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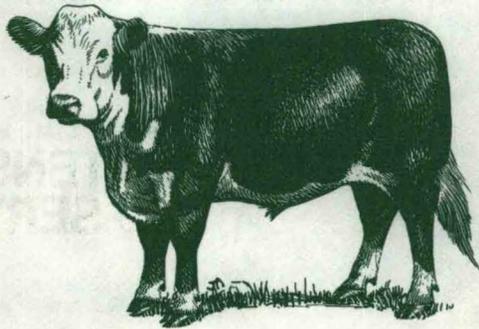
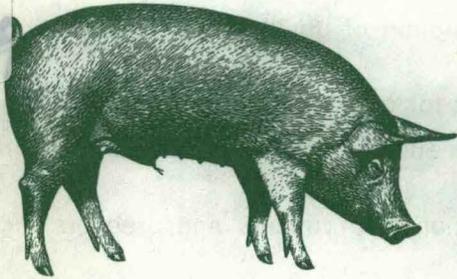
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The Oregon Carcass of Merit Program



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The Carcass of Merit program is an evaluation system developed and conducted by Northwest Extension Services to help identify standards for desirable beef, lamb, and hog carcasses and to recognize the growers and breeders who achieve those standards. Purpose of the program is to:

- Encourage production of quality meat animals that meet consumer desires.
- Develop concern for quality in livestock production.
- Extend producer education through sponsored marketing programs.
- Provide recognition to producers and breeders for high-quality animals.

This publication was prepared for 4-H leaders and livestock club members, but will serve as a guide for others with interest in improving carcass merit. Certificates of Recognition, to be awarded to growers and breeders meeting the standards, are available to sponsors through the State Extension 4-H office.

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OREGON STATE UNIVERSITY

EXTENSION
 **SERVICE**

Extension Service, Oregon State University, Corvallis, Henry A. Wadsworth, director. Produced and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. Extension work is a cooperative program of Oregon State University, the U. S. Department of Agriculture, and Oregon counties. Extension invites participation in its programs and offers them equally to all people.

Steer of Merit

Requirements for the Steer of Merit

1. Hot carcass weight—550 pounds to 775 pounds.
2. Rib eye area—1.8 square inches or more per 100 pounds of hot carcass weight, reported to the nearest tenth of an inch.
3. Fat cover at 12th rib—0.10 inch or less per 100 pounds of hot carcass weight.
4. Final carcass grade—Low Choice or better.
5. Yield grade—2.9 or better.
6. Dressing Percentage—60 percent or better.
7. Judging and placing of carcass—Placement of carcasses, if made, should be on the basis of yield grade within the following groups:
 - A. Steer of Merit.
 - B. Carcasses grading at least low Choice which fail to meet the "Steer of Merit" standards on one trait.
 - C. Carcasses grading at least low Choice which fail in more than one trait.
 - D. All carcasses failing to grade at least low Choice may be placed at the discretion of the judge. (Probably by yield grade.)
 - E. Dressing percentage is to be used to break ties.

Procedure for evaluating the Steer of Merit

1. Rib Eye Area—Obtained either by measuring the *longissimus dorsi* muscle area at the 12th rib face with a loin eye grid or by taking an acetate tracing of the muscle and measuring with a compensatory polar planimeter. All secondary muscles should be excluded from the measurement.
2. Fat cover at 12th Rib—Measured perpendicular to the outside surface of the carcass. Measurement taken at a point three-fourths of the length (from the backbone end) of the *longissimus dorsi* muscle.
3. Final Quality Grade—By a Federal Grading Service employee.
4. Yield Grade—Reported by the Federal Grader, obtained by use of a Beef Carcass Yield Grade Finder or calculated using the Yield Grade Formula. Yield Grade = $2.50 + (2.50 \times \text{adj. fat thickness, in.}) + (0.20 \times \% \text{ kidney, pelvic and heart fat}) +$

(0.0038 X hot carcass wt., lbs.) – (0.32 X area of rib eye, in.²)
 (See Tables 1 and 2.)

5. Live Weight—Preferably taken on the day prior to slaughter. Normally standard weighing conditions necessitate a 12-hour stand with no feed or water.

6. Dressing Percentage = $\frac{\text{Hot Carcass Weight}}{\text{Live Weight}} \times 100$

Table 1. Percent of Beef Carcass Weight In Boneless, Closely Trimmed, Retail Cuts From Round, Loin, Rib, and Chuck For Corresponding Yield Grades.

Yield grade	Yield of cuts	Yield grade	Yield of cuts
	<i>Percent</i>		<i>Percent</i>
0.8	55.0	3.4	49.1
1.0	54.6	3.6	48.7
1.2	54.2	3.8	48.2
1.4	53.7	4.0	47.7
1.6	53.3	4.2	47.3
1.8	52.8	4.4	46.8
2.0	52.3	4.6	46.4
2.2	51.9	4.8	45.9
2.4	51.4	5.0	45.4
2.6	51.0	5.2	45.0
2.8	50.5	5.4	44.5
3.0	50.0	5.6	44.1
3.2	49.6	5.8	43.6

Table 2. Preliminary Yield Grade And Corresponding Carcass Fat Thickness.*

Preliminary yield grade	Fat thickness	Preliminary yield grade	Fat thickness
	<i>Inches</i>		<i>Inches</i>
2.0	.00	3.1	.45
2.1	.05	3.2/3.3	.50
2.2/2.3	.10	3.4	.55
2.4	.15	3.5	.60
2.5	.20	3.6	.65
2.6	.25	3.7/3.8	.70
2.7/2.8	.30	3.9	.75
2.9	.35	4.0	.80
3.0	.40	4.1	.85

* The USDA grader's yield-grade worksheet will not have a column for fat thickness, but will have a column for preliminary yield grade. This preliminary yield grade can be converted to a fat thickness using the above table.

Lamb of Merit

Requirements for the Lamb of Merit

1. Carcass Weight—Must weigh at least 50 pounds but not more than 65 pounds. The upper limit may be raised as the trade acceptability changes.
2. Fat Cover at 12th Rib—Must have an average fat depth of at least .15 inch and not more than .30 inch at measurement site.
3. Leg Conformation Grade—Low Prime or better.
4. Kidney and Pelvic Fat—Must be 3.0 percent or less.
5. Final Carcass Grade—Low Choice or better.
6. Yield Grade—2.0 to 3.8.
7. Loin Eye Area—(if ribbed) Must not be less than 2.3 square inches adjusted to a 50-pound carcass weight basis. (See Table 3.)

Table 3. Minimum "Lamb of Merit" Specifications for Loin-eye Area for the Corresponding Chilled Carcass Weights.

Chilled carcass weight		Chilled carcass weight	
	Loin-eye area		Loin-eye area
<i>Pounds</i>	<i>Sq. inches</i>	<i>Pounds</i>	<i>Sq. inches</i>
70	2.78	52	2.35
69	2.76	51	2.33
68	2.73	50	2.30
67	2.71	49	2.28
66	2.69	48	2.25
65	2.66	47	2.23
64	2.64	46	2.21
63	2.61	45	2.18
62	2.59	44	2.16
61	2.57	43	2.13
60	2.54	42	2.11
59	2.52	41	2.09
58	2.49	40	2.06
57	2.47	39	2.04
56	2.45	38	2.01
55	2.42	37	1.99
54	2.40	36	1.97
53	2.37	35	1.94

8. Carcasses must have acceptable color and firmness of fat and lean. Those carcasses on which legs and shoulders are devoid of fat will not qualify.
9. Dressing Percentage—50 percent or better.
10. Judging and Placing Lamb Carcasses—Placement of carcasses, if made, should be on the basis of yield grade within the following groups:
 - A. Lamb of Merit.
 - B. Carcasses grading at least low Choice which fail to meet the "Lamb of Merit" standards on one trait.
 - C. Carcasses grading at least low Choice which fail in more than one trait.
 - D. All carcasses failing to grade at least low Choice may be placed at the discretion of the judge. (Probably by yield grade.)
 - E. Dressing percentage is to be used to break ties.

Procedure for evaluating the Lamb of Merit

1. Tag animals through the slaughter line at the packing house to keep a record of individual lamb identification (ear tag or brand number). Pin a metal tag into the lean on the inside of the leg (crotch area). Be sure and record metal tag number alongside the proper ear tag or brand number.
2. Work with the Federal grader in the cooler 24 hours after slaughter and record leg conformation grade and final carcass grade. Record these to one-third of the grade (example: high Choice, mid Choice, low Choice, etc.).
3. Code the leg conformation grade by the system: high Prime = 15; mid Prime = 14; low Prime = 13; high Choice = 12; etc.
4. Have the Federal grader estimate the percentage kidney and pelvic fat or remove this fat along with the kidney knob and record the weight. Divide this weight by the carcass weight to get percentage kidney and internal fat weight. Place the kidney and surrounding fat in a plastic bag inside the flank with a string to enable standard merchandising of the carcass.
5. Weigh carcasses individually and record chilled weights in pounds down to one-half-pound intervals.
6. Measure fat thickness with a ruler divided in tenths of inches. Take measurements over both right and left sides between the 12th and 13th ribs at a spot approximately one and one-half inches from the middle of the backbone. These measurements can be obtained through a small slit made over the center of the loin-eye muscle. Average the two measurements.

7. Yield Grade can be reported by the Federal Grader, obtained by use of a Lamb Carcass Yield Grade Finder or calculated using the Yield Grade Formula.

$$\text{Yield Grade} = 1.66 - (0.05 \times \text{leg conformation grade code}) + (0.25 \times \% \text{ kidney and pelvic fat}) + (6.66 \times \text{adj. fat thickness, in.}) \text{ (See Table 4.)}$$

8. If carcasses are to be ribbed, make a transverse cut midway between the 12th and 13th rib. This cut should be made at right angles to the longitudinal axis of the carcass.
9. Determine the area of both the right and left loin eyes either by use of a grid or trace both loin-eye surfaces using acetate paper and determine the surface area using a planimeter. An average of the two sides should be used as the recorded area.
10. Each specific measurement should be taken by the same individual for all the carcasses in the show.

11. Dressing percentage = $\frac{\text{Hot Carcass Weight}}{\text{Live Weight}} \times 100$

Table 4. Percent of Lamb Carcass Weight In Boneless, Closely Trimmed, Retail Cuts From Leg, Loin, Rack, and Shoulder for Corresponding Yield Grades.

Yield grade	Yield of cuts	Yield grade	Yield of cuts
	<i>Percent</i>		<i>Percent</i>
0.8	49.4	3.4	44.7
1.0	49.0	3.6	44.4
1.2	48.7	3.8	44.0
1.4	48.3	4.0	43.6
1.6	48.0	4.2	43.3
1.8	47.6	4.4	43.0
2.0	47.2	4.6	42.6
2.2	46.9	4.8	42.2
2.4	46.5	5.0	41.8
2.6	46.2	5.2	41.5
2.8	45.8	5.4	41.1
3.0	45.4	5.6	40.8
3.2	45.1	5.8	40.4

Hog of Merit

Requirements for the Hog of Merit (carcasses are broken)

1. Age for Weight—200-250 pounds, 180 days maximum for 220 pounds. Hogs must be slaughtered at not less than 200 pounds and no more than 250 pounds live weight. All data will be adjusted to 220 pounds.
2. Carcass Length—30.5 inches long at 220 pounds. The carcass must be a minimum of 30.5 inches long at 220 pounds measured from the forward edge of the aitch bone to the front of the first rib adjacent to the vertebra. There is no maximum on length.
3. Average Backfat Thickness—1.3 inches average backfat thickness maximum. This measurement is the average of three measurements taken opposite the first rib, the last rib, and the last lumbar vertebra. There is no minimum backfat thickness.
4. Loin-Eye Area—5.0 square inches minimum at 220 pounds (optional). This measurement is the area of the cross section of the loin-eye muscle taken between the 10th and 11th ribs.
5. Lean Meat Quality Score—Must qualify for No. 2, No. 3, or No. 4 quality designation for color and firmness plus the No. 2, No. 3, No. 4, or No. 5 quality designation for marbling.
6. Yield Ham and Loin—37 percent minimum. The weight of closely trimmed ham and loin expressed as percentage of chilled carcass weight must be 37 percent or more.
7. Dressing Percentage—73 percent or more with head off.
8. Judging and Placing of Carcasses—If pork carcasses qualifying under "Hog of Merit" specifications are placed, the placing shall also be determined according to the ham-loin index. Carcasses failing to qualify on quality will be placed last regardless of ham-loin index. Dressing percentage is to be used to break ties.

Requirements for the Hog of Merit (carcasses are not broken)

1. Age for Weight—200-250 pounds, 180 days maximum for 220 pounds. Hogs must be slaughtered at not less than 200 pounds and no more than 250 pounds live weight. All data will be adjusted to 220 pounds.

2. Carcass Length—30.5 inches long at 220 pounds. The carcass must be a minimum of 30.5 inches long at 220 pounds measured from the forward edge of the aitch bone to the front of the first rib adjustment to the vertebra. There is no maximum on length.
3. Average Backfat Thickness—1.3 inches average backfat thickness maximum. This measurement is the average of three measurements taken opposite the first rib, the last rib, and the last lumbar vertebra. There is no minimum backfat thickness.
4. Percentage of Muscle—The percentage of muscle must be at least 56 percent. The formula to determine the percent of muscle is from the National Pork Producers Council and is:

$$\frac{21.3 + (\text{Carcass wt., lbs.} \times .55) - (\text{average backfat thickness, in.} \times 17.75)}{\text{Carcass Weight}} = \% \text{ muscle}$$
5. Dressing percentage—73 percent or more with head off.

Procedure for Evaluating the Hog of Merit

1. Preslaughter Weight—An individual live weight taken to the nearest one pound within a 24-hour period not to exceed either 12 hours before or after the time the hog is shown alive. The limits on live weight shall be 200 pounds to 250 pounds.
2. Age—An accredited age not to exceed 180 days adjusted.
3. Carcass Measurements—Measure carcass length and backfat thickness to the nearest one-tenth of an inch, and loin-eye area to the nearest one-tenth of an inch.
4. Primal Cut Weights—Record the weight of the green, skinned ham and trimmed loin to the nearest one-tenth of a pound.
5. Quality Score—Subjective visual quality score taken at the exposed tenth rib face and ham face.
6. Slaughter Dressing Style—All carcasses must be dressed “packer style.” Dressing procedure is head off, leaf fat and kidneys out with the carcass split longitudinally down the backbone into two equal halves. In cases where the superior spinous processes are not split evenly, use the side containing the greatest proportion of these feather bones for the evaluation procedure.
7. Ham-Loin Yield—Double the weight of the trimmed ham and loin (when cutting only one side) and express weight as a percentage of the chilled carcass weight.

Example:

Ham and loin weight from one side = 30 pounds.

$30 \times 2 = 60$ pounds total ham and loin from the carcass.

$60 \div 150$ pounds (chilled carcass weight) $\times 100 = 40$ percent ham-loin yield

8. Ham-Loin Index—To obtain the ham-loin index take the ham-loin yield (see above) and add to it the square inches of loin eye. (Example: ham-loin percent of 40.0 and a loin-eye area of 4.7 square inches results in a ham-loin index of 44.7.)

9. Dressing percentage = $\frac{\text{Hot Carcass Weight}}{\text{Live Weight}} \times 100$. Subtract 3% from the dressing percentage if the head is left on the carcass.

Pork quality standards

Quality standards presented here are based on examination of the cut surfaces of muscle in the two major pork cuts—the loin and the ham.

Recent research shows that a firm, slightly dark, and moderately marbled pork muscle has a higher processing and cooking yield and is more flavorful, juicy, and tender than soft, pale, or deficiently marbled pork. Pork muscles vary widely in:

- Color—pale grayish white (inferior) to dark red.
- Firmness—extremely soft (inferior) to very firm.
- Structure—open (inferior) to closed.
- Marbling—practically devoid (inferior) to extremely abundant.

This makes it imperative to have standards from which we can uniformly evaluate pork muscles.

Further, since certain of these attributes are at least partially heritable, these standards should also be a great aid in the selection of lines of breeding stock which will give an improved pork muscle quality.

- *Color and structure*

Pork muscles are light or dark depending on the amount of pigment or the amount or rate of development of muscle acidity. Pigment increases with age. Acidity depends in part on feeding and treatment. An extremely acid muscle or rapid development of acidity usually results in a light, pale color and soft structure.

The No. 3 products are normal color—grayish pink to slightly red—and are very acceptable for processing and cooking. These products represent the ideal pork color and structure.

• **Marbling**

Marbling is intramuscular fat or fat intermingled with lean. It is an important quality factor. The greater the marbling, especially in the loin, the greater the juiciness and tenderness.

• **Firmness**

Firmness is generally related to color—darker products are firmer. No. 3, 4, and 5 hams are all firm enough for desirable products. Softer products usually have a lower processing yield and a higher cooking loss. A moderately dark, firm product is usually both juicy and tender.

Scores Used to Evaluate Pork Carcasses for Quality.

Score	Color	Structure	Marbling	Firmness
1	Extremely pale	Watery	Devoid	Soft
2	Pale	Moderately watery	Small	Moderately soft
3	Grayish pink	Moderately dry	Moderate	Moderately firm
4	Moderately dark	Dry	Slightly abundant	Firm
5	Dark	Very dry	Abundant	Very firm

Tables for Adjusting Age of Hog, Carcass Length, Backfat Thickness and Loin Eye Area to 220 Pounds Live Weight

Age of Hog—180 days maximum for 220 pounds; adjusted by 2 pounds per day.

Weight	Age	Weight	Age	Weight	Age
<i>Pounds</i>	<i>Days</i>	<i>Pounds</i>	<i>Days</i>	<i>Pounds</i>	<i>Days</i>
250	200	238	189	216	178
249	199	236	188	214	177
248	198	234	187	212	176
247	197	232	186	210	175
246	196	230	185	208	174
245	195	228	184	206	173
244	194	226	183	204	172
243	193	224	182	202	171
242	192	222	181	200	170
241	191	220	180		
240	190	218	179		

**Carcass Length—30.5 inches minimum for 220 pounds;
adjusted by 0.025 inch per pound.**

Weight	Length	Weight	Length	Weight	Length
<i>Pounds</i>	<i>Inches</i>	<i>Pounds</i>	<i>Inches</i>	<i>Pounds</i>	<i>Inches</i>
250	31.250	232	30.800	216	30.400
248	31.200	230	30.750	214	30.350
246	31.150	228	30.700	212	30.300
244	31.100	226	30.650	210	30.250
242	31.050	224	30.600	208	30.200
240	31.000	222	30.550	206	30.150
238	30.950	220	30.500	204	30.100
236	30.900	218	30.450	202	30.050
234	30.850			200	30.000

**Backfat Thickness—1.3 inches maximum for 220 pounds;
adjusted by 0.004 inch per pound.**

Weight	Thickness	Weight	Thickness	Weight	Thickness
<i>Pounds</i>	<i>Inches</i>	<i>Pounds</i>	<i>Inches</i>	<i>Pounds</i>	<i>Inches</i>
250	1.420	232	1.348	216	1.284
248	1.412	230	1.340	214	1.276
246	1.404	228	1.332	212	1.268
244	1.396	226	1.324	210	1.260
242	1.388	224	1.316	208	1.252
240	1.380	222	1.308	206	1.244
238	1.372	220	1.300	204	1.236
236	1.364	218	1.292	202	1.228
234	1.356			200	1.220

**Loin Eye Area—5.0 square inches minimum per 220 pounds;
adjusted by 0.015 square inch per pound.**

Weight	Area	Weight	Area	Weight	Area
<i>Pounds</i>	<i>Sq. inches</i>	<i>Pounds</i>	<i>Sq. inches</i>	<i>Pounds</i>	<i>Sq. inches</i>
250	5.450	232	5.180	216	4.940
248	5.420	230	5.150	214	4.910
246	5.390	228	5.120	212	4.880
244	5.360	226	5.090	210	4.850
242	5.330	224	5.060	208	4.820
240	5.300	222	5.030	206	4.790
238	5.270	220	5.000	204	4.760
236	5.240	218	4.970	202	4.730
234	5.210			200	4.700