

2020 State Fair of Virginia Lamb Carcass Evaluation

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This is the 22nd year for the Lamb Carcass Contest held in conjunction with the state youth market lamb show. The following will describe the carcass evaluation and pricing procedures, along with determination of carcass premiums. A historical summary of the program is provided on the last page.

Hot Carcass Weight (HCW)

Represents the weight of the carcass immediately following harvest. The desirable weight for lamb carcasses is dependent on the end use of the carcass. Specifically, lamb processors utilize and fabricate carcasses of different weights in various ways depending on demand by the end-user. Carcass weight is an important factor when lamb carcasses are priced, as USDA reports prices for lamb carcasses 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 are most preferred.

Dressing Percentage (DP)

Calculated by dividing carcass weight by live weight and multiplying by 100. Dressing percentage reflects the proportion of a live lamb's weight that results in carcass weight. Dressing percentage is influenced mostly by the amount of gut fill. Fat cover and muscling also influence dressing percentage. Typically, dressing percentages for shorn lambs range from 52-57%.

Fat Thickness (FT)

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 at the 12-13th rib is a strong indicator of the total amount of fat that is trimmed away when the carcass is fabricated into retail cuts. Carcasses with excessive amounts of fat are less desirable because of excess waste. Carcasses with more than 0.36 inches of fat thickness are commonly discounted in price. 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 0.10 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: $YG = 0.4 + (10 \times \text{fat thickness})$. 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. However, yield grades have been reported to the nearest 0.1 for this carcass contest. 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 are undesirable because of their excess fat, and therefore lower yield of boneless, trimmed retail cuts.

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).

Loin Muscle Area (LMA)

Loin muscle area (ribeye area) is used as an indicator of total amount of muscle mass in the carcass. Loin muscle 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 loin 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. LMA size is related to carcass weight- heavier carcasses should have larger LMAs.

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 important in determining quality grades (QG).

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.

Quality Grade (OG)

Quality grades are an estimation of the palatability characteristics (tenderness, juiciness, and flavor) of the carcass. Final quality grade is determined by three factors: maturity, flank streaking, and conformation. In young lambs, there is normally very little variation in maturity (age). 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. Most 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^o, Prime-, Choice+, Choice^o, 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

Carcass price per pound was \$3.00 for all carcass weights. The total value of the carcass is calculated by multiplying carcass price/lb. by hot carcass weight. The equivalent live price/lb. is determined by dividing total carcass value by live weight. Differences in live value reflect differences in dressing percentage. A \$0.50 per head deduction will be made for each lamb for the state lamb checkoff. This checkoff money is used for predator control, lamb promotion, and sheep research. The Virginia Sheep Industry Board allocates these funds. All lambs sold in Virginia are subject to this checkoff. There is also a national checkoff assessed at a rate of \$0.70 per 100 pounds of live weight.

Carcass Placings

Lambs were placed into five categories (Gold, Purple, Blue, Red, and Pink). Carcasses failing to meet one or more of the following standards were placed in the Pink group:

Minimum fat thickness of 0.12 in.

Maximum fat thickness of 0.35 in. (maximum Yield Grade of 3.9)

Minimum LMA for carcass weight using formula: $1.4 + (0.02 \times \text{HCW})$

60 lb. HCW minimum LMA = 2.6

70 lb. HCW minimum LMA = 2.8

80 lb. HCW minimum LMA = 3.0

Minimum Quality Grade of Choice-

Minimum carcass weight of 45.0 pounds

Carcasses meeting all of the above standards were ranked using %BCTRC and live ADG as follows:

Category	Description	Criteria
Gold	Lambs with outstanding carcass merit	≥ 50.0 %BCTRC
Purple	Lambs with superior carcass merit	49.0-49.9 %BCTRC
Blue	Lambs with desirable carcass merit	all remaining carcasses with ≥ 47.5 %BCTRC or YG 1 or 2
Red	Lambs meeting carcass standards but have less desirable combination of leanness and LMA	All remaining carcasses meeting minimum standards
Pink	Lambs which are over-finished or under-finished, and/or have small LMA relative to their weight	Carcasses failing to meet one or more of the standards listed above

The premium categories reward lambs that excel in both carcass merit and growth. ADG was not included as a placing criteria in 2020 since it was not available as a result of the change in nomination process (no starting weights on lambs). Within a premium category, carcasses are listed by %BCTRC. Traits shown in bold on the results sheet indicate the carcass does not meet the standard for that trait.

Contest Summary 1999-2020

Since 1999, a total of 3494 lambs have been evaluated through the Lamb Carcass Contest held in conjunction with Virginia's state youth market lamb show. The following table summarizes the carcass information over this period.

Over the years, live weights and carcass weights of lambs have gotten substantially heavier.

Associated with this weight increase has been a corresponding increase in loin muscle area and fatness. During the last 5 years (2015-2020), there has been an increase in the percentage of heavy lambs with heavy carcasses (> 85 pounds), as well as an increased proportion of overfinished, Yield Grade 4 lambs.

In 2020, live weights and carcass weights moderated some compared to the five year trend. The proportion of overfinished, YG4 carcasses was lower than 2019, although the trend for an increase in the proportion of YG3 and YG4+ carcasses is higher than historical averages. Despite the recent increases in fatness, carcasses are heavier muscled on average compared to earlier years of the contest (more carcass met minimum LMA standard). Genetics, feeding, and management programs all play an important role in carcass outcome, and therefore close attention to these factors will impact carcass merit.

VIRGINIA LAMB CARCASS CONTEST SUMMARY 1999-2020

	<u>2020</u>	<u>2019</u>	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	5 year avg. (2015-2019)	22 year avg. (1999-2020)
Carcass Measurements:								
Number of Carcasses	114	103	99	133	117	134	586	3494
Live Wt., lb.	134.9	139.5	139.8	135.4	129.7	136.6	136.0	126.3
ADG, lb./day		0.38	0.43	0.38	0.39	0.41	0.4	0.37
Carcass Wt., lb.	77.6	81.7	81.8	78.5	74.8	78.8	79.0	71.4
Dressing %	57.5	58.6	58.4	57.9	57.5	57.6	58.0	56.4
Adj. Fat Thickness, in.	0.32	0.36	0.32	0.29	0.28	0.28	0.3	0.24
Yield Grade	3.6	4.0	3.6	3.3	3.2	3.2	3.5	2.8
Loin muscle area, sq. in.	3.60	3.58	3.74	3.50	3.30	3.46	3.5	3.21
Leg Score (12 = Ch+, 13 = Pr-)	12.6	12.7	11.8	12.6	12.3	12.8	12.5	12.5
% BCTRC	47.5	46.5	47.3	47.4	47.3	47.4	47.2	47.9
Quality Grade (11 = Ch°, 12 = Ch+)	11.8	11.9	11.3	12.0	11.6	11.9	11.8	11.5
Carcass Price, \$/cwt.	\$300.00	\$280.00	\$250.00	\$280.00	\$304.23	\$320.00	\$288.92	\$208.98
Live Value, \$/cwt.	\$172.45	\$164.07	\$146.12	\$162.23	\$174.92	\$184.35	\$167.42	\$118.41
Carcass Contest Specifications:								
ADG standard for premium placings		0.38	0.35	0.37	0.38	0.42	0.38	0.35
< 0.10 in. Fat Thickness	0.0%	0.0%	0.0%	1.5%	0.9%	1.5%	0.9%	1.4%
Yield Grade ≥ 4 (> 0.35 in. fat)	37.7%	59.2%	35.4%	22.6%	22.2%	17.9%	30.0%	13.0%
< minimum Loin Muscle Area	4.4%	1.9%	5.1%	5.3%	9.4%	1.5%	4.6%	10.9%
< Ch- Quality Grade (No Roll)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Carcass weight < 45.0 lb.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Carcass Distributions:								
Gold Premium Category	3.5%	0.0%	4.0%	0.8%	0.0%	0.0%	0.9%	1.7%
Purple Premium Category	16.7%	5.8%	7.1%	8.3%	7.7%	4.5%	6.7%	14.1%
Blue Premium Category	28.1%	23.3%	32.3%	41.4%	41.0%	52.2%	39.1%	33.8%
Red Premium Category	11.4%	11.7%	20.2%	23.3%	22.2%	22.4%	20.3%	26.6%
Pink Premium Category	40.4%	59.2%	36.4%	26.3%	29.1%	20.9%	33.1%	23.8%
Carcass Distributions:								
Yield Grade 1	4.4%	1.0%	0.0%	5.3%	7.7%	6.0%	4.3%	19.3%
Yield Grade 2	20.2%	15.5%	23.2%	31.6%	36.8%	38.1%	29.9%	40.6%
Yield Grade 3	37.7%	24.3%	41.4%	40.6%	33.3%	38.1%	35.8%	27.2%
Yield Grade ≥ 4	37.7%	59.2%	35.4%	22.6%	22.2%	17.9%	30.0%	13.0%
Carcass Distributions:								
Prime Quality Grade	5.3%	3.9%	14.1%	8.3%	5.1%	12.7%	8.9%	3.0%
Choice Quality Grade	94.7%	96.1%	85.9%	91.7%	94.9%	87.3%	91.1%	97.0%
No Roll Quality Grade	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Carcass Distributions:								
HCW < 45 lb.	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
HCW 45-54 lb.	0.9%	1.0%	0.0%	1.5%	4.3%	3.0%	2.0%	8.0%
HCW 55-64 lb.	10.5%	4.9%	2.0%	7.5%	17.9%	7.5%	8.2%	20.7%
HCW 65-74 lb.	24.6%	12.6%	25.3%	23.3%	29.9%	16.4%	21.5%	30.8%
HCW 75-84 lb.	41.2%	43.7%	35.4%	43.6%	23.9%	43.3%	38.2%	28.2%
HCW > 85 lb.	22.8%	37.9%	37.4%	24.1%	23.9%	29.9%	30.0%	12.2%

