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THE COLORADO EXPERIMENT STATION

FORT COLLINS, COLORADO

CORN AND HOG MILLET FOR FATTENING LAMBS

Protein Supplements for Growing and Fattening Lambs

PROGRESS REPORT OF LIVESTOCK FEEDING EXPERIMENT—1929

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Type of lambs raised at United States Government Experiment Station near Akron and used in feeding experiment.

Summary

1. Hog millet (ground) had 84 percent the feeding value of shelled corn when fed with cane hay and a protein supplement to fattening lambs.

2. With an abundance of carbonaceous forage crops and grains produced in non-irrigated Eastern Colorado, a dependable home-grown protein supplement is lacking.

3. A protein supplement composed of ¼ pound of cottonseed meal and ¼ pound of alfalfa meal proved just as efficient and much cheaper than ½ pound of cottonseed meal when fed to both growing and fattening lambs.

4. The labor and expense of a simple, home-mixed protein supplement is more than justified by materially cheapened feed costs.

5. Well-balanced fattening and growing rations are as cheap and efficient in non-irrigated sections as in irrigated sections of the state.

Lamb Feeding Experiment

The carbonaceous grains and forage crops produced in non-irrigated sections of Eastern Colorado offer good opportunities for feeding livestock. The fattening value of the different grains available and especially hog millet when fed with a carbonaceous roughage and supplemented with a protein concentrate is an interesting and timely problem.

Some good protein supplement is necessary however, to produce the cheapest gains on both growing and fattening stock and at present there is no dependable source of home-grown protein among the feeds produced in non-irrigated Eastern Colorado. The question of the relative value of different protein supplements when fed with carbonaceous forages and grain to lambs has not been definitely solved. Results secured in fattening pigs would seem to indicate that certain mixtures of protein feeds are more economical than a single protein concentrate. The experiment reported here has been planned to determine the relative fattening value of some Eastern Colorado grains and the comparative efficiency of a single protein concentrate and a simple mixture of protein feeds.

Objects of the Experiment

1. To compare (1) shelled corn, (2) hog millet (ground) and (3) a ground mixture of corn and hog millet for fattening lambs.

2. To determine the relative value as a protein supplement of cottonseed meal alone, and of cottonseed meal and No. 2 alfalfa meal (mixed equal parts by weight): (a) When fed with grain and cane hay to fattening lambs; (b) when fed with millet hay and a mineral mixture to growing ewe lambs.

Lambs Used

Grade Hampshire lambs from the flock at the United States Government Experiment Station at Akron were used in the feeding experiment.

Four lots of 10 lambs each that averaged 53.5 pounds in weight were used in the fattening experiment.

Two lots of 10 ewe lambs each that averaged 67.8 pounds in weight were used in a winter growing-out experiment.

Lambs of uniform size, weight and condition were sorted into the different lots and were started on the feeding experiment December 13, 1928.

Fattening Rations Fed

Lot 1. Shelled corn, cottonseed meal, cane hay.

Lot 2. Shelled corn, cottonseed meal, alfalfa meal, cane hay.

Lot 3. Hog millet (ground), cottonseed meal, alfalfa meal, cane hay.

Lot 4. One-half corn, ½ millet (ground), cottonseed meal, alfalfa meal, cane hay.

Growing Rations Fed

Lot 5. Cottonseed meal, millet hay.

Lot 6. Cottonseed meal, alfalfa meal, millet hay.

Description of Feeds and Method of Feeding

Cane hay was of medium fine texture and of good quality. It was grown near the experiment station and was used as roughage for the fattening lambs. They had access to all they would consume during the entire feeding experiment. Like all cane and sorghum hay it was very low in protein—cane hay usually containing less than 1 percent.

Millet hay was also produced near the station and was of good quality. Millet hay contains about 8 percent protein. It was self-fed to the growing ewe lambs.

Cottonseed meal (guaranteed 43 percent protein) was fed at the rate of ½ pound per head daily to both fattening and growing lambs when used as the only protein supplement.

A No. 2 Alfalfa meal (guaranteed 13 percent protein) was mixed equal parts by weight with cottonseed meal to furnish a mixed protein supplement and this mixture was also fed at the rate of ½ pound per head per day to both growing and fattening lambs in comparison with the straight cottonseed meal.

Shelled corn and hog millet (ground) were grown locally. These grains were hand fed twice daily to the fattening lambs. Starting with about 1/10 pound per head daily the grain allowance was very gradually increased to 1 pound per head daily which was considered a full feed.

ANALYSIS OF GRAINS FED

	Water	Ash	Crude Protein	Carbohydrate Fiber	Carbohydrate N.-Free Extract	Fat	No. of Analysis
Corn	14.7	1.4	9.6	1.8	67.9	4.7	2
Hog millet	9.6	3.5	12.0	8.3	63.4	3.3	2

LAMB FEEDING EXPERIMENT AT AKRON, COLORADO

10 lambs per lot fed December 13, 1928, to April 12, 1929—120 days.
Table based on one average lamb

Lot No.	1	2	3	4	5	6
Rations Fed Salt in all lots	Sh. corn C. S. meal Cane hay	Sh. corn Alf. meal C. S. meal Cane hay	Gr. hog millet Alf. meal C. S. meal Cane hay	½ Gr. corn ½ Gr. millet Alf. meal C. S. meal Cane hay	C. S. meal Millet hay Minerals	Alf. meal C. S. meal Millet hay Minerals
Weight at start—lbs.	52.8	54.6	52.1	54.3	67.5	68.0
Final weight) Market	93.4	95.5	90.8	94.0	96.7*	97.0
Gain) Act. shk.	40.5	41.0	38.7	39.7	29.2	29.0
) Shk. %	6.8	6.5	4.8	5.5		
Daily gain)	.34	.34	.32	.33	.24	.24
Daily Feed						
Shelled or ground corn	.76	.76		.38		
Hog millet (ground)			.76	.38		
Alfalfa meal		.21	.21	.21		.21
Cottonseed meal	.41	.21	.21	.21	.43	.21
Cane hay	2.10	2.23	2.27	2.22		
Millet hay					2.14	2.17
Minerals					.003	.002
Salt	.02	.02	.03	.03	.012	.013
Feed required per 100 lbs. gain						
Shelled or ground corn	225.19	222.44		114.86		
Ground hog millet			235.66	114.86		
Alfalfa meal		61.46	65.12	63.48		86.90
Cottonseed meal	121.48	61.46	65.12	63.48	176.71	86.90
Cane hay	622.22	652.68	703.87	671.03		
Millet hay					879.45	897.93
Minerals					1.233	.8275
Salt	5.93	5.85	9.30	9.07	4.93	5.38
Feed cost per cwt. gain	8.65	7.77	7.37	7.61	8.86	7.66
Cost per lamb @ $13 cwt.	6.86	7.10	6.77	7.06		
Feed cost per head	3.51	3.18	2.85	3.02	2.59	2.22
Est. fixed cost including interest, labor and equip.	.95	.95	.95	.95	Ewe lambs wintered thru for breeding herd	
Shipping and selling expense freight 50c cwt.	1.56	1.59	1.51	1.57		
Total cost at market	12.88	12.82	12.08	12.60		
Selling price cwt. at Denver	15.25	15.25	15.25	15.25		
Gross return	14.24	14.57	13.85	14.34		
Net. estimate profit	1.36	1.75	1.77	1.74		

Cost of feeds—

- Shelled corn ..... $1.35 cwt.
- Ground corn ..... 1.45 cwt.
- Ground hog millet ..... .95 cwt.

Mineral mixture:

- Lime cake ..... 40 lbs.
- Spent bone black ..... 40 lbs.
- Salt ..... 20 lbs.

- Cottonseed meal ..... $50.00 per ton
- Alfalfa meal ..... 20.00 per ton
- Cane hay ..... 8.00 per ton
- Millet hay ..... 10.00 per ton
- Salt ..... 20.00 per ton
- Simple mineral mixture ..... 20.00 per ton

Conclusions

Hog Millet (ground) vs. Shelled Corn for Fattening Lambs.—Lambs on a full feed of hog millet gained 38.7 pounds while lambs on the same feed of shelled corn gained 41 pounds. Hog millet (ground) made a very satisfactory feed for fattening lambs and with shelled corn at $27.00 per ton was worth $22.66 per ton or in other words had 83.93 percent the feeding value of shelled corn. A comparison of Lots 1 and 3 shows each ton of shelled corn equal to, or replacing 2118.8 pounds of ground millet, 32.9 pounds of alfalfa meal, 32.9 pounds of cottonseed meal and 460.2 pounds of cane hay. A mixture of equal parts by weight of ground corn and hog millet proved to be a more efficient carbonaceous concentrate than millet alone but was not as efficient as corn alone. At existing prices the millet fed alone with a protein supplement produced cheapest gains.

Cottonseed Meal vs. a Mixture of Equal Parts by Weight of Cottonseed Meal and No. 2 Alfalfa Meal.—A mixture composed of equal parts of cottonseed meal and No. 2 alfalfa meal proved just as efficient and much cheaper than cottonseed meal alone when fed as a protein supplement for both fattening and growing-out lambs. With cottonseed meal at $50.00 per ton and alfalfa meal at $20.00 per ton the reduction in cost of the protein mixture to $35.00 per ton made a substantial cut in feed cost per unit of gain that would easily justify the labor of making and using such a mixture.

A comparison of Lots 1 and 2 shows that the protein mixture reduced the cost of gain 88 cents per cwt. on the fattening lambs, showing each ton of alfalfa meal when fed with cottonseed meal and compared to cottonseed meal fed alone replacing 1953.0 pounds of cottonseed meal and 89.5 pounds of shelled corn but requiring 991.2 pounds more cane hay in producing equal gains. At prices of feeds quoted each ton of alfalfa meal fed, replaced other feeds worth $46.08 in fattening the lambs. In other words, alfalfa meal would have to closely approach this price per ton before there would be any doubt of the wisdom of adding it to cottonseed meal in developing a protein mixture for fattening lambs.

A comparison of Lots 5 and 6 shows that the protein mixture reduced the cost of gains $1.20 per cwt. in growing-out ewe lambs and shows each ton of alfalfa meal fed with cottonseed meal and compared to cottonseed meal fed alone replacing 2066.9 pounds of cottonseed meal but requiring 425.3 pounds more millet hay to produce gains. In this comparison each ton of alfalfa meal fed replaced other feeds worth $49.97.

It is interesting to note that in both cases where the protein

mixture was fed there was a greater consumption of carbonaceous hay and slightly larger gains were produced. This may be a result of the development of a more palatable ration. This experiment indicates very clearly the benefits that may be derived from the use of a simple home-made protein mixture for lambs.

The feed cost of lamb fattening rations at the Colorado Agricultural Experiment Station during this same season ranged from $9.46 to $14.08 for each 100 pounds of gain produced. Apparently well-balanced fattening and growing rations are as cheap and efficient in non-irrigated sections as in irrigated sections of Colorado.

The feeding tests described in this bulletin will be duplicated.