

2014 North Dakota 4-H Lamb Ultrasound Carcass Evaluation

A.R. Crane^{*¶}, R.R. Redden^{*}, and C.S. Schauer[¶]

^{*}Department of Animal Sciences, North Dakota State University, Fargo, ND

[¶]Hettinger Research Extension Center, North Dakota State University, Hettinger, ND

Yield and quality of the lamb carcass are what ultimately determine the value of a lamb. The carcass evaluation system is used to evaluate the carcass merit of 4-H club lambs using data from ultrasound scans. Lambs are first weighed, given a leg score, and loin muscle eye area, fat thickness, and body wall thickness. The latter three measurements are determined by ultrasound scanning between the 12th and 13th ribs. All of this data will then be used to evaluate the carcass merit of individual lambs.

INTRODUCTION

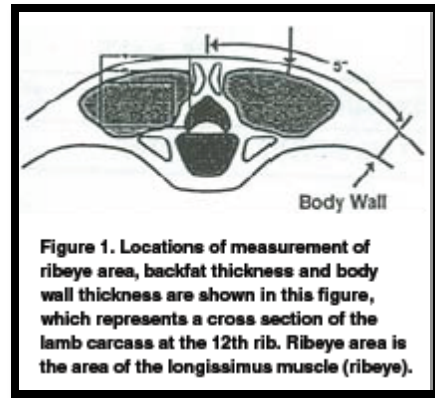
The ultimate value of lamb is determined by carcass quality, with many factors playing a part in its evaluation. Ultrasound technology allows for the objective estimation of carcass traits in real-time of live animals (Grainer, 2001). This technology is important for the genetic improvement of carcass merit and is certainly an important tool for outreach to 4-H participants. Ultrasound measurement allows an opportunity to quantify conformation in an objective manner (Greiner, 2001) allowing lambs with superior carcass quality to be recognized through the ND premium lamb certification using the carcass evaluation live lamb index.

PROCEDURES

Determining Carcass Character. Carcass traits used to evaluate lamb carcasses are based on industry standards for dressing percentage and ultrasound measurements of fat and muscling.

Hot carcass weight and dressing percentage: The weight of the carcass after slaughter is referred to as hot carcass weight. The relationship between live weight and hot carcass weight is called dressing percentage, which is figured by dividing hot carcass weight by live weight. For lambs, the dressing percentage can vary between 45 and 57 percent. For this evaluation, we used a value of 54 percent, which is based on research data from club lambs. For example, a 150-pound lamb is estimated to have a hot carcass weight of 81 pounds (150 pounds x 54 percent).

Backfat thickness: This is the thickness of the fat from the ribeye muscle to the outer surface of the carcass measured at the midpoint of the ribeye muscle at the 12th rib location (Figure 1). Backfat thickness is the only factor used in the assignment of yield grades. Figure 1 illustrates the location of the backfat measurement over the center of the ribeye, between the 12th and 13th ribs. Fat thickness may be adjusted up or down to account for unusual fat distribution at the point of measurement. Backfat on carcasses usually ranges from 0.1 to 0.5 inch.



Body wall thickness: This is a measurement across the lean, bone and fat of the lower rib 5 inches from the midline of the carcass (Figure 1). This area accumulates excess fat in some animals and is an indicator of expected trimmed cut yield from the carcass. Body wall thickness usually ranges from 0.5 to 1.2 inches.

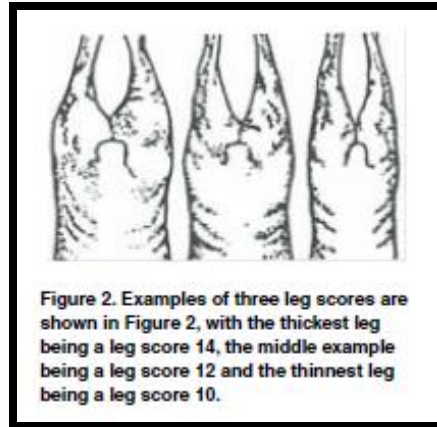
Ribeye area (REA): This is an objective measure of muscling in lambs and is measured in square inches between the 12th and 13th ribs (Figure 1). REA measurements usually range from 1.5 to 4.0 square inches. REA is affected by the weight and muscularity of the live animal and provides a good estimate of the percentage of lean to bone in the carcass.

USDA yield grade: U.S. Department of Agriculture yield grades are calculated by using the following formula: $YG = 0.4 + (10 \times \text{adj. fat thickness})$. USDA yield grades (1, 2, 3, 4, 5) categorize carcasses into groups according to the expected yield of trimmed, retail cuts. Yield grade 1 has the highest expected yield and 5 the lowest. For example, a lamb with 0.15 inch of backfat will have a USDA yield grade of 1.9 ($0.4 + (10 \times 0.15)$). Table 1 describes the assignment of yield grades based on backfat ranges and the average yield of semiboneless cuts for each yield grade.

Table 1. Lamb Carcass Yield Grade Information (Maddock et al., 2013)

Yield Grade	Backfat Range	Average Estimated % Semi-boneless Yield
1	0.15 in and less	50.3
2	0.16- 0.25 in	49.0
3	0.26-0.35 in	47.7
4	0.36-0.45 in	46.4
5	0.46 in and greater	45.1

Leg scores (Figure 2): These are used to evaluate muscling subjectively. Variations in leg score do not affect yield grade but are used to evaluate the attractiveness and lean yield of the lamb carcass. Leg scores usually range from 15 (very thick muscling) to 9 (thin muscling). A leg score of 12 is considered average for lamb leg muscling (slightly thick muscling).



Index System

If lambs make North Dakota premium lamb certification, the index system will rank lambs based on carcass merit. All premium lambs start with a base index value of 80. For each 0.1 inch increase in yield grade above 1.5, 0.25 point is deducted. For each 0.1 inch increase in loin muscle area above the base area for the lamb's weight class, lambs are given 1 point. For each 0.1 inch increase in body wall thickness above 0.8, lambs are deducted 2 points. Conversely, each 0.1 inch decrease in body wall thickness is rewarded with 2 points. Finally, lambs are given 2 additional points for each leg score above 12.

Table 2. North Dakota 4-H Lamb Live Carcass Index (Maddock et al., 2013)

Base Index	Yield Grade	Carcass Weight (lbs.)	Loin Muscle Area (in ²)	Body Wall Thickness (in.)	Leg Score
80	1.5	<50	2.7	Base = 0.8	Base= 12
		50-55	2.8		
		55-60	2.9		
		60-65	3.0		
		65-70	3.1		
		70-75	3.2		
		75-80	3.3		
		80-85	3.4		
		>85 lbs	3.5		
(+ 0.1 in. = -0.25 units)		(+0.1 in ² = +1 unit)		(+0.1 in. = -2 units) (-0.1 in. = +2 units)	

RESULTS

During the North Dakota State Fair, a total of 78 lambs were scanned for the 4-H live lamb carcass evaluation contest, belonging to 48 kids from 21 counties. Forty six percent of the lambs received the certification for ND premium lamb. The tables below list the carcass qualities and indices of the top ten lambs enrolled in the contest.

Table 3. Carcass data for the top ten lambs entered in the ND State Fair carcass contest

Exhibitor		Lamb Measurement								
First	Last	Lamb ID	Live Wt (#)	LMA (in.)	BF (in.)	BW (in.)	Leg Score	CWT	YG	LMA Class
Hadley	Detienne	280	132	4.24	0.28	0.55	13.5	71.3	3.2	2.7
Sheyenne	Freitag	598	129	3.80	0.20	1.02	13	69.7	2.4	2.6
Dylan	Rue	1431	106	3.52	0.20	0.71	12	57.2	2.4	2.4
Haley	Filipek	390	118	3.54	0.20	0.55	12.5	63.7	2.4	2.5
Lynsey	Schmitz	1417	119	3.69	0.28	0.55	14	64.3	3.2	2.5
Wyatt	Dunlop	404	119	3.57	0.24	0.63	13	64.3	2.8	2.5
Ty	Kulsrud	0037	111	3.31	0.20	0.35	12.5	59.9	2.4	2.4
Jaime	Lundquist	0940	103	3.53	0.28	0.75	12.5	55.6	3.2	2.4
Ashly	Miller	386	134	3.58	0.20	0.55	14	72.4	2.4	2.7
Wyatt	Dunlop	0221	117	3.42	0.28	0.51	12.5	63.2	3.2	2.5

Table 4. Index for the top ten lambs entered in the ND State Fair carcass contest

Exhibitor			Index					
First	Last	Lamb ID	Base	YG	LMA	BW	Leg Score	Final
Hadley	Detienne	280	80	-2.9	15.43	0.50	3	93.04
Sheyenne	Freitag	598	80	-0.9	12.03	-0.45	2	90.66
Dylan	Rue	1431	80	-0.9	11.22	0.18	0	90.49
Haley	Filipek	390	80	-0.9	10.38	0.50	1	89.96
Lynsey	Schmitz	1417	80	-2.9	11.93	0.50	4	89.54
Wyatt	Dunlop	404	80	-1.9	10.67	0.34	2	89.11
Ty	Kulsrud	0037	80	-0.9	9.07	0.89	1	89.04
Jaime	Lundquist	0940	80	-2.9	11.32	0.10	1	88.53
Ashly	Miller	386	80	-0.9	8.80	0.50	4	88.37
Wyatt	Dunlop	0221	80	-2.9	9.25	0.58	1	86.93

Table 5. Top ten lamb's data receiving the ND premium lamb certification

Exhibitor			ND Premium					
First	Last	Lamb ID	Wt	YG	LMA	BW	Leg Score	Final
Hadley	Detienne	280	1	1	1	1	1	5
Sheyenne	Freitag	598	1	1	1	1	1	5
Dylan	Rue	1431	1	1	1	1	1	5
Haley	Filipek	390	1	1	1	1	1	5
Lynsey	Schmitz	1417	1	1	1	1	1	5
Wyatt	Dunlop	404	1	1	1	1	1	5
Ty	Kulsrud	0037	1	1	1	1	1	5
Jaime	Lundquist	0940	1	1	1	1	1	5
Ashly	Miller	386	1	1	1	1	1	5
Wyatt	Dunlop	0221	1	1	1	1	1	5

IMPLICATIONS

The ND live lamb carcass evaluation contest was developed to evaluate the carcass merit of 4H club lambs using data from the ultrasound scans. Through this program children involved have been impacted by being taught the value of ultrasounding sheep and other livestock and the impact it can have on the industry. Scientists explained the process of scanning, the qualities being scanned, and what the measurements can tell us about the individual animals. Through this program, we can positively impact the lamb industry by striving to have a superior product in club lambs.

LITERATURE CITED

- Maddock, R., R. R. Redden, and C. S. Schauer. 2013. North Dakota 4-H lamb ultrasound carcass value evaluation. NDSU Extension Bulletin: GBJ09, July.
- Greiner, S. P. 2001. Understanding sheep ultrasound measurements for carcass traits. Virginia Cooperative Extension Bulletin: Livestock Update, August.