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Finishing Systems for Range Lamb Production

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Traditionally, range lambs are sold in late summer and early fall. The heavy lambs go as slaughter lambs, providing they carry sufficient finish, and the lighter lambs go as feeders. Weaning these lambs at a younger age and finishing them under alternative systems would allow more efficient feed/gain ratios, result in a higher percent being of market weight and condition and decrease grazing pressure. Decreasing losses to predators under range situations may also become of prime consideration when choosing the optimum system. Although intact male lambs grow faster and have trimmer carcasses than wethers, it is not normally advisable to leave them uncastrated in range operations since they may lack sufficient finish to grade.

A study was initiated at the Antelope Range Field Station in 1974 to study market acceptance and carcass quality of intact males produced under various management systems.

Experimental Procedure

Trial 1 - 1974

Eighty-four straightbred Targhee and Suffolk-Targhee crossbred ram lambs were assigned at random within breed of sire and type of birth groups to one of three management systems on June 6, 1974, at approximately 90 days of age. In the control system, the lambs were allowed to graze native range pasture with their dams at the Antelope Range Field Station until slaughter. Lambs in the drylot finishing system were sorted from their dams, trucked to Brookings and placed on feed in drylot at the Sheep Research Unit. These lambs were self-fed a diet composed of 20% ground alfalfa hay and 80% concentrates. In the remaining system, sudan sorghum pasture, the lambs grazed with their dams on native range until July 8 when they were weaned and placed on temporary sudan sorghum pasture. These lambs were on sorghum sudan until July 29. All lambs were provided a trace mineralized salt and dicalcium phosphate mix in equal parts free choice and wormed as necessary. Only lambs weighing 90 lb or more when final weights were taken were slaughtered. Therefore, carcass information was biased upward for treatments which had a lower percentage of lambs above 90 pounds.

Lambs in the drylot group were shorn on arrival at the feedlot. Live weights of drylot lambs have not been corrected for fleece weight loss. All lambs were trucked to Sioux Falls for slaughter. Carcass data were collected after a 20- to 24-hour chill. Lambs were scored 1 to 5 at slaughter for

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needlegrass damage to the carcass. One represented no damage and 5 considerable damage, resulting in a heavy amount of trim. Least squares procedures were utilized for analysis of data including all possible two-way interactions. However, interactions are not included in the results and discussion of this papers.

Trial 2 - 1975

Ninety-one lambs were utilized in trial 2. Treatments employed in trial 2 were similar to those used in trial 1 with the following exceptions: Approximately one-half of each group were wethers and one-half rams. Lambs were assigned to their respective treatments on June 2, 1975. The sorghum sudan group was weaned and placed on the sudan pasture July 10. All ram lambs from the native pasture system were also weaned and placed on sorghum sudan at this time. Terminal weights were taken September 8.

Trial 3 - 1976

One hundred seventeen lambs were assigned to treatment in trial 3. Treatments employed in trial 3 were similar to those used in trial 2 with the following exceptions: Lambs were assigned to their respective treatments on June 2 and final weights were obtained August 9. All pasture lambs were weaned July 7 due to heavy coyote losses and placed on sorghum sudan. Sudan pasture was available for 3 weeks, after which these lambs grazed mixed native pasture around headquarters.

Results and Discussion

Trial 1 - 1974

Results of trial 1 are shown in table 1. Lambs finished on sudan pasture gained faster than lambs on either of the other treatments, although their total weight gain was not different than lambs in the drylot. Suffolk-sired lambs were heavier in all weight parameters measured. Single-born lambs were heavier than multiple-birth lambs. However, there appears to be a tendency for multiple-birth lambs to compensate by increased (nonsignifcant, $P<.05$) average daily gains postweaning.

No lambs were lost after assignment to treatment. Two (6.9%) of the lambs on native pasture, three (10%) of the lambs in the drylot and none of those on sudan pasture weighed less than 90 lb at slaughter time.

Carcass weight, dressing percent, quality grade, leg conformation and loin eye area favored drylot-finished lambs. No differences were found for carcass parameters between native or sudan pasture systems other than in dressing percent which favored native pasture lambs. Suffolk-sired lambs had heavier carcass weights and higher leg conformation scores than straight Targhee lambs. Lambs born as singles surpassed those born as twins in carcass weight, dressing percent, quality grade and leg score. Loin eye area per 50 lb of carcass favored multiple-birth lambs. Lambs in the drylot group had significantly ($P<.005$) less needlegrass carcass damage than those in the native or sudan pasture groups (1.11, 2.41 and 2.11, respectively).

Trial 2 - 1975

Table 2 contains the results of trial 2. Lambs in the drylot system had a faster rate of gain and a higher total gain than those in either of the other management systems. Suffolk-sired lambs were heavier in four of the five weight measurements. Single-born lambs were heavier but did not gain any faster than multiples. Ram lambs were 8.6 lb heavier at final weighing than wethers and gained .11 lb more per day. One lamb was lost during the trial in each of the management systems. Two (8%), three (12%) and no lambs weighed less than 90 lb final weight in the native pasture, sudan pasture and drylot groups, respectively. Drylot finishing resulted in heavier carcasses and higher dressing percents, quality grades, leg scores, percent kidney and loin eye area than either the native or sudan pasture systems. Suffolk-sired lambs excelled in seven of the ten carcass parameters reported. No differences in carcass parameters were detected between single- and multiple-born lambs with the exception that multiple lambs carried slightly more external fat (.04 inch). Ram lambs had lower dressing percents, quality grades and percent kidney than wethers. Lambs in the native pasture system suffered significantly ($P<.005$) more needlegrass damage than those on either sudan pasture or in the drylot (2.47, 1.47 and 1.02, respectively).

Trial 3 - 1976

Management systems differed considerably in trial 3 from trials 1 and 2. From June 2 until July 7, 11 of 67 pasture lambs were lost. A large portion of these were predator losses. Therefore, it was decided to wean all pasture lambs and place them on sudan pasture closer to headquarters to reduce predator losses. Sudan pasture was available for only 3 weeks due to lack of moisture. Consequently, lambs were then returned to mixed native pasture. As a result, treatments in 1976 were drylot vs a combined sudan-native pasture management system.

Results of trial 3 are presented in table 3. Drylot lambs were heavier initially (9.1 lb) than the lambs from the sudan-native pasture system. This was also true for the intermediate (5.6 lb) and final weights (12.0 lb). Suffolk-sired lambs gained faster and were heavier at slaughter time than Targhee-sired lambs. Singles were heavier than multiples at all three weigh periods. No significant ($P<.05$) difference by type of birth was noted for gain, although the multiple lambs were slightly above singles in average daily gain. Rams gained .11 lb more per day and were 7.9 lb heaiver at slaughter than wethers.

Twenty-four of the 55 (43.6%) lambs that were present at the termination of the trial in the sudan-native pasture group weighed less than 90 pounds. One lamb died during the experiment and all weighed 90 lb or more at slaughter in the drylot system. Carcass weight, dressing percent, quality grade, leg conformation, percent kidney, fat thickness, loin eye area per 50 lb. carcass and yield grade were higher for the drylot system. Suffolk-sired lambs had a higher yield grade than Targhee lambs and rams had less fat than wether lambs.

Summary and Discussion

In general, body weight gains and carcass parameters favored lambs finished under drylot conditions. Crossbred Suffolk x Targhee lambs generally outperformed straightbred Targhee lambs. Although single-born lambs weighed more initially, multiple-birth lambs gained equally well or slightly better when given adequate opportunity. Ram lambs made superior gains to wethers and had trimmer carcasses. If they had been given credit for testicle weight (1 to 2 lb per lamb), their dressing percent would equal that of the wethers. Since fries sell for more per pound than lamb carcasses, it is logical to give this drop credit to ram lambs, although this is not the current practice in commercial channels. Market discrimination against ram lambs varied from none to $1 per hundredweight at the Sioux Falls Stockyards at the time these lambs were marketed. Young ram lambs (under 8 months) that carried a good finish were not discriminated against at any time.

Feed required per pound of gain in the drylot average 5.5 pounds. At 5 cents per pound, this results in a feed cost of gain of 27.5 cents. To determine if the drylot system is economical, one must not only consider the difference in cost of gain between the grass vs drylot systems but also the higher percent of market-ready lambs, additional total weight, less carcass damage from needles and expected predator losses of a particular operation.

The results of 1976 definitely favor drylot finishing due to high animal losses and light market weights in the pasture compared to the drylot system. In favorable moisture and forage years coupled with successful predator control (1974 and 1975), this differential is considerably smaller and may favor the pasture system.

Table 1. Least Squares Means for the Effect of Management System, Breed of Sire and Type of Birth on Growth and Carcass Traits of Lambs, 1974

Variable	Management system: Native pasture	Management system: Sudan pasture	Management system: Drylot	Breed of sire: Targhee	Breed of sire: Suffolk	Type of birth: Single	Type of birth: Multiple
Initial wt., lb	80.9	75.4	78.2	76.0[a]	80.3[b]	98.1[a]	69.3[b]
Intermediate wt., lb	110.3[a]	101.7[b]	96.8[b]	99.8[a]	106.1[b]	110.7[a]	95.3[b]
Final wt., lb	113.0	113.0	112.8	109.1[a]	116.8[b]	120.7[a]	105.1[b]
Total gain, lb	32.1[a]	37.6[b]	34.5[a,b]	33.1[a]	36.4[b]	33.7	35.9
Average daily gain, lb	.61[a]	.71[b]	.64[a]	.62[a]	.68[b]	.63	.67
Carcass wt., lb	51.4[a,b]	49.4[a]	55.0[b]	49.8[a]	54.1[b]	56.1[a]	47.8[b]
Dressing percent	45.4[a]	43.6[b]	48.6[c]	45.6	46.2	46.4[a]	45.3[b]
Quality grade[d]	10.1[a]	10.0[a]	10.6[b]	10.2	10.2	10.5[a]	9.9[b]
Leg conformation	10.6[a]	10.4[a]	11.3[b]	10.4[a]	11.1[b]	11.0[a]	10.1[b]
Estimated percent kidney	2.1	1.8	2.0	2.1	1.8	2.1	1.7
Actual fat thickness, inches	.10	.08	.10	.10	.09	.10	.09
Fat/50-lb carcass, inches	.09	.07	.09	.09	.08	.09	.08
Loin eye area, square inches	1.95	2.06	2.07	1.98	2.07	1.95[a]	2.09[b]
Yield grade[e]	2.4	2.1	2.2	2.2	2.2	2.2	2.2

[a,b,c] Means on the same line within management system, breed of sire and type of birth with different superscripts differ significantly (P<.05).

[d] Low good = 7, average good = 8, ... high choice = 12.

[e] Yield grades 1 to 6 calculated on leg conformation, fat thickness and percent kidney. Yield grade 1, most desirable.

Table 2. Least Squares Means for the Effect of Management System, Breed of Sire, Type of Birth and Sex of Lamb on Growth and Carcass Traits of Lambs, 1975

Variable	Management system: Native pasture	Management system: Sudan pasture	Management system: Drylot	Breed of sire: Targhee	Breed of sire: Suffolk	Type of birth: Single	Type of birth: Multiple	Sex: Wether	Sex: Ram
Initial wt., lb	54.9[a]	54.5[a]	60.3[b]	54.1[a]	59.0[b]	59.3[a]	53.8[b]	57.5	55.6
Intermediate wt., lb	74.5	76.1	77.5	72.8[a]	79.3[b]	78.3	73.8	77.1	75.0
Final wt., lb	95.7[a]	104.4[b]	117.7[c]	102.3[a]	109.6[b]	108.5[a]	103.4[b]	101.6[a]	110.2[b]
Total gain, lb	40.8[a]	49.7[b]	57.5[c]	48.1	50.6	49.0	49.7	44.1[a]	54.6[b]
Average daily gain, lb	.42[a]	.51[b]	.59[c]	.49[a]	.52[b]	.50	.51	.45[a]	.56[b]
Carcass wt., lb	41.6[a]	44.7[a]	61.2[b]	46.8[a]	51.3[b]	50.0	48.4	48.4	49.9
Dressing percent	43.5[a]	42.4[a]	52.5[b]	45.5	46.8	45.5	46.8	47.7[a]	44.5[b]
Quality grade	8.9[a]	9.6[a]	11.7[b]	9.6[a]	10.5[b]	10.1	10.0	10.4[a]	9.8[b]
Leg conformation[d]	9.8[a]	10.9[b]	12.9[c]	10.4[a]	12.1[b]	11.2	11.2	11.4	11.0
Estimated percent kidney	1.7[a]	1.8[a]	3.0[b]	2.0[a]	2.3[b]	2.1	2.2	2.4[a]	1.9[b]
Actual fat thickness, inches	.11	.14	.17	.12[a]	.17[b]	.12[a]	.16[b]	.14	.14
Fat/50-lb carcass, inches	.12	.14	.14	.12[a]	.15[b]	.12	.15	.14	.13
Loin eye area, square inches	1.80[a]	2.04[a]	2.48[b]	1.94[a]	2.25[b]	2.13	2.08	2.02	2.18
Loin eye area/50-lb carcass, square inches	1.87	2.01	2.03	1.91	2.03	2.00	1.94	1.96	1.97
Yield grade[e]	2.6	2.5	2.9	2.5	2.8	2.6	2.8	2.7	2.6

[a,b,c] Means on the same line within management system, breed of sire and type of birth with different superscripts differ significantly (P<.05).

[d] Low good = 7, average good = 8, ... high choice = 12.

[e] Yield grades 1 to 6 calculated on leg conformation, fat thickness and percent kidney. Yield grade 1, most desirable.

Table 3. Least Squares Means for the Effect of Management System, Breed of Sire, Type of Birth and Sex on Growth and Carcass Traits of Lambs, 1976

Variable	Management system		Breed of sire		Type of birth		Sex	
	Drylot	Sudan-native pasture	Targhee	Suffolk	Single	Multiple	Wether	Ram
Initial wt., lb	68.9[a]	59.8[b]	63.6	65.1	69.7[a]	59.0[b]	63.8	64.9
Intermediate wt., lb	86.1[a]	81.5[b]	83.1	84.5	88.7[a]	78.9[b]	82.3	85.3
Final wt., lb	102.4[a]	90.4[b]	94.5[a]	98.4[b]	100.2[a]	92.6[b]	92.5[a]	100.4[b]
Total gain, lb	32.3	29.9	29.3[a]	32.9[b]	30.2	32.0	27.4[a]	34.8[b]
Average daily gain, lb	.47	.44	.43[a]	.48[b]	.44	.47	.40[a]	.51[b]
Carcass wt., lb	54.5[a]	43.7[b]	47.3	50.9	51.5	46.7	49.0	49.1
Dressing percent	53.6[a]	45.6[b]	49.3	49.9	50.9	48.3	50.6	48.6
Quality grade[c]	10.3[a]	8.5[b]	8.9	9.8	9.8	8.9	9.6	9.2
Leg conformation[c]	12.2[a]	10.1[b]	10.8	11.5	11.4	10.8	11.5	10.8
Estimated percent kidney	3.4[a]	1.9[b]	2.6	2.7	2.6	2.7	2.9	2.4
Actual fat thickness, inches	.15[a]	.11[b]	.11	.14	.12	.14	.17[a]	.09[b]
Fat/50-lb carcass, inches	.13	.11	.11	.13	.11	.13	.15[a]	.09[b]
Loin eye area, square inches	2.18	2.15	2.16	2.17	2.09	2.25	2.16	2.17
Loin eye area/50-lb carcass, square inches	2.03[a]	2.21[b]	2.19	2.05	2.00	2.25	2.13	2.12
Yield grade[d]	2.8[a]	2.4[b]	2.4[a]	2.8[b]	2.6	2.6	2.8	2.4

[a,b] Means on the same line within management system, breed of sire and type of birth with different superscripts differ significantly (P<.05).

[c] Low good = 7, average good = 8, ... high choice = 12.

[d] Yield grades 1 to 6 calculated on leg conformation, fat thickness and percent kidney. Yield grade 1, most desirable.