

LAMB CARCASS EVALUATION

Scott P. Greiner, Ph.D.
Extension Animal Scientist, Sheep
Virginia Tech

The following will describe lamb carcass evaluation procedures, with emphasis on traits measured and their importance in determining lamb carcass value. Many of these traits can be evaluated in the live animal and serve as the basis for the various grades assigned to live lambs when marketed (Blue O, Red O, etc.).

Live and Carcass Weight

Lamb processors utilize and fabricate live lambs and carcasses of different weights in various ways depending on demand by the end-user. Carcass weights are typically taken immediately following harvest (hot carcass weight). The desirable weight for lamb carcasses is dependent on the end use of the carcass. Weight is an important factor when live lambs and carcasses are priced, as USDA reports prices for in weight increment categories. Generally, very light and very heavy carcasses receive a discount in price. Supply and demand changes throughout the year influence which carcass weights receive the highest prices.

Dressing Percentage

Dressing percentage reflects the proportion of a live lamb's weight that results in carcass weight, and is calculated by dividing carcass weight by live weight and multiplying by 100. Dressing percentage is influenced primarily by the amount of gut fill. Fleece length and weight (including presence of mud/manure), along with fat cover and muscling also influence dressing percentage. Typically, dressing percentages for lambs range from 48-56%, with 52% considered an average for shorn lambs.

Fat Thickness

Fat thickness is measured over the center of the ribeye muscle after the carcass has been ribbed (split) between the 12th and 13th ribs. This measurement may be adjusted (up or down) to reflect distribution of external fat over the entire carcass. The amount of fat thickness is a good indicator of the amount of fat that is trimmed away when the carcass is fabricated into retail cuts. Therefore, carcasses with excessive amounts of fat thickness are less desirable because this excess waste fat must be trimmed. Carcasses with more than 0.36 inches of fat thickness are commonly discounted in price. However, the industry also discriminates against carcasses that are very lean (less than 0.10 inches of fat thickness), due to increased dehydration and shrink during storage and transportation for these very lean carcasses. Fat thickness is also the determining factor in calculating lamb carcass yield grades. The goal is to produce carcasses that have at least .10 inches, but preferably not more than 0.30 inches of fat thickness. Within this range, carcasses meet the preferred minimum yet do not have an excess amount of waste.

Yield Grade (YG)

Yield grade is calculated by the equation: $YG = .4 + (10 \times \text{fat thickness})$. Yield grades are used by the industry to categorize carcasses for their expected yield of boneless, closely trimmed retail cuts. Yield grades range from 1 to 5, with a yield grade 1 having the highest expected yield and 5 the lowest. Under normal circumstances, carcasses are yield graded a 1, 2, 3, 4, or 5. Since yield grades estimate the percentage of the carcass that is saleable retail cuts, they are an important aspect of carcass pricing. Yield grade 4 and 5 carcasses commonly receive a price discount because of their excess fat, and therefore lower yield of boneless, trimmed retail cuts. The following table shows the general relationship between yield grade and percentage boneless, retail cuts.

<u>Yield Grade</u>	<u>% Retail Cuts</u>
1.5	50.4
2.5	49.1
3.5	47.8
4.5	46.5
5.5	45.2

Body Wall Thickness (BW)

Body wall thickness (inches) is measured over the rib beyond the ribeye, five inches from the midline of the carcass. Differences in body wall thickness between carcasses are due primarily to fat. Carcasses that are similar over the ribeye for fat thickness (FT), may vary considerably in body wall thickness. The body wall thickness measurement is used in the equation to determine percentage boneless, closely trimmed retail cuts (% BCTRC).

Ribeye Area (Loin Muscle Area)

Ribeye area is used as an indicator of total amount of muscle mass in the carcass. Ribeye measurements are taken by using a grid to determine the cross-sectional area (in square inches) of the loin muscle at the 12th-13th rib. The ribeye muscle is a primary muscle in the carcass, and therefore is fairly reflective of total carcass muscling. The ribeye is also the major muscle in the loin, which is the most valuable wholesale cut in the carcass. The size of the ribeye is related to carcass weight. Heavier carcasses should have larger ribeyes.

Leg Score

Leg score is a visual estimate of the amount of muscle in the leg of the carcass. Leg scores are expressed numerically with 15 (Prime +) being the heaviest muscled and 10 (Choice -) being relatively light muscled. The scores are assigned by evaluating the muscle expression, shape, and fullness to the leg relative to carcass weight. Leg scores are not used to calculate percentage of retail cuts (%BCTRC), but are included as a component in determining quality grades.

Percentage Boneless Closely-Trimmed Retail Cuts (%BCTRC)

The percentage of boneless, closely trimmed retail cuts is very meaningful as it represents the predicted proportion of the carcass that is saleable retail product. The formula to predict %BCTRC uses carcass weight, fat thickness, body wall thickness, and ribeye area as follows:

$$\%BCTRC = 49.936 - (.0848 \times HCW) - (4.376 \times FT) - (3.530 \times BW) + (2.456 \times REA)$$

This percentage varies greatly, with very high yielding carcass being greater than 50% BCTRC and low yielding carcasses less than 45% BCTRC. The two measurements of waste fat, fat thickness (FT) and body wall thickness (BW), have the largest impact on %BCTRC. Lambs with more waste fat will have lower %BCTRC. Muscling also influences the value. Larger ribeyes relative to carcass weight will increase %BCTRC. Although yield grades estimate percentage of boneless retail cuts, %BCTRC is more precise because it includes body wall thickness and also accounts for differences in muscle between carcasses. %BCTRC is commonly used in lamb carcass contests to rank.

Quality Grade

Quality grades are an estimation of the palatability characteristics (tenderness, juiciness, and flavor) of the carcass. Final quality grade is determined by a combination of three factors: maturity, flank streaking, and conformation. Carcasses qualify for lamb maturity with the presence of a break joint on at least one front shank, which is present in most sheep less than 14 months of age. Mutton carcasses (yearlings and older) are characterized by spool joints on the front shanks. Flank streakings are the fat deposits on the flank muscles. Since lamb carcasses are normally not ribbed, flank streaking is used to estimate marbling. Marbling is the small specs of fat found within the ribeye muscle, and is related to flavor and juiciness. The final component is conformation (muscling), which is primarily determined by leg score. These factors are combined to arrive at a final quality grade. The majority of lamb carcasses quality grade Choice and Prime. Prime is the highest quality grade, followed by Choice. Each quality grade is further subdivided into thirds: Prime+, Prime, Prime-, Choice+, Choice, and Choice-, from highest to lowest in quality, respectively. Carcasses that do not qualify for Choice-quality grade, are commonly referred to as "no rolls" (NR) in the industry. These carcasses are usually from lightweight, underfinished lambs. Due to their inferior quality, no roll carcasses are frequently discounted in price.

Carcass Pricing

Lamb carcass prices are differentiated based on carcass weight, quality grade, and yield grade. Slaughter lambs are most frequently traded on a live weight basis as opposed to a carcass merit system, although pricing of lambs based on carcass parameters is available through some processors. In a carcass value system, total value of the carcass is calculated by multiplying carcass price/lb. by hot carcass weight. Carcass price per pound may vary according to weight, yield grade, and/or quality grade. An equivalent live price/lb. can be determined by dividing total carcass value by live weight at the time of harvest. Differences between lambs in live value and carcass value reflect differences in dressing percentage and carcass merit (yield and/or quality grade).