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Lamb Feeding Investigation

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SUMMARY

The greatest effect of chopping and grinding alfalfa hay was derived from the reduction of the amount of hay wasted and refused. This was reduced from 30.1 per cent for long hay to 13.8 per cent for chopped hay and 1.8 per cent for ground hay. The cost of gains was only slightly decreased with no difference noted in the rate of average daily gains.

"Peewee" lambs made as economical and as large gains when fed by themselves as average sized feeder lambs.

Grinding grain did not increase the rate of average daily gains but increased the cost of production in proportion to the cost of preparation.

Wheat was not as effective as barley or corn for the production of fat lambs, either in the rate of or economy of gains and greater difficulty was experienced in maintaining the lambs on full feed.

Silage did not improve the ration or replace sufficient alfalfa hay to make its general use justifiable.

Cotton seed meal influenced the rate of gains and the degree of finish to a marked extent, making it an excellent supplement to barley or corn when fed with alfalfa hay.

Cull beans do not appear to be readily suited for fattening lambs. Their unpalatability and the digestive disorders they caused in the lambs probably account for the relatively poor showing made by the lambs.

Lamb Feeding Investigation

BY

R. F. JOHNSON, E. F. RINEHART, AND C. W. HICKMAN*

A SUMMARY of lamb feeding at the Idaho substation Caldwell, Idaho, for the winters of 1927-28, 1928-29, and 1929-30 is reported in this bulletin.

Five cars of lambs, divided in lots of 65 to 75 lambs each, were fed on 16 different rations, or under varying conditions, during the three years that this report covers. The scope of this work includes a study of the handling of western light weight feeder lambs to be fattened for market; the means whereby Idaho feeds may be converted into a more concentrated and salable product; the proper use of home grown feeds with and without supplements; and other problems pertaining to the feeding industry.

Plan and Procedure

Five hundred to seven hundred and fifty smooth bodied, fine wooled, light weight Oregon feeder lambs were purchased during the month of September each year, and pastured on the substation and surrounding farms until about the middle of November. The length of this pasturing period depended upon the amount and condition of pasture available. They were then divided into lots of equal numbers, with type, size, and condition kept as uniform as possible in each lot, and started on feed.

Lot weights were taken on three consecutive days at the beginning and end of the feeding trial, with single day lot weights at 14 day intervals. The average of the three day weights was taken as the initial and final weight of each lot. Records were kept of all feeds fed and hay refused.

The lambs were fed in open pens, with the exception of one lot fed under shelter in 1929-30. Straw bedding was used in abundance to keep the lambs comfortable and the pens dry. Coarse, granulated salt was kept before the lambs at all times. Well water was supplied in concrete troughs placed at the intersection of four adjacent pens. No attempt was made to heat the water, but the troughs were kept practically free from ice during the coldest weather.

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Hay and grain were fed in separate bunks. The morning feed of hay was followed in 45 minutes by grain. The noon feed consisted of turning over the hay in the bunk and supplying additional hay if needed. The evening feed consisted of fresh hay, after the previous day's refused hay was cleared out, and was followed in 45 minutes by grain. The lambs were started on grain at the rate of 20 pounds per 500 lambs, and raised 20 pounds every other day until they were consuming slightly in excess of 1.5 pounds per lamb per day.

The chopped hay fed during the first two years was chopped with an ensilage cutter. Care was taken to secure finely cut hay by operation of the machine according to manufacturer's directions. The hay was chopped as needed since facilities for storing chopped hay in large quantities were not available.

All lots were fed chopped hay during the last year. The hay was chopped by a commercial outfit in the fall of the year. This hay was not chopped finely enough and caused a larger percentage of waste hay than usual.

The ground hay and barley were prepared with a hammer type grinder, using a screen with three-eighths inch perforations for barley and one-fourth inch perforations for hay.

PART I

Experiments in 1927-28 and 1928-29

Object: The primary object of the feeding tests conducted during the years of 1927-28 and 1928-29 was to determine the value of chopping and grinding the hay when fed in a ration of hay and barley. Additional lots were fed to test the value of silage with barley and hay; to check the effect of grinding barley for lambs; to test the importance of beans as a means of replacing part of the barley in a ration, and to compare the feeding of younger and smaller lambs with average weight feeder lambs.

Feeds Used: The alfalfa hay fed during the winter of 1927-28 consisted of first, second, and a small amount of third cutting, grown on the substation and nearby farms. The second and third cuttings were of good quality, being leafy, clean, and bright. The first cutting did not grade as high, due to the percentage of cheat grass that it contained. The hay fed during the winter of 1928-29 was faulty because of the stemminess of the second cutting, and to the foul condition of the first cutting. The barley was of the Trebi variety, grown locally and of good quality. The silage was made from yellow dent field corn grown at the substation and cut during the hardening stage. The quality of the silage was fair. The cull

beans were re-cleaned, split and shriveled beans, purchased in Twin Falls.

Results

Long Hay vs. Chopped, and Ground Hay: For fattening lambs, the preparation of alfalfa hay by chopping or grinding is an operation that has its greatest value through the reduction of refused hay. Where livestock is being "roughed" through the winter, hay refused by fattening lambs can be utilized. The average of two years' results comparing long, chopped, and ground hay shows that with the finer preparations the amounts of refused hay are correspondingly decreased. (Tables I and II) Lots fed on long hay refused 30.1 per cent, chopped hay 13.8 per cent, and ground hay 1.8 per cent. The feeding experiment conducted during the winter of 1929-30 reported in Part II, in which all lots were fed chopped hay, shows from 5 to 15 per cent more refused hay. This may be accounted for by the fact that this hay was chopped very coarsely. An examination of this hay, when

TABLE I
Lamb Feeding Experiment (85 Days) 1927-1928

	Lot I 65 Lambs Alfalfa (Chopped) Barley	Lot II 65 Lambs Alfalfa (Long) Barley Silage	Lot III 64 Lambs Alfalfa (Long) Barley	Lot IV 63 Lambs Alfalfa (Meal) Barley
Average initial weight, lbs.	72.15	71.28	70.52	71.97
Average final weight, lbs.	95.12	93.48	92.78	95.15
Average gain, lbs.	22.97	22.20	22.26	23.18
Average daily gain, lbs.	.270	.258	.261	.272
Average daily ration:				
Alfalfa, lbs.	2.21	2.53	2.81	1.95
Silage, lbs.		.99		
Barley, lbs.	.97	.97	.98	1.00
Feed required per 100 lb. gain				
Alfalfa, lbs.	825	969	1075	752
Barley, lbs.	358	371	375	368
Silage, lbs.		378		
Refused hay, per cent	5.10	33.40	28.20	0.0
Feed cost per 100 lbs. gain	\$ 9.64	\$10.94	\$10.30	\$ 9.64

Feed Prices:

Alfalfa (Long) \$ 8.00 per ton
Alfalfa (Chopped) 9.50 per ton
Alfalfa (Meal) 10.00 per ton

Corn Silage \$6.00 per ton
Barley (Whole) 1.60 per cwt.

TABLE II
Lamb Feeding Experiment (90 Days) 1928-1929

	Lot I 70 lambs Alfalfa (Chopped) Barley (Whole)	Lot II 72 lambs Alfalfa (Ground) Barley (Whole)	Lot III 71 lambs Alfalfa (Long) Barley (Whole)	Lot IV 72 lambs Alfalfa (Long) Barley (Ground)	Lot V 70 lambs Alfalfa (Long) Barley (Whole) Beans (Whole)	Lot VI 70 lambs Alfalfa (Long) Barley (Ground) Beans (Ground)	Lot VII 75 lambs Alfalfa (Long) Barley (Whole)
Average initial weight, lbs.	74.21	74.83	75.32	75.13	74.46	74.95	56.36
Average final weight, lbs.	98.95	99.49	102.58	100.14	99.26	98.57	80.84
Average gain, lbs.	24.74	24.66	27.26	25.01	24.80	23.62	24.48
Average daily gain, lbs.	.27	.27	.30	.27	.27	.26	.27
Average daily ration							
Alfalfa, lbs.	2.68	2.00	3.39	3.44	3.40	3.10	3.14
Barley, lbs.	1.04	1.04	1.04	1.03	.80	.83	.83
Beans, lbs.					.21	.20	
Feed per 100 lbs. gain							
Alfalfa, lbs.	997.6	732.2	1134.3	1238.1	1256.9	1207.8	1159.8
Barley, lbs.	389.5	379.9	348.4	370.7	310.8	324.7	306.8
Beans, lbs.					77.7	81.7	
Refused hay, per cent	22.6	3.6	31.9	33.9	32.1	33.0	34.3
Feed cost per 100 lbs. gain	\$12.80	\$11.41	\$11.77	\$13.05	\$12.50	\$12.94	\$11.37

Feed Prices:

Alfalfa (Long)	\$10.00 per ton	Barley (Whole)	\$1.75 per cwt.	Beans (Whole)	\$1.00 per cwt.
Alfalfa (Chopped)	12.00 per ton	Barley (Ground)	1.85 per cwt.	Beans (Ground)	1.10 per cwt.
Alfalfa (Ground)	13.00 per ton				

compared with that fed in previous years, revealed a larger per cent of long stems, indicating that the hay was fed through the chopper too fast, and that the machine was operated with dull knives. Another factor in favor of chopped or ground hay is the ease with which it may be handled.

The results show that chopping or grinding hay does not increase the amount of hay actually consumed by the lamb. After deducting the amount of waste hay from the total, the amount consumed per lamb is: long hay, 2.16 pounds per day; chopped hay, 2.08 pounds per day; ground hay, 1.94 pounds per day. When it is desirable to feed large amounts of hay, and the waste hay can be used by other livestock, there may be an advantage in long hay. Average daily gains made by lambs are not increased by chopping or grinding. The amount of hay required for 100 pounds gain is lowered, but due to the cost of chopping and grinding, the total cost of producing 100 pounds gain is not materially affected, except in the case of high priced hay.

"Peewee" vs. Larger Lambs: At the beginning of the feeding period of 1928-29, there were in the two cars of lambs to be divided for experimental lots a sufficient number of small lambs to make up Lot VII which was fed the same ration as Lot. III. Lambs of this type are usually found in unsorted bunches of feeders and are unsatisfactory to feed with larger lambs because they are usually crowded from the feed bunks and remain the poorer lambs throughout the feeding period. The results, as shown in Table II, indicate that these lambs made very satisfactory and economical gains.

Whole Barley vs. Ground Barley: The result of this test comparing whole barley and alfalfa hay with ground barley and alfalfa hay indicates that the efficiency of the ration was decreased by grinding the barley, owing to the added cost of grinding and the smaller gains produced. The cost of production was increased.

PART II

Experiment in 1929-30

Object: The work outlined for the year 1929-30 (Table III) consisted of comparative tests of common grains such as barley, corn, and wheat and a continuation of feed trials, involving the use of corn silage and cull beans together with a new project to cover a period of five years, to determine if there is a need for sheltering fattening lambs under western Idaho conditions. All lots were fed the same roughage, namely, chopped alfalfa hay.

Feeds Used: All alfalfa hay was grown at the substation. It consisted of first, second, and third cuttings, and was of

TABLE III
Lamb Feeding Experiment (110 Days) 1929-1930

	Lot I 64 lambs Alfalfa* Barley†	Lot II 64 lambs Alfalfa Corn (Shelled)	Lot III 64 lambs Alfalfa Wheat (Whole)	Lot IV 63 lambs Alfalfa Barley Cottonseed Meal	Lot V 63 lambs Alfalfa Barley Corn Silage	Lot VI 64 lambs Alfalfa Barley Corn, Silage Cottonseed Meal	Lot VII 61 lambs Alfalfa Barley, 80 per cent Beans, 20 per cent	Lot VIII 64 lambs Alfalfa Barley (Shed) ‡
Ave. initial weight, lbs	63.92	63.28	64.34	63.04	64.05	63.95	64.68	64.86
Ave. final weight, lbs.	92.70	91.90	89.66	94.10	92.93	94.37	92.32	93.72
Average gain, lbs.	28.78	28.62	25.32	31.06	28.88	30.42	27.64	28.86
Ave. daily gain, lbs.	.261	.260	.230	.282	.262	.276	.251	.262
Average daily ration								
Alfalfa (chopped) lbs.	2.27	2.25	2.01	2.52	2.21	2.15	2.39	2.30
Barley lbs.	1.06			.97	1.06	.96	.82	1.06
Corn lbs.		1.02						
Wheat lbs.			.95					
Cottonseed meal lbs.				.10		.10		
Corn Silage lbs.					.96	.96		
Beans lbs.							.18	
Feed for 100 lbs. gain								
Alfalfa (chopped) lbs.	870.7	864.5	875.6	900.5	855.6	777.7	1071.3	880.2
Barley lbs.	407.7			345.8	411.5	347.6	370.9	407.2
Corn lbs.		393.2						
Wheat lbs.			414.5					
Cottonseed meal lbs.				38.4		38.6		
Corn Silage lbs.					372.0	347.6		
Beans lbs.							83.0	
Refused hay, per cent	21.36	18.73	21.92	19.23	28.27	25.73	19.46	18.19
Feed cost, 100 lbs. gain	\$10.71	\$11.26	\$11.67	\$10.98	\$11.80	\$11.34	\$12.18	\$10.76
Feed Prices								
Alfalfa (Chopped)	\$11.50 per ton		Barley (Whole)	\$1.40 per cwt.		Wheat (Whole)	\$1.60 per cwt.	
Corn Silage	6.00 per ton		Corn (Shelled)	1.60 per cwt.		Beans (Whole)	1.00 per cwt.	
Cotton Seed meal	50.00 per ton							

*Alfalfa chopped for all lots

†Barley whole for all lots

‡Lambs in Lot VIII had access to open shed and were fed hay and grain under shelter.

excellent quality throughout. Seventy-five per cent of the barley and all of the wheat and corn were produced at the sub-station or locally and were of high quality.

The cottonseed meal was purchased from local feed stores. It was of average quality, and the protein content was guaranteed to be over 40 per cent.

Results

Barley vs. Corn: Barley and corn produced relatively the same average daily gains when fed with chopped alfalfa hay. Lot II fed on corn, required 6.2 pounds less hay and 14.5 pounds less grain to produce 100 pounds of gain, but with corn valued at 20 cents per hundred-weight more than barley, the cost of producing 100 pounds gain was 55 cents more.

Barley or Corn vs. Wheat: Wheat, as a lamb feed, is less valuable than barley or corn, from the standpoint of rate and economy of gains, as shown in the results of Lot III. The average daily ration of wheat for the entire feeding period was .95 pound as compared with 1.06 pounds of barley and 1.02 pounds of corn per day. From observation it was noted that lambs go "off feed" more readily when fed wheat than when fed corn or barley, especially when on full grain feed.

The lambs in Lot III did not possess the finish shown by the lambs in Lots I and II and graded lower as dressed lambs.

Barley vs. Barley and Cottonseed Meal: The addition of one-tenth of one pound of cottonseed meal to the ration of barley and chopped hay, in Lot IV, increased the average daily gains 7.4 per cent and reduced the amount of grain necessary to produce 100 pounds of gain from 407.7 pounds to 345.8 pounds, but increased the amount of hay from 870.7 pounds to 900.5 pounds and increased the cost of producing 100 pounds gain 27 cents per hundred-weight. The lambs in Lot IV were better finished than the lambs in Lot I.

Barley vs. Barley and Silage: Lot V which was fed a ration of chopped alfalfa hay, corn silage, and barley, as compared with Lot I, fed chopped alfalfa hay and barley, was not benefited by this addition as indicated by average daily gains, or final cost of 100 pounds gain. The grain requirement to produce 100 pounds gain was slightly higher in Lot V and the 372 pounds of silage fed per 100 pounds of gain replaced only 15.1 pounds of hay. The feed cost in Lot V was \$1.09 higher than in Lot I, which was equal to the value of the silage fed.

Silage vs. No Silage: (Lots I and IV vs. Lots V and VI). A comparison of feeding silage with barley and alfalfa hay, and with barley, cottonseed meal and alfalfa hay, as against rations without silage, showed that silage did not materially

improve the ration. The average daily gain was slightly less, the total cost of producing 100 pounds of gain was 73 cents per hundred-weight more and the refused hay increased from 20.3 per cent to 27.0 per cent.

Cottonseed Meal vs. No Cottonseed Meal: In Lots IV and VI in which cottonseed meal made up part of the ration, as compared with Lots I and V, fed the same ration with the exception of cottonseed meal, the results indicate that when cottonseed meal can be purchased at prices comparable with home grown feeds, it can be used to advantage. The average daily gains were increased 6.1 per cent, the average cost of producing 100 pounds of gain reduced slightly, and the finish of the lambs higher at the end of the feeding period.

Barley vs. Barley and Beans: The use of cull beans in a ration to replace part of the barley may be of some merit on farms where the cull beans are already on hand and do not have a market value. Cull beans are objectionable to feed in that they are not palatable and may often cause digestive disturbances, such as scouring or a tendency to bloat. The results of two years' trials show that lambs fed cull beans when the beans made up one-fifth of the grain ration, made 4 per cent less average daily gains and the average cost of producing 100 pounds of gain was increased 58 cents. In these calculations cull beans were given a value of \$1.00 per hundred-weight.

From previous experiments it has been noted that in some instances lambs were inclined to sort out other feeds from beans and often leave the beans. To overcome this condition, the barley and beans were ground for one feeding trial and compared with a lot fed whole beans and whole barley. The noticeable result of this feeding test was that the final cost of producing 100 pounds of gain was increased due to the added cost of grinding the feed.

Sheltered vs. Open Lot Feeding: The first year's test of a five-year trial to determine the need for shelter for fattening lambs under western Idaho conditions was made in 1929-30. This was a comparatively dry winter with relatively short wet periods. For this kind of a winter the test indicated that the shelter provided did not add to the gain or the economy of gains over lambs fed in the open in the same section. The cost of gains shown in Table III did not take into consideration the cost of shelter for the year.

A shelter shed 16 feet deep and open to the south is being used in the five-year experiment. Hay and grain are fed within the shed, salt and water provided outside the shed, and the whole lot is bedded with straw. The lambs go in and out of the shed at will, sleeping in the shed or in the open lot as they choose.