

Comparison of Short-Scrotum And Wether Lambs for Growth And Carcass Characteristics¹

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Summary

Two hundred crossbred range lambs were individually identified at the time of docking to compare the effects on growth, performance and carcass characteristics of cryptorchidism (short-scrotum) induced by scrotal ablation. Advantages ($P < 0.05$) in average daily gain (ADG) and total gain (TG) were realized for the short-scrotum lambs over wether contemporaries weaned from range-forage diets. No differences ($P > 0.05$) were evident for ADG and TG at 28 and 42 days on-feed during the feedlot phase of the project. At 61 days on-feed, an advantage ($P < 0.05$) in ADG was evident for the short-scrotum lambs. Overall, least squares means for fat thickness, kidney and pelvic fat percentages and final yield grade favored ($P < 0.05$) short-scrotum lambs. Leg conformation scores and Quality Grades did not differ between treatment groups. The range lamb industry, under new USDA Yield Grade and Quality Grade regulations, can realize significant advantages in carcass cutability by leaving suckling lambs intact through the growing and finishing period. Prompt marketing at a desirable carcass composition is a must if producers choose a modified surgical castration of range ram lambs. Strong consideration should be given to the immediate slaughter of intact lambs from range diets.

Key words: range lambs, cryptorchidism, average daily gain, carcass traits, wethers.

Introduction

Several researchers have indicated that intact males gain more rapidly and yield leaner carcasses than do wethers (Hunt et al., 1938; Walker, 1950; McClaugherty et al., 1959; Turton, 1962). Hudson et al. (1968) reported that growth and carcass characteristics of ram lambs and lambs with shortened scrotums were essentially the same. Ray and Belling (1967) reported greater day-110 weights for lambs with shortened scrotums than for ram, wether or ewe lambs. Wilson et al. (1971) reported that rams gained significantly faster than either short-scrotum lambs or wethers prior to weaning, and that rams and short-scrotum lambs gained faster than wethers during the post-weaning period. However, in most market areas, rams are discriminated against on a live weight price basis. More information is needed to determine the practical aspects of lean lamb production under extensive range management systems, with or without the possibility of subsequent confinement feeding.

New USDA Standards for Grades of Lamb, yearling mutton and mutton carcasses and Standards for Grades of slaughter lambs, yearlings and sheep (USDA, 1992), were implemented in July 1992. For lamb carcasses presented for USDA quality grading, it is now mandatory that both Yield and Quality Grades also be assigned to each carcass (USDA, 1992). The American Lamb Council guidelines, implemented in 1988, for "Certified Lean Lamb" include specific carcass-trait parameters that are not identified in the revised USDA Grading Standards (1992). Certified Lean Lambs must have a 12th to 13th rib fat thickness (FT) in the range of 0.10 to 0.25 in., kidney and pelvic fat (KP) that is 3.5% or lower, a leg conformation score (LCS) of average Choice or higher Quality Grade (QG) and Final Yield Grade (FYG) of less than 3.9. A survey conducted by Tatum et al. (1989) indicated that lambs finished on forage-based diets more readily met the current "Certified Lean Lamb" qualifications and were leaner than those

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fed concentrates. A subsequent carcass survey by LeValley et al. (1990) on 352 western Colorado range lambs indicated overall averages for 12th to 13th rib FT of 0.22 in., KP of 2.83% and FYG of 3.34. In the latter study, the percentage of lambs that met "Certified Lean Lamb" criteria, from the eight individual producers surveyed, ranged from 32 to 90%.

The objective of the present study was to compare weights, gains and carcass merit of cryptorchid (short-scrotum) suckling range lambs to those of their surgically castrated contemporaries under extensive forage-based range conditions as well as under confinement feedlot conditions.

Materials and Methods

At docking time (early June), suckling range lambs ($n = 200$) were weighed and randomly assigned to one of two treatments: 1) short-scrotum lambs; or 2) surgically castrated lambs (control). The suckling lambs ranged from 15 to 30 days of age when they were weighed. They were sired by Suffolk or Suffolk x Hampshire rams out of Rambouillet ewes. Control ram lambs were castrated using the conventional knife method. Cryptorchidism (short-scrotum) was induced by pushing the testes into the body cavity and using elastrator rings to cause scrotal ablation. Individual weaning weights were measured in late September. Lambs were weighed for weaning weight, at shipping time, by use of an electronic single animal scale. A random sample of 25 control lambs and 25 short-scrotum lambs were then slaughtered. All remaining 75 short-scrotum lambs and an additional random sample of 75 control lambs, from the same range flock, were transported to the Rigdon Farm feedlot of Colorado State University for the feedlot-finishing phase of the study. Within treatments, lambs were sorted by frame size and live weight and randomly assigned to pens containing equal numbers of short-scrotum and control lambs. Pens of lambs were fed for periods of 28, 42 or 61 days. The bunkline feedlot-starter ration and the six-step finisher ration are presented in Table 1. The proportions of concentrate ingredients in the bunkline diets were "stepped-up" in relation to each treatment group's subsequent kill date at 28, 42 or 61 days-on-feed. On the designated dates of slaughter, lambs were individually weighed and transported to the Monfort Lamb Plant (Greeley, CO) for slaughter.

After a 24-hour chill, carcass measurements were taken for FT, estimated KP, LCS, lean quality score, QG and overall conformation score. Final Yield Grades were calculated using revised USDA formula values for fat thickness. Quality Grades (USDA, 1992) were assigned to each carcass based on a composite evaluation of carcass maturity, lean quality (flank streaking and flank firmness) and carcass conformation. A General Linear Model of SAS (SAS, 1989) using least squares means was used to analyze the data.

Results and Discussion

Short-scrotum lambs out-gained ($P < 0.05$) control lambs from docking to weaning (Table 2). Differences in feedlot gain tended to favor short-scrotum lambs during the confined-feeding phase. Least squares means for feedlot ADG and TG by feed period are reported (Table 3) for lambs slaughtered at 28, 42 and 61 days-on-feed. Average daily gain improved significantly between 28 and 42 days-on-feed as the weaned range lambs became accustomed to feedlot rations containing concentrates, and as concentrate levels increased. In contrast to previous findings from a number of studies comparing intact versus castrated lambs, feedlot performance was not significantly enhanced in this study by using the short-scrotum procedure.

Carcass trait evaluations for short-scrotum and control lambs are reported in Table 4. Fat thickness, KP and FYG favored ($P < 0.05$) short-scrotum lambs versus control lambs. Quality Grade (QG) and leg conformation score (LCS) were not different ($P > 0.05$) between short-scrotum and control carcasses. Least squares means for carcass traits for each slaughter group (range, 28, 42 and 61 days-on-feed) are reported in Table 5. Fat thickness, KP and FYG measurements increased over time ($P < 0.05$). No significant interactions between time-on-feed and treatment (short-scrotum vs. control) were observed in the analysis. As would be predicted, the longer periods of time-on-feed resulted in increases ($P < 0.05$) in FT and KP percentage. A decrease in cutability, as evidenced by larger numerical values for FYG ($P < 0.05$) would be expected as time-on-feed increases. Differences in QG and

LCS ($P < 0.05$) were observed only between lambs slaughtered immediately off range and those fed concentrate diets. Quality Grades were **all** in the Choice range but were lower ($P < 0.05$) for carcasses from range-fed lambs. The lower QG of range-fed lambs may be a function of decreased overall fatness as was evidenced by the mean FT of 0.12 in. and the hot carcass weight (HCW) of 49.2 lb. Leg conformation scores were also all in the Choice range but those for forage-fed lambs were lower ($P < 0.05$) than those ($P < 0.05$) for lambs fed concentrate diets. Hot carcass weights were different ($P < 0.05$) between those lambs slaughtered immediately from the range and all groups placed on feedlot rations.

Step	Starter			
	Ground hay	Corn silage	Protein supplement	Whole corn
1	65	25	10	0
2	50	32	8	10
3	35	40	5	20
Step	Finisher			
	Ground hay	Corn silage	Protein supplement	Whole corn
1	21	33	6	40
2	18	28	6	48
3	16	21	7	56
4	14	14	8	64
5	12	7	9	72
6	10	0	10	80

^a Percentages reported on an "as fed" basis.

Significant increases in lamb growth from docking to weaning on forage diets were realized in this study by using the short-scrutum method. Improved cutability was suggested for short-scrutum versus control lambs in FT, KP and FYG. USDA Quality Grades (QG) were higher ($P < 0.05$) for lambs fed concentrates than for those fed only forage. Three short-scrutum carcasses were determined, by USDA Grading Service personnel, to be of yearling-mutton maturity at the end of the 61 days

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Treatment	Range ^a			
	Average daily gain, lb.	SE	Total gain, lb.	SE
Short-scrutum	0.67 ^b	0.012	72.9 ^b	1.44
Control	6.06 ^c	0.028	68.16 ^c	3.23
Treatment	Feedlot			
	Average daily gain, lb.	SE	Total gain, lb.	SE
Short-scrutum	0.50	0.026	22.88	1.11
Control	0.45	0.024	20.24	1.03

^a Range diet portion of growth period (112 days; June through September).
^{b,c} Means in the same column with different superscript letters are different ($P < 0.05$).

Days on feed	Average daily gain, lb.	SE	Total gain, lb.	SE
28	0.39 ^a	0.033	11.14 ^a	1.38
42	0.53 ^b	0.031	22.53 ^b	1.30
61	0.50 ^b	0.030	31.00 ^c	1.26

^{a,b,c} Means in the same column with different superscripts are different ($P < 0.05$).

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FYG. USDA Quality Grades (QG) were higher ($P < 0.05$) for lambs fed concentrates than for those fed only forage. Three short- scrotum carcasses were determined, by USDA Grading Service personnel, to be of yearling-mutton maturity at the end of the 61 days-on-feed period.

Conclusions

Compared to results of many previous studies of short-scrotum versus wether lambs, growth differences in the present study were not as evident as has been previously demonstrated. Total gains on range-forage diets revealed a significant advantage for short-scrotum versus control lambs. However, with one exception (61 days-on-feed), feedlot gains were not significantly different.

Range sheep producers can potentially realize a growth advantage if they choose to utilize the short-scrotum procedure throughout the forage- feeding phase of the growing and finishing period. Significant advantages for

Treatment	Carcass traits																
	FT ^a	SE		KP ^b	SE		FYG ^c	SE		QG ^d	SE		LCS ^e	SE		HCW ^f	SE
Short-scrotum	0.16 ^g	0.007		2.72 ^g	0.112		2.85 ^g	0.066		11.3 ^g	0.109		11.9 ^g	0.133		58.0	1.04
Control	0.21 ^h	0.008		3.28 ^h	0.129		3.29 ^h	0.076		11.5 ^h	0.126		11.9 ^h	0.154		56.2	1.21

a FT = fat thickness at 12th rib. b KP = kidney and pelvic fat, %.
c FYG = final USDA Yield Grade Standards, July 6, 1992.
d QG = USDA Quality Grade where 10 = low Choice, 11 = average Choice and 12 = high Choice. e LCS = leg conformation score where 10 = low Choice, 11 = average Choice, 12 = high Choice.
f HCW = hot carcass weight, lb.
g,h Means in the same column with different superscript letters are different ($P < 0.05$).

carcass cutability are possible if producers choose to retain ownership of short-scrotum lambs through the feedlot. Ram lambs that are managed as induced cryptorchids are recommended to be slaughtered immediately from the range to prevent the onset of secondary sexual characteristics and significant live or carcass discounts.

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Table 5. Least squares means for carcass traits stratified according to slaughter group.^a

Slaughter Group	Carcass Traits													
	FT ^b	SE	KP ^c	SE	FYG ^d	SE	QG ^e	SE	LCS ^f	SE	HCW ^g	SE		
1	0.12 ^h	0.010	2.36 ^h	0.156	1.76 ^b	0.092	10.8 ^h	0.152	10.8 ^h	0.186	49.21 ^h	2.05		
2	0.17 ⁱ	0.013	2.83 ⁱ	0.189	2.21 ⁱ	0.111	11.7 ⁱ	0.185	12.3 ⁱ	0.225	55.17 ⁱ	2.48		
3	0.20 ^j	0.011	3.30 ⁱ	0.169	2.50 ^j	0.099	11.6 ⁱ	0.165	12.3 ⁱ	0.201	60.49 ^j	2.23		
4	0.25 ^k	0.011	3.50 ⁱ	0.167	3.00 ^k	0.098	11.4 ⁱ	0.163	11.9 ^j	0.199	63.42 ^j	2.21		

a Slaughter groups: 1 = range-fed; 2 = 28 days on feed; 3 = 42 days on feed; 4 = 61 days on feed. b FT = fat thickness at 12th rib.

c KP = kidney and pelvic fat, %.

d FYG = final USDA Yield Grade Standards, July 6, 1992.

e QG = USDA Quality Grade where 10 = low Choice, 11 = average Choice, 12 = high Choice.

f LCS = leg conformation score where 10 = low Choice, 11 = average Choice, 12 = high Choice. g HCW = Hot Carcass Weight, lb.

h, i, j, k Means in the same column, with different superscripts are different ($P < 0.05$).