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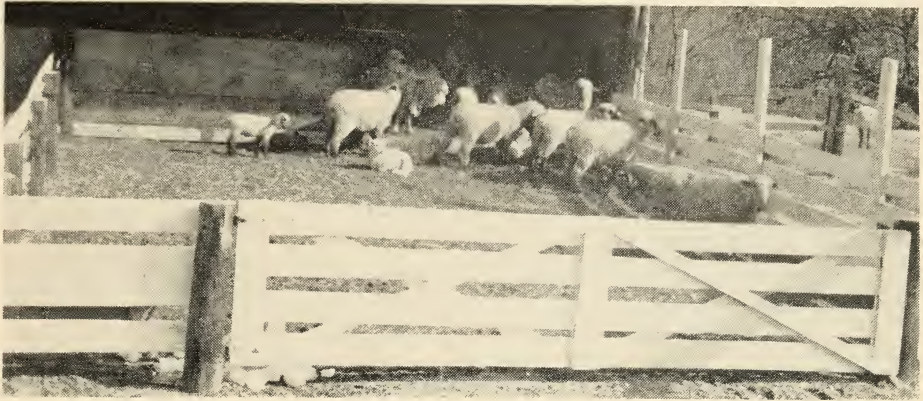
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A Study Of Different Rations For Wintering Ewes

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Conclusions

The following conclusions are apparent from this two-year study involving 123 ewes and 153 lambs on 14 treatments:

1. Alfalfa hay with a supplement was the most economical method of wintering ewes and lambs.
2. Satisfactory results were obtained from both the lambs and ewes when the ewes were fed sorghum silage supplemented with either alfalfa hay or Johnsongrass hay.
3. When ewes were fed corn silage as the only roughage or when fed with ground Johnsongrass hay, the corn silage was not consumed as readily as was sorghum silage fed alone or with ground Johnsongrass hay.
4. Lambs from ewes fed sorghum silage, Johnsongrass hay and supplement had a high feed cost per pound of lamb average daily gain.
5. Feeding ewes ground Johnsongrass hay plus a supplement resulted in a high ewe feed cost per pound of lamb produced.
6. Ewes allowed to graze winter pasture had, on an average, the highest ewe feed cost per pound of lamb average daily gain.

A Study of Different Rations for Wintering Ewes

By H. W. ESSIG, R. A. EDGAR AND C. J. CHRISTIANS

Numerous feed supplement trials have confirmed the early results of Barnicoat and associates (1) who reported that nutrition during lactation was of more importance in determining milk yield of ewes than nutrition during late pregnancy. The duration of lactation was greatly reduced in tests conducted by Palsson and Verges (2) when the ewes were fed on a low plane of nutrition during gestation and lactation. Hugo (3) reported that Merino ewes fed on a high plane of nutrition during gestation and lactation gave 81% more milk than ewes on a low plane of nutrition during these periods. According to the Recommended Nutrient Allowance for Sheep by Nutrition Research Council (4), "Probably the most common nutritional deficiency of sheep is lack of energy. This may result from lack of sufficient total feed or from the intake of such low digestible energy in the feed that the animal is unable to obtain enough useful energy from the feed to meet its requirement. Poor roughage, in abundance, will often not supply enough TDN for sheep." According to Morrison (5), "Ewes that are suckling lambs need a liberal supply of TDN. Therefore, ewes lambing before they go to pasture need a sufficient amount of concentrates, in addition to good roughage, to keep up a good milk yield. If they are on suitable pasture they need to be fed no concentrates." Workers at Purdue (6, 7, 8) have shown that oat straw supplemented with protein was not adequate for wintering ewes. However, corn silage properly supplemented or alfalfa hay gave favorable results.

It is the common practice in Mississippi to winter ewes and fatten their lambs on winter pasture; however, a period of lack of forage generally appears at some point between December 1 and March 1. Therefore, the objectives of the studies reported here were to study types of roughages and concentrates or combinations of the two which would best supplement or replace the presently accepted method of wintering ewes and lambs.

Trial I, 1959-60

Experimental Procedure; Trial 1 was conducted to determine the type and amounts of roughages and concentrates which would be efficient in supplementing the ewe wintering and lamb fattening regimes. Sixty-six western crossbred ewes with their lambs were divided into six groups on the basis of date of lambing and number of lambs. The rations fed are shown in Table 1. Rations 1 through 5 were composed of roughage (hay and/or silage) plus a supplement, whereas ration 6 consisted only of sod-seeded oats. The grain supplement fed to the ewes in the drylot treatments consisted of 40% ground corn, 40% crimped oats, and 20% cottonseed meal. Ewes in treatment 6 were allowed to graze the sod-seeded oats from about 8:30 a.m. until 4:00 p.m. each day. All ewes and lambs had access to a mineral mixture containing two parts trace mineralized salt and one part steamed bone meal. All lambs had access to a creep which was of the same composition as the grain supplement fed the ewes.

Table 1.—Feed consumption, calculated analysis and daily requirements.

Treatment	1	2	3	4	5	6
Ave. daily consumption per ewe						
Alfalfa hay	-----	1.50	-----	-----	2.64	---
Silage, sorghum	4.49	5.82	7.40	-----	-----	---
Supplement ¹	1.50	0.75	1.50	1.50	0.50	---
Johnsongrass hay	1.35	-----	-----	1.51	-----	---
Pasture (sod-seeded oat)	-----	-----	-----	-----	-----	+
Total consumption per day per ewe	7.34	8.07	8.90	3.01	3.14	Unknown
Total daily feed cost per ewe, ¢	7.291	6.499	6.476	6.144	6.039	7.58 ²
Calculated analysis						
Total digestible nutrients	2.45	2.13	2.22	1.86	1.59	---
Crude protein	0.40	0.41	0.36	0.34	1.14	---
Dry matter	3.68	3.49	3.22	2.70	2.80	---
Total nutrient's	6.53	6.03	5.80	4.90	5.53	---
Ration lacking in following nutrient's						
Total digestible nutrients	-0.12	-0.37	-0.28	-0.64	-1.41	---
Crude protein	+0.07	+0.10	+0.03	+0.01	+0.81	---
Dry matter	-0.05	-0.31	-0.58	-1.10	-1.00	---
Ewe Requirements (Morrison's)						
Total digestible nutrients	2.5 — 2.90					
Crude protein	0.3 — 0.33					
Dry matter	3.8 — 4.50					

¹The supplement contained 40% cracked corn; 40% crimped oats; and 20% CSM. Ingredient costs were priced as follows: corn \$1.35 per bu.; oats \$.94 per bu.; CSM \$67 per ton; sorghum silage \$6 per ton; Johnsongrass hay \$25 per ton; alfalfa hay \$35 per ton; and sod-seeded oats \$25 per acre.

²Cost was based on grazing stocking rate of 2 ewes and lambs per acre for about one-half of the grazing period.

This trial began December 15, 1959 and ended March 1, 1960. Ewes and lambs were weighed at the start, at 14-day intervals and at the end of the wintering period. Records were kept on all feed consumed by the ewes. No record was kept on the feed consumed by the lambs.

Results and Discussion: Table 1 shows the feed consumption, calculated analysis and daily requirements for the ewes. Calculations showed that all rations were lacking in total digestible nutrients (TDN) and dry matter (DM) and were high in crude protein, according to Morrison's requirements.

The sorghum silage-Johnsongrass hay ration (treatment 1) was the most nearly balanced but was still below the recommended level by 0.12 lb. in TDN and 0.05 lb. in DM, whereas the crude protein level was 0.07 lb. above the allowance. Each ewe on this ration lost about 4.75 lbs. which was near the average weight loss for the ewes in drylot while the ewe feed cost per pound of lamb average daily gain was almost the highest.

The sorghum silage-alfalfa hay ration (treatment 2) exhibited the least amount of weight loss in the ewes whereas the lambs of these ewes produced gains which could only be considered average for this trial. The sorghum silage ration fed in treatment 3 contained 0.03 lb. excess crude protein and was deficient in TDN and DM. Ewes on this treatment rooted a large amount of the silage out of the feed trough and this feed was charged to them, perhaps explaining why they did not perform as well as ewes on other treatments.

Treatment 4 (Johnsongrass hay ration) contained the least amount of excess protein (0.01 lb.), the largest amount of dry matter deficit and the second greatest amount of TDN deficit. Ewes fed this ration exhibited an average weight loss and average lamb gain. This was probably due to the calculated nutrient values being too high for the Johnsongrass hay. The ration fed in treatment 5 (alfalfa hay) was the least balanced of the five rations, according to calculations, due to

the lack of TDN and DM and having an excess of protein. It produced second highest gain in the lambs and second smallest loss in ewe weight.

Ewes on treatment 6, wintered on sod-seeded oats and fed no other source of feed, showed the greatest ewe weight loss with the lambs having the largest average daily gain.

Results of this study are shown in Table 2. Of the 66 ewes that started the test, 61 finished. Four were removed because of death of their lambs and the fifth because of a broken neck. All ewes in the trial lost weight, which can be explained by the fact that all rations were low in TDN. The most significant ewe weight loss occurred in lot 6 (winter grazing) where the ewes average daily loss was 0.21 pounds. The probable principle reason for this was that the ewes were lactating and apparently did not receive a sufficient amount of nutrients from the winter grazing to meet the minimum requirements. The ewes losing the least amount of weight per day were on treatment 2 (alfalfa hay, silage, and supplement) losing only 0.03 pound per day.

Eight-four lambs started the test; however, six were removed before the end of the test—five because of death and one because of the death of a ewe. The average initial weight of the lambs was

approximately 17 lbs. The lambs exhibiting the highest average daily gain were on the sod-seeded oat treatment (0.51 lb.). Those with the lowest average daily gain (0.38 lb.) were on the sorghum silage ration (Treatment 3) and the ewes on this treatment showed the second greatest loss of weight.

The total daily feed cost per ewe was greatest for the ewes allowed to graze sod-seeded oats. In the treatments where the ewes were fed in drylot the daily feed cost per ewe was only slightly less than that for ewes on sod-seeded oats. Ewe feed cost per pound of lamb average daily gain for the alfalfa hay supplement treatment was about two cents per pound less than that for the remaining treatments. Treatments 1 and 3 (those containing silage) showed the highest ewe feed costs per pound of lamb average daily gain.

Summary Trial I: The ration consisting of 2.64 pounds of alfalfa hay and 0.50 pound of supplement (Treatment 5) was the least expensive to feed per day per ewe. Cost of lamb production from ewes fed this ration was the least when based on the ewe feed cost per pound of lamb average daily gain. Most expensive rations in this trial were sorghum silage and supplement (treatment 1) and sor-

Table 2.—Gain or loss of ewes and lambs (75 days), Trial 1.

Treatment	1	2	3	4	5	6
EWES						
Number to start	11	11	11	11	11	11
Number to finish	11	8 ¹	10 ¹	10 ²	11	11
Ave. initial weight	125.6	121.0	122.4	122.6	123.8	122.0
Ave. final weight	120.9	118.5	114.7	116.3	117.0	106.2
Ave. daily loss	0.06	0.03	0.10	0.08	0.06	0.21
Ave. total loss	4.73	2.50	7.65	6.30	4.82	15.80
LAMBS						
Number to start	14	14	14	14	14	14
Number to finish	14	10	13	13	14	14
Number of animal days	1050	750	975	975	1050	1050
Ave. initial weight	18.1	17.4	18.2	16.9	17.3	16.1
Ave. final weight	50.9	51.7	46.9	49.0	53.6	54.2
Ave. daily gain	0.438	0.457	0.384	0.437	0.484	0.508
Ewe feed cost per lb. lamb ADG	16.65	14.22	16.86	14.06	12.48	14.92

¹Ewes removed due to death of their lambs.

²Ewe broke neck.

ghum silage-Johnsongrass hay and supplement (treatment 3). When sorghum silage, alfalfa hay and supplement were fed, good results were obtained. When the treatments (rations) in this trial are ranked on the basis of least cost and best performance they are: 5, 4, 2, 6, 1 and 3.

Trial II, 1962-63

Experimental Procedure: Trial 1 had shown that the alfalfa hay ration produced economical lamb gain but further information on other roughage combinations fed at levels to meet the nutritive requirement of the ewe was needed. Therefore, trial 2 was initiated to study the value of roughages such as sorghum silage, corn silage, Johnsongrass hay, alfalfa hay and winter pasture for wintering ewes prior to lambing and after lambing.

Trial 2 was conducted during the '62-'63 wintering period from November 14 to February 22. Eighty ewes were randomly divided into eight groups; however, only 62 of the ewes lambed while on experiment and only they were used in the study. One group was then assigned to each of the treatments shown in Table 3.

All treatments except 4 and 5 were fed in drylot. Sheep on treatments 4 and 5 were allowed to graze a mixture of oat and ryegrass. All lambs had access to a creep ration which contained 45% crimped oats, 45% cracked corn and 10% cottonseed meal. All ewes and lambs had access to a mineral mixture which contained one part deflourinated rock phosphate, one part limestone and two parts trace mineralized salt. Wood shavings

were used as bedding. The supplement mixtures were calculated to provide equal crude protein and total digestible nutrients if the roughage consumption was at the estimated level. The criteria for evaluating the rations were ewe weight change, ewe condition score, ewe wintering cost, and average daily gain and grade of lambs.

Results and Discussion: Rations used in this trial were calculated to furnish 0.42 lb. crude protein and 2.9 lbs. TDN. provided consumption was at the estimated level of intake shown in Table 3. When the feed consumption was determined, the ewes on treatment 1 and 8 were below the estimated intake level (Table 4). The lowered feed intake by ewes on these two treatments was probably due to the lack of acceptance of the corn silage, thereby resulting in the lowest daily feed costs per ewe. Feed consumption records also showed that the ewes in treatment 6 (ground Johnsongrass hay) consumed more feed than the estimated intake; however, it should be pointed out that the ewes in this treatment rooted a great deal of feed out of the feed trough. This waste resulted in the highest feed cost per day for ewes fed in drylot. The feed cost for all treatments was highest for the ewes on winter pasture (treatments 4 and 5). Perhaps one reason for this was the unusually severe winter which slowed forage growth and limited the number of animals allowed to graze per acre.

All ewes lost weight and all showed a reduction in condition score. Those on treatment 7 (sorghum silage and alfalfa hay) showed the least average daily loss

Table 3.—Ration composition necessary to furnish 0.42 lb. C. P. and 2.9 lb. TDN daily.

Treatment	1	2	3	4	5	6	7	8
Pasture (Oat-Ryegrass)	--	--	--	+	+	--	----	--
Corn Silage	7.0	--	--	--	--	--	----	4.5
Sorghum Silage	--	7.0	4.5	--	--	--	5.75	--
Ground Johnsongrass Hay	--	--	1.5	--	--	2.0	----	1.5
Alfalfa Hay	----	----	----	----	----	----	1.5	--
Supplement	2.5	2.25	2.0	----	----	2.55	1.65	1.8

Table 4.—Ewe performance on various winter rations in trial 2 1962-63.

Treatment	1	2	3	4	5	6	7	8
Ewes								
Number ewes	9	7	7	8	9	7	6	9
Av. initial wt.	134.8	130.1	129.6	121.5	129.9	130.3	128.8	135.7
Av. final wt.	110.2	118.4	110.6	108.9	110.2	116.9	120.0	111.1
Av. daily loss	0.246	0.117	0.190	0.126	0.197	0.134	0.088	0.246
Av. initial condition score ¹	6.40	3.86	3.86	4.13	3.89	4.57	4.75	3.72
Av. final condition score	2.60	2.57	2.50	2.19	1.94	2.36	2.75	1.78
Av. condition score change	3.80	1.29	1.36	1.94	1.95	2.21	2.00	1.94
Daily feed consumption:	7.57	9.86	7.99	---	---	5.40	8.60	7.18
Pasture ²	---	---	---	+	+	---	---	---
Corn silage	5.61	---	---	---	---	---	---	4.11
Sorghum silage	---	7.16	4.53	---	---	---	5.41	---
Ground Johnsongrass hay	---	---	1.45	---	---	2.37	---	1.36
Alfalfa hay	---	---	---	---	---	---	1.55	---
Supplement	1.96	2.70	2.01	---	---	3.03	1.64	1.71
Supplement percent composition								
Corn	75	75	45	--	--	65	96	45
Oats	13	13	43	--	--	27	--	43
CSM	10	10	10	--	--	6	--	10
DFRP	2	2	2	--	--	2	4	2
Vit. A, 2,500 I.U./lb. supp.	+	+	+	--	--	+	+	+
Supplement cost per lb., ¢ ³	2.62	2.62	2.77	---	---	2.65	2.47	2.77
Total daily feed cost per ewe, ¢ ³	6.818	9.222	6.927	13.33	13.33	11.585	8.387	6.300

¹Condition score was based on a 9 point scale which contained three major condition classifications: Thin, 2; Average, 5; Fat, 8; with each major classification having three possible values (i.e. low average, 4; average, 5; high average, 6).

²Pasture was used during the entire wintering and a pasture cost was estimated to be \$40 per acre. The wintering grazing stocking rate was 1.5 ewes with lambs per acre and was grazed for 100 days or approximately 1/2 of the available grazing period.

³Cost of ingredients: Corn, \$1.36 per bu.; Oats \$.94 per bu.; Cottonseed meal \$67 per ton; De-flourinated rock phosphate \$2.80 per 100 lb.; Vitamin A 10¢ per million I.U.; Alfalfa hay \$35 per ton; Johnsongrass hay \$25 per ton plus \$5 per ton for grinding; corn and sorghum silage \$6 per ton.

while those receiving treatments 1 and 8 (rations containing corn silage) had the greatest loss. The loss by ewes in the various treatments was not considered to be critical since the initial weight was taken before the ewes lambed. If one would assume that each ewe lost about 10 pounds due to lambing this would constitute about one-half or more of the ewe weight loss.

There was little difference in average daily gains between the lambs from ewes on treatments 2, 7, and 8 (Table 5). These lambs gained about 0.10 lb. more than those from treatments 1, 3, 4, 5, and 6. Based on pounds of lamb gain per ewe per day of lamb age (takes into account twins) there was considerably less advantage for the lambs from ewes on treatments 2, 7, and 8 when compared to

those on treatments 1, 3, 4, 5 and 6. The calculations of feed cost per pound of lamb average daily gain (A.D.G.) and feed cost per pound of lamb gain per ewe per day showed similar trends. Lambs from treatment 8 produced the most economical gain when calculated on the basis of feed cost per pound of lamb average daily gain or on the basis of feed cost per pound of lamb gain per ewe per day of lamb age. The lambs from ewes on treatments 4, 5, and 6 were produced at the greatest cost per pound. There was little difference between cost of gains of lambs from ewes on treatments 1, 2, 3 and 7.

Summary Trial 2: In trial 2 the ration consisting of sorghum silage, ground Johnsongrass hay and supplement produced the most economical ewe feed

Table 5.—Lamb performance trial 2 1962-63.

Treatment	1	2	3	4	5	6	7	8
Lambs:								
Number	12	8	9	10	12	9	6	9
Birth wt.	8.02	8.10	7.48	7.84	8.28	6.97	8.42	7.76
Final wt.	24.9	34.9	26.6	29.3	32.1	25.7	37.17	36.0
Ave. gain	16.9	26.78	19.07	21.46	23.81	17.92	28.75	28.2
Ave. daily gain	0.299	0.430	0.310	0.316	0.370	0.298	0.419	0.423
Animal days	679	498	554	680	772	541	412	601
Ave. lamb age	56.5	62.3	61.6	68.0	64.3	60.1	68.7	66.8
Total gain	202.8	214.2	171.7	214.6	285.7	161.3	172.5	254.2
Grade ¹	10.3	12.3	10.28	10.55	10.46	10.56	11.8	10.61
No. sets twins, weaned	3	1	2	2	3	2	0	0
No. sets twins, born	3	1	2	2	3	3	1	2
Lb. of lamb gain per ewe per day lamb age	0.399	0.491	0.398	0.394	0.494	0.383	0.419	0.423
Ewe feed cost per lb. lamb ADG	22.80	21.45	22.35	42.18	36.03	38.86	20.02	14.89
Ewe feed cost per lb. lamb per ewe	17.09	18.78	17.40	33.83	26.98	30.25	20.02	14.89

¹Feeder grades were scored: low good — 9; good — 10; high good — 11; low choice — 12; choice — 13.

cost per pound of lamb average daily gain and daily feed cost per ewe. There was little difference in the ewe feed cost per pound of lamb average daily gain for treatments 7, 2, 3, and 1, while treat

ments 4, 5, and 6 were distinctly more costly than the other 5. When the rations in this trial were ranked on the basis of least cost and best performance they were: 8, 7, 2, 3, 1, 6, and 4, and 5

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