

JANUARY, 1926

CIRCULAR 123

AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE
MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY



GRAND CHAMPION WETHER, AMERICAN ROYAL LIVE STOCK SHOW, 1924

LAMB FEEDING INVESTIGATIONS, 1923-24¹

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The feeding of one or more carlots of western lambs is becoming more and more popular on Kansas farms. The Missouri river markets as well as the western ranges offer excellent opportunities for the purchase of feeding lambs, and a good market has prevailed for the finished product.

Previous investigations by the Kansas Agricultural Experiment Station have indicated that alfalfa hay and shelled corn make an

1. Contribution No. 78 from the Department of Animal Husbandry.

excellent ration for fattening lambs. Alfalfa does not grow and do well in all parts of Kansas, neither does corn. Other forage and grain crops must necessarily be grown in those sections where alfalfa and corn are not adapted. Sweet clover will grow and make a good crop in many places where alfalfa will not. Sudan grass will do well in all parts of the state. Kafir and the other grain sorghums are largely grown, especially in the western part of the state, where corn is not a sure crop. With these facts in mind, the Agricultural Experiment Station has undertaken to determine what forage and grain crops may be efficiently substituted for alfalfa and corn for fattening lambs when for one reason or another the latter feeds cannot be used.

OBJECTS OF THE EXPERIMENT

The specific objects of the experiment herein reported were to determine: (1) The comparative value of alfalfa, sweet clover, cow-pea, and Sudan grass hays as roughages for fattening lambs when shelled corn is fed as the grain portion of the ration; and (2) the comparative value of threshed kafir and kafir heads as a grain ration for fattening lambs when alfalfa hay is fed as the roughage portion of the ration.

PLAN OF THE EXPERIMENT

LAMBS USED

One hundred and fifty Colorado lambs were purchased on the Kansas City market at \$11.35 per hundredweight. These lambs had been run in the pea fields of the San Luis Valley in Colorado, and were the thin ones cut back from a band of pea-field lambs purchased by the packers. The lambs were shipped to Manhattan, December 20, 1923. They were divided into six lots of 25 head each, care being taken to have each lot as uniform in conformation, quality, and weight as possible.

From the time of their arrival in Manhattan until the start of the experiment, December 28, 1923, each lot was fed those feeds which it would receive during the experiment.

At the beginning of the experiment proper the lambs were weighed on three consecutive days, and the average of the three weights was taken as the initial weight. They were also weighed on three consecutive days at the close of the experiment, and the final weight determined in the same manner as the initial weight. Tables I and II report both the final weight at the feedlots and the selling weight at Kansas City.

QUARTERS PROVIDED

The lambs were quartered in an open shed facing the south, each lot of 25 lambs having access to 280 square feet of shed space. The lots outside the shed were each 100 by 13 feet. All lots had sufficient slope to give them adequate drainage, and weather conditions during the trial were such that the lots were fairly dry at all times. The lambs were hand fed in combination racks and had access to fresh water and salt at all times.

FEEDS FED

The shelled corn used in the trial was grade No. 3 mixed. The kafir was white kafir grown on the college farm. Four tons of the kafir heads threshed out 5,000 pounds of grain, and this ratio was used in determining the amount of grain fed those lambs receiving kafir heads.

The alfalfa used was of medium quality and a trifle "stemmy." The sweet clover hay was from first year's growth, having been sown with oats in early March. The oats were harvested, leaving a rather high stubble, and the sweet clover cut for hay later in the season. The hay contained a great deal of the stubble from the oats, and was otherwise of good quality and palatable. The Sudan grass hay was of good quality, not too coarse, and bright and clean. The cowpeas were cut when the pods were beginning to ripen. Cut at this stage the stems appeared coarse and woody, but the hay was readily eaten by the lambs.

FEEDING PLAN

Lot 1 was fed shelled corn and alfalfa hay; lot 2, shelled corn and sweet clover hay; lot 3, shelled corn and Sudan grass hay; lot 4, shelled corn and cowpea hay; lot 5, threshed kafir and alfalfa hay; and lot 6, kafir heads and alfalfa hay.

Previous experiments at this station have shown that the addition of a protein supplement to a hay and grain ration for fattening lambs slightly increases the gains and decreases the cost of gains, due to the stimulation of the appetite and the aid it gives to digestion. In this trial, however, no supplement was included, in order that a more accurate check might be made on the feeding value of the grains and roughages used.

At the start of the experiment, December 28, 1923, each lot of 25 lambs was receiving 8.25 pounds of grain and 40 pounds of hay daily. The ration was gradually increased, care being taken to see that the feed was cleaned up at each feeding. Half of the grain and

hay was given in the morning and the other half at night, regular feeding hours being observed.

The lambs were fed for a period of 44 days, being shipped on February 14 and marketed in Kansas City on February 15, 1924.

RESULTS OF THE EXPERIMENT

Table I shows in detail the results obtained in the comparison of the different roughages, and Table II, the results obtained in the comparison of the different concentrates.

TABLE I.—Relative efficiency of alfalfa, sweet clover, Sudan grass, and cowpea hays as roughages when fed with shelled corn to fattening lambs.

Lot No.....	1	2	3	4
Number of lambs in lot.....	25	25	25	25
Initial weight per lamb at feed lot.....	<i>Pounds</i> 75.07	<i>Pounds</i> 73.92	<i>Pounds</i> 73.00	<i>Pounds</i> 75.87
Final weight per lamb at feed lot.....	89.04	88.40	83.81	89.04
Gain per lamb based on feed-lot weights.....	13.97	14.48	10.81	13.17
Average daily gain per lamb at feed lot.....	.32	.33	.25	.30
Selling weight per lamb.....	85.20	84.80	80.40	86.80
Gain per lamb based on selling weights.....	10.13	10.88	7.40	10.93
Avg. daily gain per lamb based on selling weights.....	.23	.25	.17	.25
Average daily ration per lamb:				
Shelled corn.....	1.34	1.34	1.34	1.34
Alfalfa hay.....	1.45	1.45		
Sweet clover hay.....			1.45	
Sudan grass hay.....				1.45
Cowpea hay.....				
Feed required for 100 pounds gain based on feed-lot weights:				
Shelled corn.....	420.69	405.87	543.66	446.24
Alfalfa hay.....	456.69	440.61		
Sweet clover hay.....			590.19	
Sudan grass hay.....				484.43
Cowpea hay.....				
Selling price per head.....	\$12.27	\$12.00	\$10.93	\$12.02
Initial cost per head.....	8.52	8.39	8.29	8.61
Marketing cost per head.....	.45	.45	.44	.46
Cost of grain per head.....	.73	.73	.73	.73
Return per head for roughage.....	2.57	2.43	1.47	2.22
Return per ton for roughage.....	80.40	76.20	46.00	69.60
Relative efficiency of roughages based upon returns per ton.....	<i>Per cent</i> 100	<i>Per cent</i> 95	<i>Per cent</i> 56	<i>Per cent</i> 87

Price of feeds: Shelled corn, 70 cents per bushel; alfalfa hay, \$15 per ton; sweet clover hay, \$12 per ton; Sudan grass hay, \$8 per ton; and cowpea hay, \$10 per ton.
At the prevailing prices for feeds in this locality as above given, the average profit per lamb was as follows: Lot 1, \$2.08; lot 2, \$2.05; lot 3, \$1.21; and lot 4, \$1.90.

TABLE II.—Relative efficiency of shelled corn, threshed kafir, and unthreshed kafir heads when fed with alfalfa hay to fattening lambs.

Lot No.	1	5	6
Number of lambs in lot.	25	25	25
Initial weight per lamb at feed lot.	<i>Pounds</i> 75.07	<i>Pounds</i> 75.16	<i>Pounds</i> 75.09
Final weight per lamb at feed lot.	89.04	89.17	89.61
Gain per lamb based on feed lot weights.	13.97	14.01	14.52
Average daily gain per lamb at feed lot. ....	.32	.32	.33
Selling weight per lamb.	85.20	85.60	87.20
Average daily gain per lamb based on selling weights. ....	.23	.24	.28
Average daily ration per lamb:			
Shelled corn.	1.34		
Threshed kafir.		1.34	
Kafir heads (a).			(b) 2.15
Alfalfa hay.	1.47	1.45	1.45
Feed required for 100 pounds gain based on feed-lot weights:			
Shelled corn.	420.69		
Threshed kafir.		419.49	
Kafir heads (a).			(c) 657.12
Alfalfa hay.	465.85	455.39	489.39
Selling price per head.	\$12.27	\$11.98	\$12.21
Initial cost per head.	8.52	8.53	8.52
Marketing cost per head. ....	.45	.45	.46
Cost of roughage per head. ....	.48	.48	.48
Return per head for grain.	2.82	2.50	2.75
Return per bushel for grain.	2.69	2.41	2.58
Relative efficiency of grains based upon returns per bushel.	<i>Per cent</i> 100	<i>Per cent</i> 90	<i>Per cent</i> 96

(a) Kafir heads figured on basis of five-eighths grain.

(b) The equivalent of 1.34 pounds of grain.

(c) The equivalent of 410.7 pounds of grain.

Price of feeds: Shelled corn, 70 cents per bushel; threshed kafir, 70 cents per bushel; grain in kafir heads (5/8 of weight), 65 cents per bushel; alfalfa hay, \$15 per ton.

At the prevailing prices for feeds in this locality as above given the average profit per lamb was as follows: Lot 1, \$2.08; lot 5, \$1.78; lot 6, \$2.12.

All lots were fed in accordance with the appetite of the limiting lot, which in this instance was the one receiving shelled corn and Sudan grass hay. This lot apparently went on feed slower and consumed less feed than the other lots, but all lots were fed the same amount that the shelled corn and Sudan grass lot (lot 3) cleaned up.

Lot 5, receiving threshed kafir and alfalfa hay, had the best appetite of all. Lot 2, receiving corn and sweet clover hay, ranked second in this respect. Practically no difference was noticeable in the appetites of lot 1, receiving corn and alfalfahay; lot 4 receiving corn and cowpea hay; and lot 6, receiving kafir heads and alfalfa hay. Lot 3, receiving corn and Sudan grass hay, always had a poor appetite and took a great deal of time in cleaning up their feed,

Lot 6, receiving kafir heads and alfalfa, ate all the grain from the heads but did not eat the brush.

No sickness occurred in any of the lots,

SUMMARY AND CONCLUSIONS

The results indicate that corn and alfalfa are the best of the feeds used in this test for fattening lambs, due largely in this case to the higher degree of finish obtained by the use of these feeds and consequently the higher selling price.

The results indicate further that where it is not possible to use either corn or alfalfa there are other feeds which can be profitably used. The lot receiving corn and sweet clover hay made a larger daily gain in weight and required less grain and hay per 100 pounds gain than did the corn and alfalfa lot, but did not equal the latter lot in selling price, due to a lesser degree of finish.

Sudan grass hay proved to be an unsatisfactory roughage when fed with corn alone to fattening lambs, the Sudan-fed lot requiring more grain and hay per 100 pounds gain, making a small daily gain, and bringing a lower price per pound on the market than any of the other lots. The lot receiving corn and cowpea hay (lot 4) required slightly more hay and grain per 100 pounds gain than did either the corn and alfalfa lot or the corn and sweet clover lot. Lot 4, receiving corn and cowpea hay, also produced less finish and sold for less per pound.

Assuming alfalfa hay to be 100 per cent efficient, the relative efficiency of the other roughages, based upon the returns per ton from them, was: Sweet clover, 95 per cent; cowpea hay, 87 per cent; and Sudan grass hay, 56 per cent.

The lot receiving threshed kafir and alfalfa hay (lot 5) made the same daily gain, and required less feed per 100 pounds gain than did the corn and alfalfa lot (lot 1), but did not have the desirable degree of finish produced by the corn and alfalfa.

The kafir head and alfalfa lot (lot 6) required less feed per 100 pounds gain, and made a larger daily gain than either the corn and alfalfa or threshed kafir and alfalfa lots, though not equaling the corn and alfalfa lot in finish or selling price per hundred.

Assuming corn to be 100 per cent efficient as a grain for fattening lambs, the relative efficiency of the other grains, based on the returns per bushel from them was: Head kafir, 96 per cent; threshed kafir, 90 per cent.