

# CARCASS EVALUATION OF WESTERN COLORADO RANGE LAMBS<sup>1,2</sup>

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## Summary

Carcass data were collected for 352 range lambs from six western Colorado producers. Information recorded for each carcass included fat thickness, kidney and pelvic fat, leg conformation score, hot carcass weight, quality grade, overall conformation score, lean quality and final yield grade. Lambs were slaughtered at the Monfort of Colorado Greeley lamb facility after removal from native range forages. Carcass data were collected after a 24-hour chill.<sup>4</sup> Overall averages for carcass traits measured were: fat thickness, .22 in.; kidney and pelvic fat, 2.83%; leg conformation score, 11.78; hot carcass weight, 59.6 lb; quality grade, 11.74; overall conformation, 11.79; lean quality, 11.90; and final yield grade, 3.34. Carcasses that qualified under the current American Lamb Council "Certified Lean Lamb" program as described by fat thickness .10 to .25 in., kidney and pelvic fat  $\leq$  4.5%, leg conformation score  $\geq$  11 and yield grade of  $\leq$  3.9, ranged from 32 to 90% among producers. Carcasses that averaged  $\leq$  11 (average Choice) leg conformation score between producers ranged from 0 to 21 %. Fat thickness was the limiting factor preventing additional carcasses from qualifying under the American Sheep Industry Association's "Certified Lean Lamb" specifications.

(Key words: range lambs, carcass, lean lamb, quality, fat thickness, yield grade)

## Introduction

Carcass merit of weanling range lambs from western Colorado has not been well documented. Therefore, the objective of this study was to evaluate various carcass traits from six range sheep flocks pastured on the western slope of Colorado and to compare these flocks with the American Sheep Industry Association's amended "lean lamb" specifications.

In 1986, the American Sheep Producers Council (ASPC), which has since merged with the National Wool Growers Association to form the American Sheep Industry Association, convened a Consumer Acceptability Task Force to study and improve domestic lamb products. A national survey of lamb carcass cutability traits (Tatum et al., 1989) indicated that only about 1/3 of the over 6,200 lamb carcasses would meet the following "lean" specifications as described by ASPC: 1) external fat thickness .10 to .25 in.; 2) leg conformation score of average choice (11) or higher; 3) kidney and pelvic fat 3.5% or less; quality grade USDA Choice or higher and no evidence of "buck" characteristics. Since 1988, the American Lamb Council has amended the "lean lamb" carcass characteristics as follows: external fat thickness from .10 to .25 in., internal kidney and pelvic fat  $<$  3.5%, leg conformation score average Choice or higher ( $\geq$  11) and final yield grade  $\leq$  3.9. The survey conducted by Tatum et al. (1989) indicated that forage-based lambs had leaner carcass composition and more readily met the current American Lamb Council's "lean lamb" qualifications.

A typical weaning and shipping process would include removal of lambs from summer range flocks of approximately 1000 ewes mid-September. Lambs would be individually evaluated through a runway system as to those considered "fats" and immediately available for slaughter and those observed as "feeders." Feeders are sent to aftermath pastures or confinement feedlot- operations. The percentage of lambs that qualify as "fats" varies considerably from year to year. Summer forage supplies, subsequent feedlot or pasture costs and current lamb prices contribute to increases or decreases in the percentage of lambs slaughtered directly from the range.

## Materials and Methods

Range sheep operations on the western slope of Colorado are forage based, low input, migratory systems. Lambs born from April 20 to May 20, 1990 were removed from high mountain summer ranges between September 10 and September 26 and transported to the Monfort of Colorado Greeley lamb plant for slaughter.

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<sup>4</sup>Carcass evaluations were conducted by personnel from Colorado State University Department of Animal Sciences

<b>Flock</b>	<b>Breed<sup>a</sup></b>	<b>Number of Lambs Surveyed</b>
104	Crossbred	66
106	Crossbred	51
202	Crossbred	40
203	Crossbred	40
204	Crossbred	36
212	Crossbred	40
301	Crossbred	39
304	Columbia	40

<sup>a</sup> Crossbred lambs are offspring from western white-faced ewes mated to Suffolk, Hampshire or Suffolk x Hampshire rams.

The genetic base of the ewes, for a majority of flocks surveyed, were western white-faced ewes (Rambouillet or a Rambouillet x Columbia). The predominant terminal meat breed sires used were Suffolk, Hampshire or Suffolk x Hampshire. Flock 304 is Columbia breeding. All flocks were managed under herded conditions in typical western Colorado intermediate spring sagebrush uplands and mountain alpine summer ranges.

Carcass data were collected on 352 slaughter lambs from six range sheep operations on the western slope of Colorado. After a 24-hour chill, carcass measurements were taken. Each carcass was evaluated for fat thickness, estimated kidney and pelvic fat, leg conformation score, hot carcass weight, lean quality, quality grade, and overall conformation. Final USDA yield grades for each carcass were calculated using values for fat thickness, kidney and pelvic fat, and leg conformation score. Quality grade was assigned to each carcass based on a composite evaluation of carcass maturity, lean quality (flank streaking and flank firmness) and carcass conformation (USDA, 1982).

Leg conformation score, lean quality and overall conformation scores were assigned using the USDA system, 1 to 15; 1 = low Cull, 15 = high Prime (USDA, 1982). A mixed model least squares analysis of variance by Harvey (1990), was used to calculate overall means, least squares means and correlation coefficients. The independent variable throughout the analysis was hot carcass weight.

### **Results and Discussion**

*Sample Characteristics.* Data presented in tables I and 2 characterize the survey sample. Table I indicates the flocks by number and size of sample. Lots 104 and 301, 202 and 212 are individual flocks owned by the same producer. Overall means and standard deviations of carcass traits in the survey are shown in table 2. Overall means for leg conformation score (LCS), quality grade (QG), lean quality (LQ) and overall conformation (OC) indicate average Choice (11) or greater values for each trait.

Table 2 also indicates simple correlations of hot carcass weight (HCW) and dependent carcass variables. The medium correlations reflect the relationships normally observed between carcass weight, fat thickness and yield grade (increases in carcass weight generally are associated with higher, less desirable fat thickness and yield grades).

<b>Carcass Traits</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>HCW</b>
HCW	59.63	5.12	--
FT	.22	.08	.42
FYG	3.34	.69	.38
LCS	11.78	.91	.32
QG	11.74	1.43	.31
LQ	11.90	1.68	.29
OC	11.79	1.39	.23
KP	2.83	1.04	.13

<sup>a</sup> Carcass traits: HCW – hot carcass wt (lb), FT = fat thickness (in), KP – kidney and pelvic fat (%), LCS – leg conformation score, QG – quality grade, LQ – lean quality, FYG – final yield grade.

Carcass least squares means by flock for lean quality (LQ), overall conformation (OC), quality grade (QG), fat thickness (*FT*), kidney and pelvic fat (KP), leg conformation (LC), and final yield grade (FYG) are reported in Table 3. Muscling and overall carcass quality as described by LQ, OC, QG and LC indicated average choice quality or greater for all traits. Least squares means for *FT* and YG indicated considerable variation between flocks. Figure 1 shows the percentage of lambs by flock, that qualified under American Lamb Council "Certified Lean Lamb" specifications. Fat thickness was the limiting factor in flocks with a low percentage of lambs qualifying. This suggests that even with forage based lamb diets, producers must monitor fat thickness of lambs when "lean lamb" certification is an economic consideration.

## Conclusions

Using the current specifications as amended by the American Lamb Council for "Certified Lean Lamb," 57% of the western Colorado range lambs evaluated in this study met the criteria as described in Figure 1. Flock averages for lamb carcasses qualifying as "Certified Lean Lamb," ranged from 32 to 90%. Fat thickness was the limiting factor in preventing "Certified Lean Lamb" carcass qualification. This suggests that producers should monitor fat thickness and market lambs in a more timely fashion to prevent external fat accumulation. Field et al. (1971) reported that high concentrate feeding of lambs over extended periods of time increased carcass fat, thus lowering carcass cutability. This study indicates that lambs can be finished on forage while maintaining acceptable carcass characteristics.

Flock	LQ	OC	QG	FT	KP	LCS	FYG	Percentage Certified Lean
104	11.87	11.73 <sup>c</sup>	11.72	.26 <sup>d</sup>	2.98 <sup>d</sup>	11.56 <sup>c</sup>	3.62 <sup>d</sup>	32
106	11.79	11.63 <sup>c</sup>	11.62	.21 <sup>c</sup>	3.58 <sup>d</sup>	11.77 <sup>c</sup>	3.44 <sup>d</sup>	55
202	11.92	11.90 <sup>c</sup>	11.82	.22 <sup>c</sup>	3.04 <sup>d</sup>	11.93 <sup>c</sup>	3.34 <sup>c</sup>	50
203	11.77	11.64 <sup>c</sup>	11.56	.24 <sup>c</sup>	2.90 <sup>d</sup>	11.55 <sup>c</sup>	3.48 <sup>d</sup>	43
204	12.19	11.37 <sup>d</sup>	11.87	.21 <sup>c</sup>	2.71 <sup>c</sup>	11.56 <sup>c</sup>	3.22 <sup>c</sup>	64
212	11.71	11.80 <sup>c</sup>	11.73	.20 <sup>c</sup>	2.56 <sup>c</sup>	11.57 <sup>c</sup>	3.09 <sup>c</sup>	80
301	12.27	12.36 <sup>d</sup>	11.91	.24 <sup>d</sup>	2.12 <sup>c</sup>	12.45 <sup>d</sup>	3.29 <sup>c</sup>	62
304	11.82	11.95 <sup>c</sup>	11.75	.19 <sup>c</sup>	2.40 <sup>c</sup>	11.96 <sup>c</sup>	2.99 <sup>c</sup>	90
Ave.	11.92	11.80	11.75	.22	2.79	11.79	3.31	57

<sup>a</sup> Carcass traits: LQ - lean quality, OC - overall conformation, QC - quality grade, Fr - fat thickness (in.), KP - kidney and pelvic fat (*o/o*), LCS - leg conformation score, FYG - final yield grade.

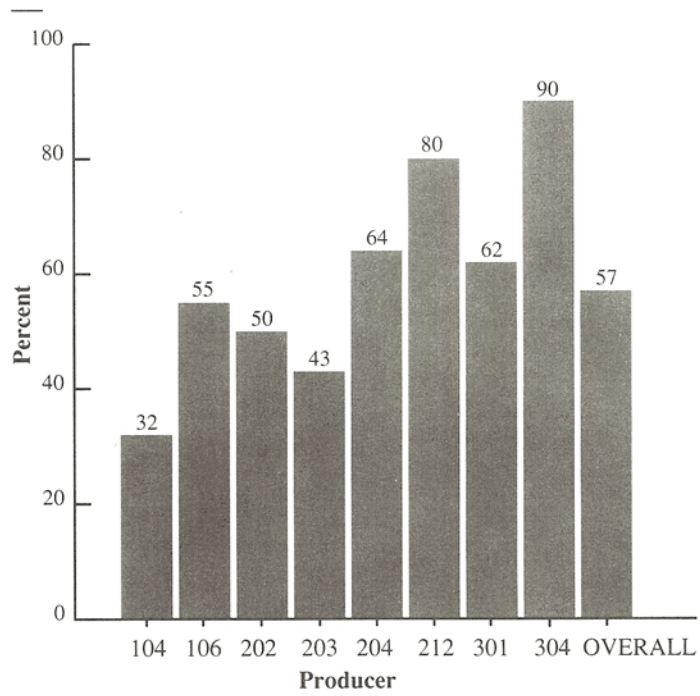
<sup>b</sup> American Lamb Council- Certified Lean - .10 to .25 Fr, KP ~ 4.5, LCS ~ 11, FYG ~ 3.9.

<sup>c,d</sup> Means in the same column with different superscript letters are different ( $P < .05$ ) using the Tukey HSD test. Columns where superscripts are not denoted indicate no significant differences in means ( $P > .05$ ).

## Literature Cited

- Field, R.A., M.L. Riley, M.P. Botkin, E.K. Faulkner, B.F. Craddock, G.P. Roerkasse, G.M. Spurlock, M. Dohn, J.K. Judy, R.H. Brimshaw, C.F. Parker, H.R. Cross, M. Shelton, G.C. Smith, Z.L. Carpenter, J.A. Jacobs, W.G. Wells, L.F. Bush, R.W. Mandigo, R.H. Hatch, T.H. Doane, P.E. Bloom, M.W. Galgan, J.K. Hillers, C. Opheikens, J.D. Kemp and T. Wickersham. 1971. Survey and identification of management systems which are producing high cutability Choice and Prime lambs. Report to the American Sheep Producers Council, Inc.
- Harvey, W.R. 1990. Mixed model least-squares and maximum likelihood computer program. The Ohio State University, Columbus, Ohio.
- Tatum, J.D., J.W. Savell, H.R. Cross and J.G. Butler. 1989. A national survey of lamb carcass cutability traits. SID Research Journal 5:1.
- USDA. 1982. Standards for grades of lamb, yearling mature and mutton carcasses. Agr. Marketing Serv., USDA, Washington, DC.

Figure 1. Percentage of Lambs, by Flock, that Certify Under American Lamb Council Certified Lean Lamb Criteria<sup>a</sup>



<sup>a</sup> .10-.25 inches fat thickness, kidney and pelvic fat  $\leq$  4.5 percent, leg conformation score  $\geq$  11, final yield grade  $\leq$  3.9.