Oregon 4-H
Carcass of Merit

Procedures and Guidelines

The **Oregon 4-H Carcass of Merit Program** offers recognition to Oregon State University Extension 4-H members who breed and/or buy, feed, and raise animals whose carcasses meet the "ideal" for red meat: lean, early maturing, high yielding, and containing minimal external fat. This publication was prepared for 4-H leaders and livestock club members, but it can also be a useful guide to others interested in improving quality and desirability of meat animal carcasses.

Your local program can award Oregon 4-H Carcass of Merit Certificates to acknowledge the skills and abilities 4-H members practiced in raising a market animal. Certificates are available through the State 4-H office at Oregon State University.

Many county 4-H animal science programs are using ultrasound technology when actual carcass data cannot be collected and interpreted. Though ultrasound technology is an excellent tool, it is not 100 percent accurate. If possible, it is highly recommended to use actual carcass data instead of ultrasound data. In any case, it is best to use one carcass data collection method for the Carcass of Merit Program, to allow for uniformity and consistency of results.

Individual county 4-H programs may wish to adjust the requirements outlined in the following procedures and guidelines. If your county does this, please change the name of the merit program to reflect your county or area (for example, "Clatsop County Carcass of Merit Program").

Through the Oregon Carcass of Merit Program, 4-H members will learn:

- Standards for quality meat animals that appeal to the public
- The importance of carcass traits in animal selection
- To ensure a carcass free of blemishes and contamination through proper animal care
- The economic factors and public attitudes associated with the Oregon Carcass of Merit Standards

Oregon 4-H Lamb Carcass of Merit

Requirements

1. **Hot carcass weight.** Minimum 55 pounds, maximum 80 pounds.

2. **Fat thickness at the 12th rib.** Minimum adjusted fat thickness of 0.15 inch.

3. **Muscling.** If ribbing the carcass is possible, the minimum ribeye area

Oregon State University | Extension Service

requirement is equal to 2.2 + [(hot carcass weight – 55) x 0.02] or:

Hot carcass weight	Minimum ribeye area requirement
55	2.5
60	2.6
65	2.7
70	2.8
75	2.9
80	3.0

Ribbed and unribbed carcasses must have a leg conformation score (see "Leg conformation") of high Choice or higher. Carcasses should be ribbed if possible, because ribeye area can be determined more objectively than leg conformation grade.

4. **USDA Yield Grade.** 2.5 or lower, reported to the 10th of a yield grade (drop the 1/100th decimal digit; i.e., report a yield grade of 2.99 as 2.9).

5. **USDA Quality Grade.** Low Choice or higher.

6. **Carcass acceptability.** Carcasses must have acceptable color and firmness of fat and lean, and be free of defects which may significantly reduce carcass value. For example, carcasses with excessive trim (more than 5 percent muscle, fat, and/or bone removal) should be eliminated.

Evaluating lamb carcasses

The Oregon 4-H Lamb Carcass of Merit Program recognizes superior achievement in producing market lambs that have high-quality carcasses with high cutability.

1. **Hot carcass weight** is the dressed carcass weight immediately after harvest and prior to chill. If you record chilled weights, convert to hot carcass weight basis by dividing by 0.98 (most lamb carcasses shrink approximately 2 percent during the chilling process).

2. **Adjusted fat thickness** is measured between the 12th and 13th rib over the midpoint of the longissimus (ribeye) muscle, perpendicular to the outside surface of the fat. If carcasses are not ribbed, you can get this measurement by making a small slit in the fat over the center of the ribeye muscle. For greater accuracy, use an average of the fat thickness over both sides of the carcass. You may adjust this measurement to reflect an unusual distribution of fat on other parts of the carcass.

3. **Ribeye area** is measured only when carcasses are ribbed. Ribeye area is the cross-sectional area of the longissimus (ribeye) muscle, measured between the 12th and 13th rib of the ribbed carcass. Use a plastic lamb-and pork-grid to measure to the nearest 0.05 square inch, or any other approved measuring procedure or device. Exclude all adjacent secondary muscles from the measurement.

4. **Leg conformation** is a visual estimate of the proportion of edible meat to bone in the leg. Superior leg conformation is reflected in legs that are very wide and thick in relation to their length, and very plump, full, and round in appearance.

Leg conformation scores are coded as follows:
15 = high Prime
14 = average Prime
13 = low Prime
12 = high Choice
11 = average Choice
10 = low Choice

Leg conformation is no longer a factor in the USDA Lamb Carcass Yield Grade Standards, but it remains a valuable part of lamb carcass evaluation.

5. **USDA Quality Grade** is a blended evaluation of eating quality—or **palatability**—that points out characteristics of the lean and the conformation of the carcass. A USDA meat grader (or other qualified and

experienced person) should determine the final yield grade and the yield grade factors of conformation, maturity, flank streaking, firmness of lean, and external fat.

If anyone other than a USDA meat grader does the grading, make a note to that effect. There is no advantage for Prime over Choice, because there is little or no difference in eating quality and no premium is paid for Prime lambs. In fact, Prime lamb carcasses often have yield grades inferior to those of Choice carcasses.

6. **USDA Yield Grade** identifies differences in cutability between carcasses. **Cutability** refers to the percentage of the carcass that can be made into trimmed, boneless retail cuts from the four major wholesale cuts: the leg, loin, rack, and shoulder. USDA Yield Grades are 1, 2, 3, 4, and 5, with YG 1 indicating the highest yield of retail cuts.

The Lamb Carcass Grade Standards[*] rely solely on fat thickness to determine yield grades. The formula to calculate yield grade is YG = 0.4 + (10 x adjusted fat thickness) or:

YG 1 = 0.00 to 0.15 inches fat thickness

YG 2 = 0.16 to 0.25 inches fat thickness

YG 3 = 0.26 to 0.35 inches fat thickness

YG 4 = 0.36 to 0.45 inches fat thickness

YG 5 = >0.46 inches fat thickness

Ranking lamb carcasses

Place carcasses that meet the requirements of the Oregon 4-H Carcass of Merit on the basis of yield grade. Award only these lambs the Carcass of Merit distinction.

The Oregon 4-H Lamb Carcass of Merit Program is not designed to rank carcasses. There are many good ranking systems for which you can use the data collected for the

[*] USDA Federal Register, Vol. 57, No. 97, pp. 21338–21345, implemented on July 6, 1992

Oregon 4-H Carcass of Merit guidelines. The ranking system you choose for a show should be in line with the demands of local producers and packers.

Do not rank carcasses that have been collected from different plants by several individuals.

Your local steering committee may decide to rank carcasses further than just those of highest merit. Your group could consider the following:

A. Carcasses grading at least low Choice which fail to meet the Oregon 4-H Lamb Carcass of Merit standards on one trait.

B. Carcasses grading at least low Choice which fail in more than one trait.

C. All carcasses failing to grade at least low Choice may be placed at the discretion of the judge (probably by yield grade).

Ask your local OSU Extension Service office about other systems for ranking lamb carcasses.

Oregon 4-H Beef Carcass of Merit

Requirements

1. **Hot carcass weight.** Minimum 650 pounds, maximum 950 pounds.

2. **Fat thickness at the 12th rib.** Adjusted fat thickness of 0.15 to 0.50 inch.

3. **Ribeye area.** Minimum 1.8 square inches of ribeye area per 100 pounds of hot carcass weight, reported to the nearest 10th of an inch.

4. **Yield grade.** Yield grade of 1.0 to 3.5 (calculated formula to be in the range 1.0 to 3.5).

5. **Carcass quality grade.** Meets or exceeds the minimum requirements of USDA low Choice.

6. **Color and firmness of the lean.** Carcasses should have acceptable color

and firmness of the lean muscle tissue. Eliminate a carcass if quality grade is lowered because of dark lean (dark cutters).

7. **Bruises and abscesses.** Carcasses should be excluded from consideration if there are bruises and abscesses to the primal cuts. A carcass should also be eliminated if it has other significant quality defects that affect the final quality grade or carcass value.

Evaluating beef carcasses

1. **Hot carcass weight** is the dressed carcass weight immediately after harvest and prior to chill. If you record chilled weights, convert to hot carcass weight basis by dividing by 0.98 (most beef carcasses shrink approximately 2 percent during the chilling process).

2. **Adjusted fat thickness** is measured between the 12th and 13th rib, perpendicular to the outside surface of the fat. Take the measurement at a point ¾ of the length of the longissimus (rib eye) muscle from the backbone or chine bone end. This measurement may be adjusted either up or down, as necessary, to reflect unusual amounts of fat deposited on other parts of the carcass, or if excessive amounts of fat were removed during the process of hide removal.

3. **Ribeye area** is the size of the cut surface of the longissimus muscle where the carcass is ribbed between the 12th and 13th rib. You can take this measurement using a ribeye grid; by taking an acetate tracing of the muscle and measuring with a compensatory polar planimeter; or with another approved measuring procedure or device. Include only the longissimus muscle in the measurement. Exclude all secondary muscles.

4. **USDA Quality Grade** is based upon two major factors: (1) degree of marbling, and (2) degree of maturity. In addition, color, texture, and firmness of the lean in the ribeye muscle are considered in determining the final quality grade. A USDA grader or other qualified person should determine the marbling score and final quality grade.

5. **USDA Yield Grade** identifies differences in cutability between carcasses. **Cutability** refers to the percentage of the carcass that can be made into trimmed, boneless retail cuts from the four major wholesale cuts: the round, loin, rib, and chuck. USDA Yield Grades are 1, 2, 3, 4, and 5, with YG 1 indicating the highest yield of retail cuts.

Yield grade is determined using a formula that includes adjusted fat thickness; ribeye area; percentage kidney, pelvic, and heart fat (KPH%); and hot carcass weight. A lower yield grade number indicates a higher percentage of salable red meat that a carcass is expected to yield. The USDA yield grade formula is as follows:

USDA Yield Grade = 2.50 + (2.50 x adjusted fat thickness, inches) + (0.20 x KPH%) + (0.0038 x hot carcass weight, pounds) – (0.32 x ribeye area, square inches)

Kidney, pelvic, and heart fat (KPH) is the fat accumulated in the body cavity of the carcass. Its weight is estimated and reported as a percentage of the hot carcass weight. It ranges from 0.5 to 8.0 percent and averages about 3.5 percent. A USDA grader or other qualified individual should figure the KPH%.

Carcass quality grade is a guide to the eating quality of the meat. The industry uses yield grade as a guide to the percentage of closely trimmed, boneless retail cuts of meat from a carcass.

By using these two grading systems, a wholesaler, packer, or retailer can buy uniform carcasses within certain specifications that assure both eating quality (quality grade) and percentage of salable retail product (yield grade).

Ranking beef carcasses

Rank all Oregon 4-H Beef Carcass of Merit animals on numerical yield grade from lowest to highest. Carcasses meeting Oregon 4-H Carcass of Merit Program standards should always be ranked before those not meeting the standards.

Ranking carcasses that do not meet the Oregon 4-H Carcass of Merit criteria is at the discretion of local groups. If your group wishes to rank carcasses further, it is recommended that you first group them relative to grade, size, and prices of the current beef market. Then, rank them on yield grade. For example, the second group you rank might be the Choice yield grade 1 to 3.5 steers not meeting the standards, then the Select carcasses, then the Choice yield grade 4 and 5 carcasses, then the Standard carcasses.

Oregon 4-H Swine Carcass of Merit

Requirements

1. **Hot carcass weight.** Minimum 165 pounds, maximum 200 pounds.
2. **Fat thickness at 10th rib.** Adjusted fat thickness of 0.50 to 0.90 inch.
3. **Percent lean.** A minimum of 48 percent lean as predicted by carcass percent lean equation (NPPC, 1991).
4. **Muscling**. If carcasses are ribbed for evaluation, a carcass must have a minimum of 5.0 square inches of loin eye area.
5. **Carcass quality.** Carcasses must have acceptable color and firmness of lean. Carcasses are unacceptable if they possess any of these muscle characteristics: soft, watery, and pale (PSE); dark color; or too little marbling. A carcass should be free of defects that may significantly reduce carcass value.

Evaluating swine carcasses

1. **10th rib backfat measurement** is the width of the backfat (including the skin) at a point opposite the 10th rib, perpendicular to the skin surface. Take care not to include the white connective tissue layer between the backfat layer and the vertebrae.

   If the skin has been removed from the carcass, add 0.1 inch to the measurement. Measure backfat to the nearest 0.05 inch. If the carcass is split off-center, measure both sides and average the values. You may adjust this measurement to reflect an unusual distribution of fat on other parts of the carcass.

2. **Loin eye area** is the size of the cut surface of the longissimus muscle between the 10th and 11th rib, if the carcass is ribbed. Use a plastic lamb and pork grid to measure to the nearest 0.05 square inch, or any other approved measuring procedure or device. Exclude all adjacent secondary muscles from the measurement.

3. **Muscle score** is taken and assigned a value of 1 to 3, in which 1 = thin, 2 = average, and 3 = thick.

4. **Hot carcass weight** is assessed immediately after harvest and prior to chill, with the head removed. If you record chilled weights, convert to a hot weight basis by dividing by 0.985 (most swine carcasses shrink about 1.5% during the chilling process). Adjust skinned carcasses to a skin-on basis by dividing the hot carcass weight by 0.94 (skin is approximately 6 percent of the carcass weight).

   To produce a pork carcass that meets the minimum hot carcass weight and industry quality specifications, it is suggested that pre-harvest weight be at least 230 pounds.

5. **Percent lean** is the percentage of acceptable quality lean pork (containing 5 percent fat) in a carcass as predicted

by a carcass percent lean equation[*]. For unribbed carcasses, there are two equations:

1. Use with adjusted hot carcass weight

Percent lean (170-pound carcass basis) = {[88.506 – (0.045 x adjusted hot carcass weight, pounds) – (15.077 x last rib backfat, inches) + (6.062 x muscle score) + (3.957 x sex code)] / 170} x 100

2. Use when the weight is not held constant

Percent lean (as is) = {[8.179 + (0.427 x adjusted hot carcass weight, pounds) – (15.596 x last rib backfat, inches) + (6.290 x muscle score) + (3.858 x sex code)] / hot carcass weight, pounds} x 100

(Sex code: barrow = 0, gilt = 1)

The above formulas are based on unribbed carcasses. There are other equations to predict percent lean if:

- The carcasses are ribbed.
- You use an electronic probe on carcasses.
- You use ultrasound on a live animal.

[*] Formulas are from *Procedures to Evaluate Market Hogs,* third edition, 1991, National Pork Producers Council.

You can find these formulas also in *Procedures to Evaluate Market Hogs* (see footnote below).

Ranking swine carcasses

The Oregon 4-H Swine Carcass of Merit Program is not designed to rank carcasses. Instead, this program recognizes superior achievement in the production of high cutability and quality carcasses.

There are ranking systems that can be used with the data collected for the Oregon 4-H Carcass of Merit qualifications. The ranking system you choose should be in line with demands of local producers and packers.

Published July 1994. Revised March 2009.