8 17	36.0 14	36.12 10
155	84.3 6	40.9 8	55.0 11	27.2 8	36.5 11	36.46 8
132	84.2 7	37.3 26	51.7 23	21.3 28	35.2 19	38.00 2
116	81.5 8	39.9 10	53.2 20	25.7 18	34.3 24	35.86 14
126	81.1 9	39.3 15	56.1 5	25.4 21	36.2 14	35.60 16
103	80.8 10	38.5 21	51.6 24	24.7 23	33.2 26	36.12 10
146	80.3 11	39.2 17	54.1 16	26.8 9	36.9 8	34.90 20
145	80.2 12	41.1 7	56.6 3	27.6 7	38.0 4	33.42 25
129	79.8 13	37.9 24	53.6 19	24.7 23	35.0 20	34.32 21
122	79.6 14	38.4 22	54.0 17	24.1 26	33.2 26	36.12 10
134	74.5 15	42.2 3	56.0 6	27.8 5	37.0 7	37.76 3
142	73.9 16	42.0 4	56.4 4	28.3 4	38.0 4	37.64 6
128	73.7 17	36.9 27	51.3 26	25.1 22	34.9 21	32.98 27
157	72.0 18	39.3 15	54.9 12	26.8 9	37.4 6	33.20 26
106	71.7 19	39.7 13	54.8 13	26.4 11	36.5 11	37.24 7
147	70.5 20	40.3 9	54.6 14	26.3 12	35.6 17	35.96 13
143	69.2 21	38.6 20	52.6 22	26.0 15	35.4 18	34.16 22
140	67.4 22	39.5 14	53.2 20	25.7 18	34.6 23	35.36 18
107	66.7 23	38.8 19	51.6 24	25.6 20	34.2 25	36.18 9
127	65.7 24	37.8 25	54.0 17	24.3 25	34.7 22	35.66 15
115	62.5 25	36.0 28	49.8 28	23.0 27	31.9 28	34.06 23
111	62.6 26	39.8 12	55.6 8	26.3 12	36.8 9	34.04 24
105	60.6 27	39.9 10	56.0 6	26.1 14	36.6 10	37.76 3
141	58.1 28	38.1 23	50.8 27	26.0 16	35.8 15	32.80 28

[a]Carcasses that did not meet certification requirements

The most difficult wholesale cut to standardize is the loin because five cutting errors are possible: carcass split, scribe length, anterior and posterior cutting locations, and external fat trim.

Points where the ham is separated from the carcass and foot are easy to establish, but standardizing fat trim is difficult. Shoulder cuts also involve cutting errors. Some errors cancel each other when cut weights are combined as with four lean cuts. Errors also tend to cancel each other in calculating value of the five primal cuts.

The ham-loin index may be the most repeatable measurement. It is derived from loin eye area, a fairly repeatable value, and ham's percentage of adjusted live weight.

The ham-loin index would be most workable under most packing plant conditions because only one cut would be weighed. Loin eye area is obtained for all ranking methods, to determine if minimum requirements are met. The criticism against using loin eye in the index is that loin-eye size does not correlate closely with percentage loin is of live weight nor with loin value.

The four lean cut percentages would appear to emphasize development of shoulder cuts equally with ham and loin.

Ham-plus-loin percentages could vary most because loin percentage is a major component.

Using percentages of live weights, rather than carcass, would tend to emphasize dressing percentage. In this study,

wide variations in fill were avoided by taking all animals off feed 18 hours before slaughter. Percentages based on live weight are not valid when fill varies widely, unless an adjusted live weight is calculated.

Value of the five primal cuts depends on prices used. Wholesale-cut prices fluctuate widely (Table 15), so an average price seems to be the fairest way to estimate relative carcass value. Some carcass shows use all cuts, which entails too much extra work under the time pressure of most carcass contests.

Table 18 Correlation coefficients of average daily gain and indicated carcass characteristics (57 carcasses)

Ham-loin index	% Ham + loin	Loin eye area	Av. backfat thickness	% Lean cuts
-.007	-.054	+.104	+.288*	-270*

*Probability > 95%.

Correlation coefficients of various carcass factors to average daily gain are presented in Table 18. Ham-loin index, percentage ham-plus-loin and loin eye area were not significantly related to average daily gain. This means that selecting for one of those factors would not adversely affect average daily gain. Both average backfat thickness and percentage lean cuts correlated significantly with average daily gain. Hogs that gained fastest tended to be fatter with leans cuts a smaller percentage of carcass. However the relationships were not strong. It seems that one

could select for both gaining ability and some indicator of carcass merit, preferably ham-loin index or percentage ham-plus-loin without having selection factors in conflict.